
 California ISO	Reliability Coordinator Procedure	Procedure No. RC0460
		Version No. 1.0
		Effective Date 7/01/2019
Reliability Coordinator Area Restoration Plan		Distribution Restriction: None

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Purpose

Ensure that plans are established to enable effective coordination of the System restoration process, to maintain reliability during restoration, and to place priority on restoring the Interconnection.

1. Responsibilities

- Reliability Coordinator Operator
- Transmission Operators
- Balancing Authorities

2. Scope/Applicability

2.1 Background

This Plan was developed to establish the protocols that will be implemented to coordinate system restoration activities following a major system Disturbance¹. System restoration should progress through an orderly sequence of steps and communications with impacted Transmission Operators (TOPs), Balancing Authorities (BAs), and neighboring Reliability Coordinators (RCs), in order to facilitate the restoration of the RC Area and the Interconnection.

2.2. Scope/Applicability

Following a Disturbance in which one or more areas within the CAISO RC Area become isolated or blacked out, the CAISO RC System Operators will implement the CAISO RC restoration plan. The scope of the CAISO RC's restoration plan starts when either:

1. Blackstart Resources are utilized to re-energize a shutdown area of the Bulk Electric System (BES), or
2. Adjacent tie lines are utilized to re-energize a shutdown area of the BES, or
3. Separation has occurred between neighboring RCs, or
4. An energized island has been formed on the BES within the CAISO RC Area.

The scope of the CAISO RC's Restoration Plan ends when all the TOPs in the CAISO RC Area are interconnected, and the CAISO RC Area is interconnected to all of its neighboring RC Areas.²


The CAISO RC criteria for a TOP to transfer operations and authority back to its BA³ includes:

1. The TOP's restoration objectives have been met and,
2. The TOP's BA(s) have the ability to perform generation and demand balancing.

¹ EOP-006-3R1

² EOP-006-3R1

³ EOP-006-3 R1.6

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Entities that operate as a combined BA/TOP may not need to suspend the BA function during system restoration activities. In these cases, the entity shall notify the RC Operator when the TOP restoration objectives have been met and normal generation and demand balancing can resume. When returning to normal operations, the goals for all BAs should include resuming normal Interchange activities.

Note: Controlled local area islanding with an existing operating plan is exempt from plan activation.

3. Procedure Detail

3.1. Overall Coordination and Communication

The RC Operator implements its plan by coordinating the actions of the BAs and TOPs over a wide area. The wide-area view of the CAISO RC Area and the Western Interconnection gives the RC Operator the visibility to analyze the extent of the disturbance or event. Following a major Disturbance, the CAISO RC will coordinate with impacted entities to determine the best way to stabilize the remaining portion of the CAISO RC Area and the Western Interconnection, in order to efficiently restore and resynchronize any islands that may have been formed during the Disturbance, with the overall goal of restoring the integrity of the Interconnection.

Implementation of each TOP's restoration plan, in coordination with the RC Operator, will ensure the necessary coordination between impacted entities and will help to enable the expeditious restoration of the BES.

If the TOP's restoration plan cannot be implemented as expected because actual system conditions are different from studied conditions, the RC Operator shall use the RC restoration plan strategies, in coordination with the impacted entity's restoration priorities, to implement alternative actions for achieving system restoration. The RC Operator shall coordinate restoration activities, monitor restoration progress and coordinate any needed assistance until normal operations are resumed.

The RC Operators, TOPs, BAs and GOPs will follow established protocols using three-part communications for all Operating Instructions.⁴

3.2. RC Responsibilities


The RC Operator has the overall coordinating role during system restoration, to ensure that reliability of the BES is maintained during restoration, and that restoring the CAISO RC Area and impacted areas within the Western Interconnection has the highest priority. The RC Operator will consider the impacted area(s) to be in an operational emergency condition when any CAISO RC Area TOP has implemented their system restoration plan(s).

The RC Operator is the primary contact for disseminating information regarding restoration activities to neighboring RCs, and to TOPs and BAs within CAISO RC Area.⁵ RC Operators will be assigned to coordinate restoration activities for the affected area(s).

- Once the RC Operator is aware that the RC restoration plan may need to be implemented, the RC Operator will notify all BAs and TOPs of the initial system conditions, to the extent

⁴ COM-002-4 R5 and R6

⁵ EOP-006-3 R1.4, 1.5, 1.6

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known.

- The RC Operator will establish and maintain active communications between the RC and the TOPs and BAs regarding the status of the restoration effort, by using RC conference calls and the BA/TOP Messaging Tool.
- The RC Operator will request periodic updates throughout the restoration process and/or will establish mutually agreed-upon times when next communications should occur.
- The RC Operator will keep neighboring RCs informed of the current restoration efforts via the Reliability Coordinator Information System (RCIS) and the NERC Reliability Coordinator Hotline.⁶
- The RC Operator will work with CAISO Emergency Response support personnel to coordinate reporting to regulatory agencies and government agencies as applicable.⁷
- The RC Operator will communicate, coordinate and issue Operating Instructions directly to the TOPs and BAs.
- RC Operators, in coordination with RC Operations Engineers, will support TOPs and BAs by performing engineering studies as needed.

3.3. TOP Responsibilities


Each TOP within the CAISO RC Area shall have a Restoration Plan to re-establish its electric system in a stable and orderly manner in the event of a partial or total system shutdown. This section summarizes communication, coordination and reporting requirements for the TOPs⁸. TOPs will:

- Implement their restoration plans in coordination with the CAISO RC.
 - If a TOP is unable to implement its own Restoration Plan, then it will follow restoration strategies which should be consistent with the CAISO RC Strategies to Assess, Stabilize, Restore and Resynchronize.
- Make an effort to contact RC Operator to obtain system status and coordinate implementation of their respective restoration plan.
- Communicate if any automatic load shedding relays were triggered.
- Coordinate with their BA(s), if applicable, to determine if the BA function needs to be suspended. For example:
 - If the BA is unable to operate AGC due to inadequate frequency sources,
 - If insufficient generation remained online following an event,
 - If the BA is unable to schedule Interchange,
 - If the code of conduct needs to be suspended so the TOP can direct generation resources as needed, or
 - If there was a complete system shutdown and any other situation where the BA(s) have

⁶ EOP-006-3 R1.4

⁷ See EOP-004 and DOE OE-417 related procedures for details

⁸ EOP-006-3 R1.3

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lost the ability to balance generation and demand, and if the TOP needs to initiate frequency and voltage control for the impacted areas.

- Provide periodic updates to the RC Operator throughout the restoration process and establish mutually agreed-upon times when next communications should occur.
- Communicate with their BA(s) and GOPs to determine the status of the system and generating resources.
- Comply with Operating Instructions issued by an RC Operator unless such action cannot be physically implemented or would violate safety, equipment, regulatory or statutory requirements.
- Communicate and issue Operating Instructions to BAs, GOPs and DPs as needed.⁹
- Request permission or pre-approval from the RC Operator before initially synchronizing islands between adjacent TOPs or before paralleling systems between adjacent RC areas.
- Notify the RC Operator before synchronizing a TOP island with load greater than 500 MW within a single TOP area, unless preauthorized by the RC Operator to proceed.
- As an option, can provide current system conditions and status updates, which are transmitted to email, to subscribed GO/ GOPs via the BA/TOP Messaging Tool.

3.4. BA Responsibilities

During system restoration activities, BAs ensure that any remaining energized portion of the system, as well as energized islands and inerties to the Interconnection, are stable. This section summarizes communication, coordination and reporting requirements for the BAs¹⁰. BAs will:


- Coordinate, if applicable, with their TOP(s) to determine if the BA function needs to be suspended.¹¹ *Note: This may not be applicable to Entities that operate as a combined BA/TOP.*
- Comply with “Operating Instructions” issued by RC Operator unless such action cannot be physically implemented or would violate safety, equipment, regulatory or statutory requirements.
- Communicate and issue Operating instructions to TOPs, GOPs, and DPs as needed.¹²
- Coordinate with TOPs, GOPs, and DPs, as needed, to determine the status of the system and generation and notify the RC of the status. These activities may include but aren’t limited to:
 - Determining status of online and offline generation,
 - Determining status of transmission and generation facilities with scheduled outages in progress,
 - Evaluating proper AGC control mode,

⁹ TOP-001-4 R1 and R3

¹⁰ EOP-006-3 R1.3

¹¹ EOP-006-3 R1.6

¹² TOP-001-4 R2 and R4

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- Evaluating frequency sources, and
- Determining reserve requirements and availability:
 - Managing Interchange schedules (i.e. curtailing to zero MW on open ties),
 - Communicating with gas companies, and
 - Managing changes to load forecasts.
- As an option, can provide current system conditions and status updates, which are transmitted to email, to subscribed GO/ GOPs via the BA/TOP Messaging Tool.

3.5. RC Restoration Objectives

The primary goal of the CAISO RC System Restoration Plan is to safely restore the integrity of the Western Interconnection as efficiently as possible. Within the CAISO RC Plan, restoration objectives include:

- Restoration of off-site power to nuclear power plants,
- Interconnection of all TOPs within the CAISO RC Area,
- Transfer of authority from each TOP back to its respective BA, and
- Connection of the CAISO RC Area to all neighboring RC Areas.


3.6. RC Restoration Strategies

Following a major Disturbance, the CAISO RC Area may be totally or partially shut down, may contain isolated electrical islands consisting of load and generation, or may be separated from an adjacent RC Area. Under these conditions, the RC Operator expects that TOPs and BAs will take immediate action to stabilize their systems.

The RC Operator shall complete an initial assessment to determine whether the CAISO RC Restoration Plan should be implemented. If implementing the Restoration Plan, the restoration strategies¹³ below will be followed:

- Initial Assessment and Analysis,
- Stabilization,
- Restoration,
- Resynchronization and Restoration of the Interconnection, and
- Return to normal operations.


¹³ EOP-006-3 R1.1

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The high level process to follow after an event occurs can be summarized in the following criteria and actions:

Reliability Coordinator Actions
<p><i>Note: The following process includes criteria throughout each stage of the restoration process for sharing information regarding restoration with neighboring RCs and with TOPs and BAs within the RC Area.¹⁴</i></p> <p><u>Initial Assessment and Analysis</u></p> <ul style="list-style-type: none"> • Review system conditions immediately following the disturbance. • Conduct a detailed assessment of the CAISO RC Area to determine system conditions and extent of the outage(s): <ul style="list-style-type: none"> ○ Determine if electrical islanding has occurred and if so, identify the existing islands and their respective boundaries. ○ Determine if a portion of the CAISO RC Area has been shut down and if it can be restarted from an energized part of the system; or if cranking paths are available and Blackstart resources can be used. ○ Identify BAs and TOPs impacted by the disturbance and determine which TOPs must initiate their restoration plans to restore shut-down areas to service or to resynchronize energized islands. ○ Determine the status of transmission and generation facilities. ○ Determine status of system, including unavailable transmission facilities which cannot be returned to service in the near term, and impacts to local load loss. ○ Determine status of critical loads, such as nuclear generating stations and storage facilities, and as identified by the BAs and TOPs. ○ Determine status of communications systems – identify any issues such as cell towers, RTUs, or other systems which the RC, TOPs and BAs require for interpersonal communications and visibility. ○ Determine status of RAS, UFLS and other relay activations. ○ Determine status of ties and neighboring RC areas. ○ Identify voltage levels and frequency; and ○ Consider other factors which could impact restoration efforts, such as extreme weather, natural disasters, cyber security incident(s), or civil unrest. • Gather information to help determine cause of the Disturbance. • Conduct an assessment of adjacent BA, TOP and RC areas to determine system conditions. • Communicate with all BAs, TOPs and RCs to ensure situational awareness.

¹⁴ EOP-006-3 R1.4

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- Coordinate with BAs, TOPs and adjacent RCs to decide how best to approach restoring the system, based on system conditions.
- Communicate regional strategies and priorities for restoration within its footprint.


Stabilization

- Coordinate with TOPs to ensure their actions will help stabilize the system
- Determine actions necessary to stabilize and maintain reliable operations of the CAISO RC Area and/or of existing electrical islands.
- Ensure online generation and load are balanced to operate within established limits.
- Coordinate with TOPs to stabilize generators and maintain frequency in the range of at least 59.5 Hz to 60.5 Hz.
- Coordinate the identification of elements that are exceeding SOL limits, and coordinate adjustments.
- Coordinate with adjacent TOPs and BAs within the CAISO RC Area to ensure surrounding areas are taking actions to help stabilize and keep the remaining energized system intact.
- Coordinate to ensure appropriate levels of operating reserves are maintained
- Coordinate and approve TOP requests to restore load.
 - Consider if load restoration is needed for frequency and voltage control. Otherwise, load restoration is not a priority at this stage.
- Adjust, reconfirm and communicate regional restoration priorities for the RC Area and Interconnection.

Restoration

- Coordinate with impacted TOPs to identify and track restoration objectives and goals.
- Coordinate with TOPs to ensure they are able to implement their plans, which should include, but aren't limited to:
 - Provide off-site power requirements to nuclear power plants, as applicable;
 - Use Blackstart Resources as required to restore shut-down areas to service, with primary focus on providing start-up power to available generating units and restoring substation station service; and
 - Restore critical loads in accordance with TOP priorities.
- Coordinate with adjacent TOPs and BAs to determine if resources are available to assist with restoration effort.
- Perform and/or validate TOP's studies as needed, in coordination with RC Operations Engineer.
- Monitor system island voltage and frequency.

Note: *Some islands will be energized or operated at a reduced voltage due to*

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transient over-voltage concerns.

- Adjust, reconfirm and communicate regional restoration priorities, as needed, for the RC Area and Interconnection.


Resynchronize and Restore Interconnection

- Determine when it is appropriate to synchronize electrical islands and re-establish interconnections between TOPs within CAISO RC Area and with neighboring RCs.¹⁵
 - Determine if, once combined, the resulting island will be capable of sustaining all credible contingencies (i.e., operating in an N-1 secure state).
 - Ensure the TOPs have agreed to key operating parameters prior to proceeding:
 - Allowable frequency differences between the islands to be synchronized,
 - Allowable voltage phase angle differences between the islands to be synchronized,
 - Allowable voltage magnitude differences between the islands to be synchronized,
 - Which island will primarily be responsible for frequency regulation (i.e. – which island will utilize a generator(s) with 0% governor droop or which island will have AGC in service), and
 - Acceptable transfer limits and expected Interchange with the TOPs and BAs.
- Approve, communicate and coordinate the re-synchronization of system islands, and/or synchronizing points, so as not to cause a burden on adjacent TOPs, BAs, or RCs.
- Coordinate with TOPs to determine load pick-up limitation post connection.
- Coordinate with neighboring RCs to interconnect RC Areas.
- Notify all BAs and TOPs in the RC Area, and neighboring RCs, once synchronization has been accomplished.
- Coordinate load restoration with the affected BAs and TOPs.

Return to Normal Operations

- Declare and send out notification of return to normal operations, once the RC has achieved all objectives.
- Declare system emergency, or issue appropriate Energy Emergency Alert (EEA) as needed for any area still experiencing emergency condition - refer to “RC44xx System Emergencies”. The RC operator may elect to declare “No Touch” on specific TOP areas adjacent to TOP area that are still experiencing an emergency condition.

¹⁵ EOP-006-3 R1.2, 1.4

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3.7. System Restoration Scenarios

The RC Operator is responsible for the overall coordination of the system restoration, and shall identify the extent of the outages and impacted areas and notify all entities. The RC Operator will coordinate with the TOPs to maintain the energized portion of the transmission system within established line loadings, voltages and first contingency protections.

Several restoration scenarios are detailed below with actions and considerations for the RC and TOP operators:

- [Whole or partial transmission system islanding.](#)
- [Blackout Restoration using connection to an energized system, and](#)
- [Blackstart Restoration Energizing a De-energized System.](#)

Note: The following scenarios include criteria throughout each stage of the restoration process for sharing information regarding restoration with neighboring RCs and with TOPs and BAs within RC Area.¹⁶

3.7.1. Whole or Partial Transmission System Islanding

Assumptions:


- Major WECC RAS operation, UFLS event, any other combinations of relay activations,
- Multiple Islands exist that may have stabilized at a frequency other than 60 Hz, and
- Major transmission paths are available, BA functions have not been suspended.

Priorities:

- Resynchronization of electrical islands and restoration of the Interconnection.

Reliability Coordinator Actions
<p>Once the RC Operator has determined that islanded conditions exist within the RC Area, the RC Operator will inform all BAs and TOPs of the islanded condition.</p> <p><u>Perform initial assessment</u></p> <ul style="list-style-type: none"> • Assess initial conditions, boundaries and relative strengths of islands. • Determine if there are any voltage or stability concerns, including identification of any actual exceedances of both established limits and potential Interconnected Reliability Operating Limits (IROL) for the current conditions. • Confirm which mode of AGC operation (if any) each entity is using for each island. • Determine and adjust frequency control sources to ensure RC, BAs and TOPs are monitoring the same data. • Coordinate with impacted BAs to determine status of Operating and Contingency Reserves to confirm deliverability.

¹⁶ EOP-006-3 R1.4

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Stabilization

- Coordinate with BAs and TOPs to ensure each electrical islands are stable, with voltage and frequency within limits.
- Coordinate with adjacent BAs and TOPs within CAISO RC area and adjacent RC areas to analyze reliability impacts and ensure entities consider cutting schedules and adjusting limits, and are responding to large ACE deviations.


Resynchronization and Restoration of the Interconnection:

- Determine when it is appropriate to synchronize electrical islands and re-establish interconnections between TOPs within CAISO RC Area and with neighboring RCs.¹⁷
 - Determine if, once combined, the resulting island will be capable of sustaining all credible contingencies (i.e., operating in an N-1 secure state)
 - Ensure the TOPs have agreed to key operating parameters prior to proceeding:
 - Allowable frequency differences between the islands to be synchronized,
 - Allowable voltage phase angle differences between the islands to be synchronized,
 - Allowable voltage magnitude differences between the islands to be synchronized, and
 - Which island will primarily be responsible for frequency regulation (i.e. – which island will utilize a generator(s) with 0% governor droop or which island will have AGC in service).
- Verify acceptable transfer limits and expected Interchange with the TOPs and BAs.
- Approve, communicate and coordinate the re-synchronization of system islands, and/or synchronizing points so as not to cause a burden on adjacent TOPs, BAs, or RCs
- Coordinate load restoration with the affected BAs and TOPs
- Coordinate with neighboring RCs to interconnect RC Areas.
- Notify all BAs and TOPs in the RC Area, and neighboring RCs, once synchronization has been accomplished.

Return to Normal Operations:

- Declare and send out notification of return to normal operations once all of the RC's objectives have been achieved.
- Declare a System Emergency or issue appropriate Energy Emergency Alert (EEA), as needed, for any area still experiencing emergency condition – refer to “RC44XX System Emergencies”. The RC Operator may elect to declare “No Touch” on specific TOP areas adjacent to the TOP area still experiencing an emergency condition.

¹⁷ EOP-006-3 R1.2, 1.4

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3.7.2. Blackout Restoration using Connection to an Energized System


Assumptions:

- One or more TOPs in the CAISO RC Area have experienced a blackout condition.
- The restoration can be accomplished through the connection to another energized system.

Priorities:

- If nuclear generation stations or storage facilities within the CAISO RC Area have lost access to off-site power, the RC Operator shall coordinate with the affected TOPs to give top priority to restoration of off-site power to the affected nuclear stations.
- Use Blackstart Resources as required to restore shut-down areas to service, with primary focus on providing start-up power to available generating units and restoring station service at critical substations.
- Restore critical loads in accordance with TOP priorities.
- Resynchronize electrical islands and restore the Interconnection.

Reliability Coordinator Actions
<p>Once it's been determined that a portion of the RC Area is shut down, the RC Operator will inform all BAs and TOPs of the shut-down area, and will request emergency assistance from adjacent TOP, BA and RC areas.</p> <p><u>Perform initial assessment</u></p> <ul style="list-style-type: none"> • Conduct an assessment of adjacent BA, TOP and RC areas to determine system conditions. • RC Operator will communicate to all BAs, TOPs and RCs to ensure situational awareness. • Coordinate with BAs and TOPs to discuss how best to approach restoring the shutdown area, based on system conditions. • RC Operator shall communicate regional strategies within its footprint, as well as priorities for restoration, after coordination with adjacent RCs. <p><u>Stabilization</u></p> <ul style="list-style-type: none"> • Coordinate with adjacent BA and TOP areas to analyze reliability impacts – remind entities to consider schedule cut, adjusting limits, large ACE deviation, etc. • Coordinate the identification of elements that are exceeding SOL limits and coordinate adjustments. • Coordinate with adjacent TOPs and BAs to ensure surrounding areas are taking actions which help stabilize and keep remaining energized system intact. Ensure actions do not adversely impact restoration efforts. <p><u>Restoration</u></p> <ul style="list-style-type: none"> • Coordinate with BA and TOP areas adjacent to shut-down area, to evaluate possibility of using energized Tie lines to meet restoration priorities, and if able, follow RC priorities

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and strategies.

- Declare system emergencies for energy and/or transmission, as necessary, and coordinate with adjacent BAs and TOPs to call on additional resources to assist in restoration efforts.
- Monitor tie line flows and ensure all elements are operating within established limits.
- Issue appropriate Operating Instruction to adjacent BA and TOP areas.
- Ensure TOP follows all restoration principles for establishing and stabilizing an electrical island.
- Ensure restoration strategies are followed when TOPs deviate from their plan.

Paralleling

Coordinate with TOPs to parallel or synchronize with adjacent systems.¹⁸

- Communicate, coordinate and approve the paralleling or re-synchronizing of system, including paralleling and synchronizing points.
- Coordinate with Reliability Coordinator Operations Engineer to facilitate studies to determine closing angles and potential system impacts.
- Coordinate dispatch of generating resources to reduce closing angles, as needed to facilitate paralleling.
- If synchronizing is required, refer to RC Procedure attachment RC0460E Synchronization Checklist.

Return to Normal Operations:

- Notify all BAs and TOPs in the RC Area, and neighboring RCs once paralleling has been accomplished.¹⁹
- Declare and send out notification of return to normal operations once all of the RC's objectives have been achieved.
- Declare system emergency or issue appropriate Energy Emergency Alert (EEA), as needed, for any area still experiencing emergency condition - refer to RC44xx System emergencies. The RC operator may elect to declare "No Touch" on specific TOP areas adjacent to TOP area still experiencing an emergency condition.


3.7.3. Blackstart Restoration Energizing a De-energized System

Assumptions:

- Restoration will use individual TOP Blackstart restoration plans in coordination with the RC Operator.
- Blackstart generators and cranking paths have been identified in the TOP restoration plan.

¹⁸ EOP-006-3 R1.2

¹⁹ EOP-006-3 R1.4

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- TOPs can begin restoration activities that do not affect the Interconnection.

Priorities:

- Coordinate with TOPs to start islands with the most direct paths to impacted nuclear plants and other high priority areas.
 - If the nuclear plants have lost off-site power, anticipate that TOPs will work to restore off-site power as quickly as possible.

Reliability Coordinator Actions
<p>Once it's been determined that the RC Area, or a portion thereof, is shut down, the RC Operator will inform all BAs and TOPs.</p> <p><u>Perform Initial Assessment</u></p> <ul style="list-style-type: none"> • Coordinate with the TOPs and adjacent RCs to determine the boundaries of the shut-down area and its effect on the Interconnection. • Coordinate with the TOPs and adjacent RCs to assess initial conditions and availability of blackstart resources and cranking paths. • Ensure BAs and TOPs understand roles and responsibilities during the restoration process. • Coordinate with TOPs and BAs to confirm system visibility and control. • Communicate to BAs and TOPs that impacted entities are implementing their plans; and provide an update regarding the wider area system status and energized areas. • Coordinate with TOPs to confirm status of interties (i.e. open breakers, busses, etc.). <p><u>Stabilization</u></p> <ul style="list-style-type: none"> • Monitor established islands to ensure they are stable and are operating within acceptable voltage and frequency limitations. <p><u>Restoration</u></p> <ul style="list-style-type: none"> • Request periodic updates throughout the restoration process and/or establish mutually agreed-upon times when next communications should occur. Conference calls should include time zone for call(s). <ul style="list-style-type: none"> ○ Conference calls may be established by area, as needed, for different milestones throughout the restoration process. • Coordinate with TOPs to determine status of blackstart restoration processes. • Coordinate with TOPs to receive updates as restoration milestones are achieved. <p><u>Resynchronization and Restoration of the Interconnection</u></p> <ul style="list-style-type: none"> • Determine when it is appropriate to synchronize electrical islands and re-establish interconnections between TOPs within CAISO RC Area and with neighboring RCs.²⁰

²⁰ EOP-006-3 R1.2, 1.4

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- Determine if, once combined, the resulting island will be capable of sustaining all credible contingencies (i.e., operating in an N-1 secure state).
- Ensure the TOPs have agreed to key operating parameters before proceeding:
 - Allowable frequency differences between the islands to be synchronized,
 - Allowable voltage phase angle differences between the islands to be synchronized,
 - Allowable voltage magnitude differences between the islands to be synchronized, and
 - Which island will primarily be responsible for frequency regulation (IE – which island will utilize a generator(s) with 0% governor droop or which island will have AGC in service).
- Approve, communicate and coordinate the re-synchronization of system islands, and/or synchronizing points so as not to cause a burden on adjacent TOPs, BAs, or RCs.
- Verify acceptable transfer limits and expected Interchange with the TOPs and BAs.
- Coordinate load restoration with the affected BAs and TOPs.
- Coordinate with neighboring RCs to interconnect RC Areas.
- Notify all BAs and TOPs in the RC Area, and neighboring RCs, once synchronization has been accomplished.²¹
- Coordinate load restoration with the affected BAs and TOPs.

Return to Normal Operations


- Notify all BAs and TOPs in the RC Area, and neighboring RCs once paralleling has been accomplished.
- Declare and send out notification of return to normal operations once all of the RC's objectives have been achieved.
- Declare system emergency or issue appropriate Energy Emergency Alert (EEA), as needed, for any area still experiencing emergency condition - refer to "RC44xx System Emergencies". The RC operator may elect to declare "No Touch" on specific TOP areas adjacent to TOP area still experiencing an emergency condition.

3.8. Post-Restoration: Returning to Normal Operations

Assumptions:

- All CAISO RC Area TOPs that have the capability to be interconnected are interconnected and operating synchronously.
- The RC Operator has verified that the CAISO RC Area BES is in a stable state.

²¹ EOP-006-3 R1.4

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- The RC Operator has verified with all CAISO RC Area BAs and TOPs that they are ready to return to normal operations.
- The RC Operator has verified the status of neighboring RC Areas, and has confirmed that those entities are ready to return to normal operations mode with RC Area operating entities.
- Actual BES line flows and contingency analysis results should indicate that the BES is operating within applicable System Operating Limits (SOLs) and Interconnected Reliability Operating Limits (IROLs).
- TOPs have transferred operations and authority back to their respective BAs²².

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Communicate with all CAISO RC Area BAs and TOPs (or their designated agent) and verify the status of their systems and readiness to return to normal operations. • Contact adjacent RCs to verify that they are ready to resume normal operations with the CAISO RC Area's operating entities. • Issue a message via the BA/TOP Messaging Tool and RCIS messaging systems announcing a return to normal operations.

3.9. TOP System Restoration Plan Review

Each TOP within the CAISO RC Area shall have a Restoration Plan to re-establish its electric system in a stable and orderly manner in the event of a partial or total shutdown of its system.

The CAISO RC shall review the System Restoration Plans for TOPs within its Reliability Coordinator Area²³. The CAISO Operations Compliance team shall work in conjunction with the RC to facilitate reviews of the System Restoration Plans submitted by TOPs.

The CAISO RC shall work with each TOP to develop a mutually-agreed, predetermined annual review schedule.²⁴ If the TOP needs to modify the annual schedule or submit a change between annual reviews, they shall contact operationscompliance@caiso.com.

Each TOP shall submit its revised Restoration Plan to CAISO RC for approval, when the revision would change its ability to implement its Restoration Plan, as follows²⁵:

- Within 90 calendar days after identifying any unplanned permanent BES modifications, or
- Prior to implementing a planned permanent BES modification subject to its Reliability Coordinator approval requirements per EOP-006.


The CAISO RC shall provide a secure website where TOPs may upload System Restoration Plans for RC review. The TOPs shall upload/email the document(s) with a completed RC Procedure attachment RC0460F EOP-005 Plan Review Checklist.

²² EOP-006-3 R1.6

²³ EOP-006-3 R5

²⁴ EOP-005-3 R3

²⁵ EOP-005-3 R4, 4.1, 4.2

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Within 30 calendar days of receipt²⁶, the CAISO RC shall:

- Review each submitted Restoration Plan on the basis of compatibility and inter-dependency with other TOPs' restoration plans,
- Review each plan to ensure consistency with the RC's restoration plan,
- Review each plan to ensure consistency with the requirements in EOP-005-3, and
- Notify each submitting TOP of the results of its review, specifying any time frame for resubmittal of its restoration plan if revisions are identified.
- Each TOP shall address any reliability risks identified by the CAISO RC and resubmit its Restoration Plan to CAISO RC within the specified time period.
- CAISO RC will post an approval letter to the secure site upon completion of the review process, and notify the submitting TOP entity.

4. Supporting Information


Operationally Affected Parties

Shared with Public.

References

NERC Requirements	EOP-006-3 EOP-005-3 TOP-001-4 R1, R3 TOP-001-4 R2, R4 COM-002-4 R5, R6
Procedure References	CAISO RC0130 - Notification Requirements for Real-Time Events CAISO RC0330 - Coordination with Neighboring RCs CAISO RC0410 - System Emergencies CAISO RC0420 - Event Reporting CAISO RC9000 - Open Loop Guideline

²⁶ EOP-006-3 R5.1

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Definitions

The following terms capitalized in this Operating Procedure are in accordance with the NERC Glossary, and/or otherwise when used are as defined below:

Term	Description
Disturbance	<ol style="list-style-type: none"> 1. An unplanned event that produces an abnormal system condition. 2. Any perturbation to the electric system. 3. The unexpected change in ACE that is caused by the sudden failure of generation or interruption of load.
Blackstart Resources	A generating unit(s) and its associated set of equipment which has the ability to be started without support from the System or is designed to remain energized without connection to the remainder of the System, with the ability to energize a bus, meeting the Transmission Operator's restoration plan needs for Real and Reactive Power capability, frequency and voltage control, and that has been included in the Transmission Operator's restoration plan.

Version History

Version	Change	Date
1.0	Approved by Steering Committee.	10/16/18

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		Version No.	1.0
		Effective Date	7/01/2019
Reliability Coordinator Area Restoration Plan		Distribution Restriction: None	

5. Periodic Review Procedure

Review Criteria & Incorporation of Changes

Reviewer shall ensure that the procedure is consistent with the requirements in EOP-006-3.

Due to the nature of the content in the Appendices, the CAISO RC may incorporate changes into the affected attachments as needed in order to be consistent with the TOP Plans. These attachments may be re-published without reissuing the parent RC0460 – Reliability Coordinator Area Restoration Plan document.

This plan shall be reviewed by neighboring Reliability Coordinators. Each neighboring RC shall have 60 days to review and provide written notification of any conflicts discovered during that review to operationscompliance@caiso.com.²⁷ If either RC finds conflicts between its restoration plans and any of its neighbors, the conflicts shall be resolved within 30 calendar days of receipt of written notification.²⁸

Frequency

This plan shall be reviewed within 13 calendar months of the last review.²⁹

Distribution

At a minimum, the plan shall be distributed to each of the CAISO TOPs, BAs and neighboring RCs within 30 calendar days of creation or revision.³⁰ Prior to the effective date of this plan, the CAISO RC shall have a copy of its latest restoration plan and copies of the latest approved restoration plan of each TOP in its RC Area available to its RC Operators within both control rooms in Folsom and Lincoln.³¹

Appendix

- RC0460A – Restoration Principles
- RC0460B – Whole or Partial Transmission System Islanding Checklist
- RC0460C – Blackout Restoration Using Connection to Energized System Checklist
- RC0460D – Blackout Restoration Energizing a De-energized System Checklist
- RC0460E – Synchronizing Checklist
- RC0460F – EOP-005 Plan Review Checklist

²⁷ EOP-006-3 R4

²⁸ EOP-006-3 R4.1

²⁹ EOP-006-3 R3

³⁰ EOP-006-3 R2

³¹ EOP-006-3 R6