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		Version No.	1.1
		Effective Date	7/01/2019
System Emergencies		Distribution Restriction: None	

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Purpose

Provide guidance on mitigating transmission system operating Emergencies; Capacity and Energy Emergencies; and extreme weather and environmental Emergencies. Provide the RC's philosophy on load shedding.

1. Responsibilities

- Reliability Coordinator Operator
- Operations Compliance Support

2. Scope/Applicability

- Reliability Coordination during *Bulk Electric System (BES) Emergencies* or during conditions or events that could result in *Adverse Reliability Impact* on the BES.
 - As defined in the NERC Glossary, a BES Emergency is any abnormal system condition that requires automatic or immediate manual action to prevent or limit the failure of transmission facilities or generation supply that could adversely affect the reliability of the BES.
 - In addition, the NERC Glossary defines Adverse Reliability Impact as the impact of an event that results in frequency-related instability; unplanned tripping of load or generation; or uncontrolled separation or cascading outages, that affects a widespread area of the Interconnection.

3. Procedure Detail

3.1. Capacity and Energy Emergencies


Each Balancing Authority (BA) shall develop, maintain, and implement an RC-reviewed Operating Plan to mitigate Capacity and Energy Emergencies within its Balancing Authority Area¹. During a BA Capacity or Energy Emergency, the RC operator will declare an Energy Emergency Alert (EEA) for the affected entity. This may be at the request of the BA, or when deemed necessary in the judgment of the RC operator.

There are three levels of EEAs and an additional termination level². It is not necessary to progress through the levels sequentially, and the RC operator should use good judgment in declaring the level best defined by the criteria. Public appeals for conservation or demand response programs under contractual agreements during normal operations do not qualify as EEA triggering events.

Following the activation of Contingency Reserves, a BA or Reserve Sharing Group (RSG) must recover Contingency Reserves within 60 minutes following an event requiring activation. If there is an additional event that takes place during this recovery period, the 60-minute recovery period resets. The RC operator should **not** declare an EEA for a BA during this recovery period unless

¹ EOP-011-1 R2

² Attachment 1-EOP-011-1 B.

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requested by the BA, or if the RC operator, after consultation with the BA, has reason to believe that the BA will not be able to recover their Contingency Reserves within the recovery period.

3.1.1. EEA 1 – All Available Generation in Use

A BA is considered to be in EEA 1 when all available generation resources are in use and/or:

- The BA is experiencing conditions where all available generation resources are committed to meet firm Load, firm transactions, and reserve commitments, and is concerned about sustaining its required Contingency Reserves.
- Non-firm wholesale energy sales (other than those that are recallable to meet reserve requirements) have been curtailed³.

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Declare an <i>EEA 1</i> for the affected entity <i>upon discussion</i> with BA and the situation meets the above criteria. • Issue an <i>alert</i> to all impacted entities <i>without delay</i>, but not longer than within 30 minutes from time of the declaration⁴: <ul style="list-style-type: none"> ○ Notify all BAs and TOPs in the RC Area via the Grid Messaging System (GMS). ○ Notify neighboring RCs via RCIS. ○ Notification should include the name of the BA, the EEA level, and if necessary, contact information that other BAs can use to provide emergency assistance. • Assist BA in finding <i>emergency assistance</i> from neighboring BAs if necessary. • Review all current outages which constrain generation. Discuss with BA/TOP the possibility of an emergency return of the outages to service. • Discuss if additional Contingency Reserves available within the RSG can be used, if the entity is in an EEA and is a member of a RSG. A RSG may allow additional reserves to be used if the BA is, or would otherwise be, in an EEA. Ensure adequate transmission is available for delivery.

3.1.2. EEA 2 – Load Management Procedures in Effect


A BA is considered to be in EEA 2 when load management procedures are in effect and/or:

- The Balancing Authority is no longer able to provide its expected energy requirements and is an energy-deficient Balancing Authority.
- An energy-deficient Balancing Authority has implemented its Operating Plan(s) to mitigate Emergencies.
- An energy-deficient BA is still able to maintain minimum Contingency Reserve requirements⁵.

³ Attachment 1-EOP-011-1 Section B-1

⁴ EOP-011-1 R5.

⁵ Attachment 1-EOP-011-1 Section B-2

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Once an EEA 2 has been declared, the BA should provide periodic updates to the RC operator at a minimum of every hour until the EEA2 has been terminated⁶.

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Declare an <i>EEA 2</i> for the affected entity, <i>upon discussion</i> with BA, and the situation meets the above criteria. • Issue an <i>alert</i> to all impacted entities <i>without delay</i>, but not longer than within 30 minutes from time of the declaration: <ul style="list-style-type: none"> ○ Notify all BAs and TOPs in the RC Area via GMS. ○ Notify neighboring RCs via RCIS. ○ Notification should include the time of declaration, the BA name, the EEA level, and contact information that other BAs can use to provide emergency assistance. • Assist BA in finding <i>emergency assistance</i> from neighboring BAs. • Update RCIS and GMS with any changes in information. • Review Transmission <i>outages</i> and work with TOPs for viability of returning transmission elements that may relieve loading on SOLs or IROLs for the possibility of energy delivery. • Discuss if additional Contingency Reserves available within the RSG can be used if the entity is in an EEA, if the BA is a member of a RSG. A RSG may allow additional reserves to be used if the BA is in or would otherwise be in an EEA. Ensure adequate transmission is available for delivery.

3.1.3. EEA 3 – Firm Load Shedding Imminent or in Progress

A BA is considered to be in an EEA 3 condition when firm load interruption is imminent or in progress and the energy-deficient BA is unable to meet minimum Contingency Reserve requirements.

Before requesting an EEA 3, the energy-deficient BA must make use of all available resources; this includes, but is not limited to:

- Ensuring all available generation units are online and all generation capable of being on line within the time frame of the Emergency is on line.
- Activating Demand-Side Management within provisions of any applicable agreements.⁷


The energy-deficient BA is responsible for updating the RC operator at a minimum of every hour until the EEA 3 is terminated⁸.

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Declare an <i>EEA 3</i> for the affected entity <i>upon discussion</i> with BA and the situation meets the above criteria.

⁶ Attachment 1-EOP-011-1 Section B-2.2 (applicable to BA)

⁷ Attachment 1-EOP-011-1 Section B-2.5

⁸ Attachment 1-EOP-011-1 Section B-3.2 (applicable to BA)

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Reliability Coordinator Actions
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- **Continue** actions initiated during the *EEA 2*.
- **Issue** an *alert* to all impacted entities *without delay*, but not longer than 30 minutes from time of the declaration:
 - Notify all BAs and TOPs in the RC Area via GMS.
 - Notify neighboring RCs via RCIS.
 - Notification should include the name of the BA, the EEA level, and contact information that other BAs can use to provide emergency assistance.
- **Discuss** if additional Contingency Reserves available within the RSG can be used if the entity is in an EEA, if the BA is a member of a RSG. A RSG may allow additional reserves to be used if the BA is, or would otherwise be, in an EEA. Ensure adequate transmission is available for delivery.
- **Update** RCIS and GMS with any changes in information.
- **Evaluate** the risks of *revising SOLs* and *IROLs* for the possibility of delivery of energy to the energy-deficient BA. This must be coordinated with other RCs with agreement from the responsible TOP.
- **Notify** internal parties to ensure the appropriate report is submitted per RC0420 - Event Reporting procedure.

3.1.4. EEA 0 - Termination

When the energy-deficient BA is able to meet its Load and Operating Reserve requirements, it shall request the Reliability Coordinator Operator to terminate the EEA.


Reliability Coordinator Actions
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- **Confirm** with BA that it meets the criteria for EEA Termination.
- **Notify** all *BAs* and *TOPs* in the RC Area via GMS of the termination.
- **Notify** neighboring *RCs* via RCIS of termination.

3.1.5. EEA Templates

When declaring an EEA, the RC operator may use the following templates. Include any additional information as necessary.

- Subject: EEA [1,2, or 3] Declaration
 - Effective XXXX PPT, the California ISO Reliability Coordinator has declared an EEA-[1, 2, or 3] for [entity and/or entity area (if applicable)]. Please contact them at (XXX) XXX-XXXX if you can provide them with emergency assistance.
- Subject: EEA 0 Declaration
 - Effective XXXX PPT, the California ISO Reliability Coordinator has declared an EEA-0 for [entity and/or entity area (if applicable)].

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3.2. Transmission System Emergencies

TOPs are expected to have Operating Plans reviewed by the RC entity to mitigate transmission system Emergencies in their area, and to notify the RC operator in real-time when the TOP is experiencing an Emergency⁹. A Transmission system Emergency may include, but is not limited to:

- An actual or potential IROL exceedance,
- An actual or potential SOL exceedance with potential Adverse Reliability Impacts,
- Unacceptable voltage levels,
- Loss of reactive reserves,
- Loss or potential loss of transmission elements due to fires, earthquakes, storms, physical attacks, vandalism or other reasons,
- A single or credible multiple Contingency will result in instability, uncontrolled separation, or cascading outages that adversely impact the reliability of the BES,
- System separation or islanding,
- Extraordinary Contingency, and
- Any other transmission event that result in Adverse Reliability Impact.


When the RC operator receives a notification from a TOP of an Emergency on the transmission system:

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Confirm the <i>Emergency condition</i> in collaboration with the affected TOPs • Actively evaluate system <i>conditions</i> and determine <i>mitigation</i> options in coordination with TOPs contributing to and/or affected by the condition. TOP Operating Plans include (but not limited to) mitigation options¹⁰ such as: <ul style="list-style-type: none"> ○ Cancelling or recalling transmission and generation outages, ○ Reconfiguring transmission system, ○ Re-dispatching generation, and ○ Operator-controlled manual load shedding that minimizes overlap with automatic load shedding, and is capable of being implemented in a timeframe for mitigating the Emergency. • Refer to CAISO RC0460 - System Restoration if electrical <i>islanding</i> has occurred. • Determine if there are any <i>SOL</i> or <i>IROL exceedances</i>. Refer to CAISO-RC0310 - Mitigating SOL and IROL Exceedances. • Issue an <i>alert, without delay</i>, to all impacted entities, but not longer than within 30 minutes¹¹. <ul style="list-style-type: none"> ○ Notify all BAs and TOPs in the RC Area via GMS.

⁹ EOP-011-1 R1 (applicable to TOP)

¹⁰ EOP-011-1 R1.2 (applicable to TOP)

¹¹ EOP-011-1 R5.

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Reliability Coordinator Actions
<ul style="list-style-type: none"> ○ Notify neighboring RCs via RCIS. ● Consider initiating a <i>conference</i> call if the condition affects multiple entities and if a conference call will expedite coordination efforts. ● Coordinate <i>mitigation</i> activities with affected TOPs and determine if an <i>Operating Instruction</i> is needed. ● Coordinate with BAs, TOPs and neighboring RCs that may be able to provide <i>assistance</i>. ● Issue <i>Operating Instructions</i> without delay, in accordance with Section 3.4: Operating Instructions, and Section 3.5: Load Shedding Instructions. ● Monitor system <i>conditions</i> to determine if the instructed <i>actions</i> were implemented, and whether the transmission Emergency will be resolved in a timely manner. ● Issue <i>additional Operating Instructions</i> if needed. ● Issue <i>notification</i> to all impacted entities once Emergency condition has been mitigated and the system is stable: <ul style="list-style-type: none"> ○ Notify all BAs and TOPs in the RC Area via GMS. ○ Notify neighboring RCs via RCIS. ● Log a summary of all <i>communications</i> and <i>actions</i>.

3.3. Extreme Weather Emergencies

BAs and TOPs are expected to have Operating Plans (reviewed by the RC entity) that address the reliability impacts of extreme weather in their area. They are also required to notify the RC operator in Real-time when experiencing such an Emergency¹². Extreme weather Emergencies may include, but are not limited to:

- Unanticipated high loading due to high or low temperatures,
- Wind/rain storms,
- Thunderstorms,
- Tsunamis,
- Hurricanes,
- Floods,
- Snow, and
- GMDs (See RC0430 - GMD Operating Plan).

¹² EOP-011-1 R1.2.6, R2.2.9 (applicable to TOP and BA respectively)


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When the RC operator receives a notification from a BA or TOP of an Emergency due to extreme weather:

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Issue an <i>alert without delay</i> to all impacted entities, but not longer than within 30 minutes¹³. <ul style="list-style-type: none"> ○ Notify all BAs and TOPs in the RC Area via GMS. ○ Notify neighboring RCs via RCIS. • Actively evaluate system <i>conditions</i> and determine <i>mitigation</i> options in coordination with the affected BAs/TOPs. BA/TOP Operating Plans include (but not limited to) mitigation options¹⁴ such as: <ul style="list-style-type: none"> ○ Cancelling or recalling transmission and generation outages, ○ Reconfiguring transmission system, ○ Re-dispatching generation, ○ Shedding operator-controlled manual load that minimizes overlap with automatic load shedding, and is capable of being implemented in a timeframe for mitigating the Emergency, ○ Requesting EEAs (Refer to Section 3.1: Capacity and Energy Emergencies), ○ Managing generation to address capability and availability, fuel and inventory concerns, fuel and switching capabilities, and environmental constraints, ○ Submitting public appeals for voluntary load reductions, ○ Requesting government agencies to implement their programs to achieve necessary energy reductions, ○ Instructing a reduction of internal utility energy use, and ○ Using interruptible load, curtailable load and demand response. • Refer to Section 3.2: Transmission System Emergencies if the weather Emergency is affecting the transmission system. • Refer to Section 3.1: Capacity and Energy Emergencies if the weather Emergency creates capacity or energy issues. • Monitor <i>weather</i> and <i>forecast</i> tools to determine the effect of current and projected conditions. • Coordinate <i>mitigation</i> activities with affected BAs and TOPs and determine if an <i>Operating Instruction</i> is needed. • Issue <i>Operating Instructions</i> without delay, in accordance with Section 3.4: Operating Instructions, and Section 3.5: Load Shedding Instructions.

¹³ EOP-011-1 R5.

¹⁴ EOP-011-1 R1.2 (applicable to TOP)

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Reliability Coordinator Actions
<ul style="list-style-type: none"> • Issue notification to all impacted entities when the Emergency condition has been mitigated and the system is back to normal: <ul style="list-style-type: none"> ○ Notify all BAs and TOPs in the RC Area via GMS. ○ Notify neighboring RCs via RCIS. • Log a summary of all communications and actions.

3.4. Operating Instructions


During system Emergencies, the RC operator will actively evaluate system conditions, coordinate mitigation activities with the affected BAs/TOPs and determine if there is a need to issue an Operating Instruction.

During a system Emergency, take the following actions:

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Actively evaluate system <i>conditions</i> and determine possible <i>mitigation</i> options • Coordinate with affected <i>BA/TOP</i> to determine if the potential <i>mitigation</i> is viable. <ul style="list-style-type: none"> ○ If not, advise the <i>BA/TOP</i> of <i>alternate</i> or additional <i>mitigation</i> options. • Evaluate the <i>mitigation</i> in <i>progress</i> to determine if the Emergency condition will be resolved in a timely manner. • Issue an <i>Operating Instruction</i> without delay if the actions being taken are not adequate or will not resolve the condition in a timely manner. (Refer to CAISO RC0110 - Communications Protocols.) <ul style="list-style-type: none"> ○ If load shedding is required, refer to Section 3.5 - Load Shedding . • Monitor system <i>conditions</i> to determine if the instructed <i>actions</i> were implemented and whether the issues will be resolved in a timely manner. • Issue <i>additional Operating Instructions</i> if needed. • Log a summary of all <i>communications</i> and <i>actions</i>.

3.5. Load Shedding Instructions

Load shedding should be considered a last resort to mitigate reliability issues that occur in Real-time. All appropriate mitigation options should first be explored as time allows, including timely demand-side management or load transfer, before issuing an Operating Instruction to shed firm load. However, during Emergency situations or during situations or events with the potential to result in Adverse Reliability Impact, the RC operator may determine that other mitigation actions will not be adequate or would not resolve the issue in a timely manner. In such cases, the RC operator should consider issuing an Operating Instruction to shed firm load.

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3.5.1. Situations that May Require Load Shedding

The RC operator should consider issuing an Operating Instruction to shed load, when:

- A single or credible multiple Contingency will result in cascading outages, instability or voltage collapse,
- An IROL exceedance is unlikely to be mitigated within 30 minutes or T_V ,
- Potential Adverse Reliability Impact due to generation/load imbalance caused by large sustained ACE or frequency excursion, EEA, etc., or
- Following Real-time Assessment, it is unclear whether the system can sustain the next single or credible multiple Contingency.

When the RC operator determines that one of the above Emergency conditions exists and load shedding is being considered as an option:


Reliability Coordinator Actions
<ul style="list-style-type: none"> • Perform Real-time <i>Assessments</i> in collaboration with the <i>RTOE</i> to <i>validate</i> the reliability issue, if time allows. • Confirm results with the affected BAs, TOPs and neighboring RCs. • Operate <i>conservatively</i> if there is disagreement in study results between entities <ul style="list-style-type: none"> ○ If there is disagreement with a neighboring RC on the IROL or T_V for a shared facility, operate to most limiting IROL or T_V.¹⁵ • Discuss mitigation <i>options</i> with the affected BAs/TOPs and determine if those options can resolve the issue in a timely manner • Evaluate <i>effectiveness</i> of mitigation in progress to determine if the condition will be resolved in timely manner • Determine whether <i>post-Contingency</i> automatic or manual mitigation <i>actions</i> are available or acceptable • Issue an <i>Operating Instruction</i> to shed load, if other mitigation actions will not resolve the issue in a timely manner (Refer to CAISO RC0110 - Communications Protocols). • Log a summary of all <i>communications</i> and <i>actions</i>.

3.5.2. When Load Shedding Instruction May Not Be Viable

Generally, an Operating Instruction to shed firm load may not be viable, when:

- The reliability issue can be mitigated in a timely manner using other mitigation actions.
- Shedding firm load will violate safety, equipment, regulatory or statutory requirements.
- A load shed instruction cannot be physically implemented.
- Studies show that the risk to the system will be contained within a defined area.

¹⁵ IRO-009-2 R4.

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- Load at risk is not sufficiently more than the load that would have to be shed pre-Contingency.

3.6. Event Reporting

Certain BES Emergencies such as IROL violations, system separation (islanding), firm load shedding, etc., require filing a NERC EOP-004 or a DOE OE-417 report. The RC operator will ensure that the appropriate internal parties are notified to ensure that the proper reports are submitted.

Reliability Coordinator Actions
<ul style="list-style-type: none"> • Notify internal CAISO parties of the BES Emergency in accordance with CAISO-RC-0420 - Event Reporting.

3.7. TOP EOP-011 Plan Submissions and Review

The CAISO Operations Compliance Support shall work in conjunction with the RC to facilitate reviews of the Emergency Operating Plan(s) submitted by BAs and TOPs¹⁶.

The CAISO RC shall provide a secure website for BAs and TOPs to upload Emergency Operating Plan(s) for RC review. The BAs and TOPs shall upload the plan document(s) with a completed EOP-011 Operating Plan Checklist.

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

- Review each submitted Operating Plan(s) on the basis of compatibility and inter-dependency with other BAs' and TOPs' Operating Plans,
- Review each submitted Operating Plan(s) for coordination to avoid risk to Wide Area reliability, and
- Notify each BA and TOP of the results of its review, specifying any time frame for resubmittal of its Operating Plan(s) if revisions are identified.

Each TOP and BA shall address any reliability risks identified by the CAISO RC and resubmit its Operating Plan(s) to CAISO RC within the specified time period.


Upon CAISO RC's completion of the review process, the RC will post a review letter to the secure site and notify the submitting entity.

4. Supporting Information

Operationally Affected Parties

Shared with Public.

¹⁶ EOP-011-1 R3, R3.1 and sub requirements

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References

NERC Requirements	EOP-011-1 R3, R5, R6; IRO-009-2 R2, R3, R4
BA/TOP Operating Procedure	CAISO 4100 System Operations Emergency Plan
Other References	CAISO-RC0310 Mitigating SOL and IROL Exceedances CAISO RC0420 Event Reporting CAISO RC0460 System Restoration CAISO RC0430 GMD Operating Plan CAISO RC0110 Communications Protocols


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
Emergency or BES Emergency	Any abnormal system condition that requires automatic or immediate manual action to prevent or limit the failure of transmission facilities or generation supply that could adversely affect the reliability of the Bulk Electric System.
Adverse Reliability Impact	The impact of an event that results in frequency-related instability; unplanned tripping of load or generation; or uncontrolled separation or cascading outages that affects a widespread area of the Interconnection.
Extraordinary Contingency	<p>Shall have the meaning set out in Excuse of Performance, section B.4.c. language in section B.4.c:</p> <p>Means any act of God, actions by a non-affiliated third party, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, earthquake, explosion, accident to or breakage, failure or malfunction of machinery or equipment, or any other cause beyond the Reliability Entity's reasonable control; provided that prudent industry standards (e.g. maintenance, design, operation) have been employed; and provided further that no act or cause shall be considered an Extraordinary Contingency if such act or cause results in any contingency contemplated in any WECC Reliability Standard (e.g., the "Most Severe Single Contingency" as defined in the WECC Reliability Criteria or any lesser contingency).</p>

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Term	Description
System Operator on mitigating System Operating Limit (SOL)	<p>The value (such as MW, MVA_r, amperes, frequency or volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include, but are not limited to:</p> <ul style="list-style-type: none"> • Facility Ratings (applicable pre- and post-Contingency Equipment Ratings or Facility Ratings), • Transient stability ratings (applicable pre- and post-Contingency stability limits), • Voltage stability ratings (applicable pre- and post-Contingency voltage stability), and • System voltage limits (applicable pre- and post-Contingency voltage limits).
Interconnection Reliability Operating Limit (IROL)	<p>A System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading outages that adversely impact the reliability of the Bulk Electric System.</p>
Contingency Reserve	<p>The provision of capacity that may be deployed by the Balancing Authority to respond to a Balancing Contingency Event and other contingency requirements (such as Energy Emergency Alerts as specified in the associated EOP standard). A Balancing Authority may include in its restoration of Contingency Reserve readiness to reduce Firm Demand and include it if, and only if, the Balancing Authority:</p> <ul style="list-style-type: none"> • Is experiencing a Reliability Coordinator declared Energy Emergency Alert level, and is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan, or • Is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.
Reliability Coordinator (RC) Area	<p>The collection of generation, transmission, and loads within the boundaries of the Reliability Coordinator. Its boundary coincides with one or more Balancing Authority Areas.</p>
Capacity Emergency	<p>A capacity emergency exists when a Balancing Authority Area's operating capacity, plus firm purchases from other systems, to the extent available or limited by transfer capability, is inadequate to meet its demand plus its regulating requirements.</p>

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Term	Description
Cascading	The uncontrolled successive loss of System Elements triggered by an incident at any location. Cascading results in widespread electric service interruption that cannot be restrained from sequentially spreading beyond an area predetermined by studies.
Contingency	The unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element.
Energy Emergency	A condition when a Load-Serving Entity or Balancing Authority has exhausted all other resource options and can no longer meet its expected Load obligations.

Version History

Version	Change	Date
1.0	Approved by Steering Committee.	9/26/18
1.1	Section 3.3: Corrected minor reference error.	11/20/18

5. Periodic Review Procedure

Appendix

No references at this time.