



# **Reliability Coordinator**

## **Outage Coordination Methodology**

Revision 1.1

MAINTAINED BY  
SPP Operations Engineering

PUBLISHED: 5/07/2020

LATEST REVISION: Effective 9/01/2020

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## REVISIONS

<b>Revision</b>	<b>Date</b>	<b>Description of Modification</b>
1.0	4/30/2018	Initial Creation with approval and implementation of RR270
1.1	9/1/2020	Require breaker outages to be submitted. Added definition for denied in outage status

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## 1. Purpose

The purpose of this methodology is to provide technical requirements and criteria to Transmission Operators, Generator Operators and SPP Staff related to submission of Transmission and Generation outages to the Southwest Power Pool, Inc. (SPP) Reliability Coordinator and SPP Balancing Authority via the SPP CROW tool. Outage submissions will be shared with other Reliability Coordinators, Transmission Operators, and Balancing Authorities via the NERC System Data Exchange (SDX) and will be used for assessing real-time and future reliability of the Bulk Electric System. Transmission and Generator Operators are responsible for submitting all outages through the CROW tool. All other Transmission Operators will be able to view and identify all outages that are submitted through the CROW tool. SPP reserves the right to approve, deny, or reschedule any outage deemed necessary to ensure system reliability on a case by case basis regardless of date of submission.

### 1.1 Use of Capitalized Terms

For the purposes of this document, the following rules should be used concerning the use of capitalized terms. Non-italicized capitalized terms are defined by the NERC Glossary of Terms. Italicized capitalized terms indicate terms used in the CROW tool itself. Further description of many of these italicized capitalized terms can be found in the CROW Outage Scheduler Web GUI Tutorial.

## 2. Transmission Outages and Operations

For the purpose of identifying applicable facilities, the nominal kV level of the facility will be used. For transformers, use the low side voltage class. Example: A 161/69kV transformer shall be classified as a 69kV facility for the purposes of this methodology.

### 2.1 Forced Transmission Outage Submission Requirements

Forced outages of all transmission facilities greater than 60kV that are modeled in the SPP regional models and have been modeled in the CROW tool should be submitted within 30 minutes or as soon as practical after the outage. Each outage submission must be accompanied by a *Planned End Time*, *Forced Outage Priority*, an associated *Outage Request Type*, and an *Outage Cause*. *Forced Outage Priority* outages will be considered *Non-Recallable*. At the time of submission, forced outage reasons may not be known so a reason of Unknown may be selected. It is recognized that the duration of a forced outage will typically not be known at the

time of the initial submission. The *Planned End Time* should be the best estimate for the return of the outaged facility. Any known updates to the *Planned End Time* and/or reason for the outage shall be submitted promptly to the CROW tool.

## 2.2 Scheduled Transmission Outage Submission Requirements

Scheduled outages of all BES elements must be submitted to the CROW tool and approved by the Reliability Coordinator prior to implementing the outage. Scheduled outages of all other transmission elements greater than 60kV that are modeled in the SPP regional models must be submitted to the Reliability Coordinator’s CROW tool for coordination and review. Expected equipment types include lines, transformers and selective isolation points. Isolation points will be required for stations that are in the ring bus, breaker and half, or double bus double breaker scheme. Other impactful isolation points may be submitted based on the TOP’s discretion. Each outage submission must be accompanied by a *Planned Outage Start Time* and *Planned End Time*, *Outage Priority*, *Outage Request Type*, and *Outage Cause*. Each outage request must also be designated as *Non-Recallable*, or provide an expected *Recall Time* if directed. Sufficient notation in the outage scheduler *Requestor Notes* comment field should include a description or explanation for the outage. An incomplete outage request of any missing data could result in the outage being denied. Once the actual outage takes place, the *Actual Start Time* of the outage must be submitted to the CROW tool. When the outage has ended, the *Actual End Time* of the outage must be updated.

## 2.3 Transmission Outage Priority and Timing Requirements

Each *Transmission Outage* submitted must include one of the following *Outage Priorities*. *Forced Outages* of equipment must be submitted with an *Outage Priority* of *Forced* as defined below. The CROW tool will enforce the lead time requirements of each *Outage Priority*. Outages that are not planned will have a lower priority and may not be approved by the RC. Outages not submitted as planned will be reviewed and approved by SPP on a case-by-case basis. The risk of imminent equipment failure will have priority over other outages including planned. If sufficient time is not available to analyze the request then the outage will be denied.

Priority	Definition	Minimum Lead Time	Maximum Lead Time
Planned	Equipment is known to be operable with little risk of leading to a forced outage. As required for preventive maintenance, troubleshooting, repairs that are not viewed as urgent, system improvements such as capacity upgrades, the	14 Calendar Days	None

	installation of additional facilities, or the replacement of equipment due to obsolescence.		
<b>Discretionary</b>	Equipment is known to be operable with little risk of leading to a forced outage; however the timeline for submission of Planned outage priority has passed. Discretionary outages are required to be submitted at least 1 calendar days in advance. Due to the shorter lead time, this outage priority has increased risk of being denied based upon higher priority outage requests.	<b>1 Days</b>	<b>14 Calendar Days</b>
<b>Opportunity</b>	Lead time may be very short or zero. An outage that can be taken due to changed system conditions (ie Generator suddenly offline for forced outage allows transmission work to be done).	<b>None</b>	<b>7 Days</b>
<b>Operational</b>	Equipment is removed from service for operational reasons such as voltage control, constraint mitigation as identified in an operating procedure, etc.	<b>None</b>	<b>None</b>
<b>Urgent</b>	Equipment is known to be operable, yet carries an increased risk of a forced outage or equipment loss. The equipment remains in service until maintenance crews are ready to perform the work.	<b>2 Hours</b>	<b>14 Days</b>
<b>Emergency</b>	Equipment is to be removed from service by operator as soon as possible because of safety concerns or increased risk to grid security.	<b>None</b>	<b>2 Hours</b>
<b>Forced</b>	Equipment is out of service at the time of the request.	<b>None</b>	<b>1 Hour</b>

## 2.4 Transmission Outage Equipment Request Types

Each Transmission outage (scheduled and forced) request submitted must include one of the following *Outage Request Types*.

<b>Outage Request Type</b>	<b>Definition</b>	<b>Modeling Assumptions</b>
<b>Out of Service (OOS)</b>	Equipment is out of service.	<b>SDX = Open</b> <b>EMS = Open</b>
<b>Normally Open (NO)</b>	Equipment is normally out of service and is identified as normally open in the SPP regional models. Normally Open request type is used to close (place in service) a normally open facility.	<b>SDX = Closed</b> <b>EMS = Closed</b>
<b>Informational (INF)</b>	Used for outage events that are not covered by one of the other Outage Equipment Request Types. Not an out of service event.	<b>None – Informational Only</b>
<b>Hot Line Work (HLW)</b>	Work is being performed on live or energized equipment.	<b>None – Informational Only</b>

<b>General System Protection (GSP)</b>	Work is being performed on protection systems. Requestor shall specifically identify protection systems out of service and any modification to operation or behavior of system contingencies.	<b>None – Informational Only</b>
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## 2.5 Transmission Outage Request Reasons/Causes

Each *Transmission Outage Request* must be submitted with one of the following reasons for the outage.

Reason/Cause	Definition
<b>Maintenance &amp; Construction</b>	Outages to facilitate repair, maintain, or upgrade of facility related equipment. This includes clearances to perform vegetation management. Does not include outages to support Maintenance & Construction of other facilities. Those should be submitted as Voltage or SOL Mitigation.
<b>Third Party Request</b>	Non-transmission facility related requests for clearance or work such as highway construction.
<b>Voltage Mitigation</b>	Operation of facilities to preserve or correct Bulk Electric System voltage.
<b>SOL Mitigation (Thermal)</b>	Operation of facilities to preserve or correct Bulk Electric System thermal loading issues.
<b>Weather/Environmental/Fire (excluding Lightning)</b>	Outages caused by wind, ice, snow, fire, flood, etc. All weather or environmental causes excluding lightning strikes.
<b>Lightning</b>	Outages caused by direct or indirect Lightning strikes.
<b>Foreign Interference (including contamination)</b>	Outages caused by blown debris, bird droppings, kites, falling conductors, airplanes, etc.
<b>Vandalism/Terrorism/Malicious Acts</b>	Outages resulting from known or suspected vandalism, terrorism, or other malicious acts.
<b>Equipment Failure</b>	Outages resulting from failure of facility related equipment.
<b>Imminent Equipment Failure</b>	Operation of facilities due to expected imminent facility rated equipment failure.
<b>Protection System Failure including Undesired Operations</b>	Operation of facilities due to failure or undesired operation of the facility protection systems.
<b>Vegetation</b>	Outages resulting from contact with vegetation. This does not include outages due to clearances required to perform vegetation management which should be submitted as Maintenance & Construction. This does not include vegetation blown into rights of way or into contact with facilities which should be submitted as Foreign Interference.
<b>BES Condition (Stability, Loading)</b>	Outages resulting from Bulk Electric System conditions such as islanding, cascading outages, sudden thermal loading due to other contingencies, transient stability conditions, etc.
<b>Unknown</b>	Operation of facilities due to an unknown reason. Most forced outages will be submitted with an initial reason of Unknown. Once the actual reason for the operation is known, the outage requestor

	should update the outage request. SPP Staff will follow up after some time to determine the actual outage reason for any outages which still have a reason of Unknown submitted.
<b>Upcoming Model Change</b>	Outages created for the purpose of correcting system topology related to pending model changes. This cause should only be used by SPP operations personnel.
<b>Other</b>	Operation of facilities due to a reason not listed here.

### 3. Generation Outages and Derate Submission Requirements

All generating resources within the SPP Reliability Coordinator Area or Balancing Authority Area meeting one or more of the criteria listed below (regardless of voltage connection) shall report in the CROW tool all *Outages* and *Derates* if the gross reduction in capability is greater than or equal to 25 MW. Changes to the reported capability shall be reported in 25 MW increments from the last reported Derate level regardless of system capability/conditions.

- 1) Generating resource(s) with gross individual nameplate rating greater than 20 MVA or gross plant/facility aggregate nameplate rating greater than 25 MVA; or
- 2) *Blackstart Resources* identified in a Transmission Operator’s restoration plan; or
- 3) Dispersed power producing resources with aggregate capacity greater than 25 MVA (gross aggregate nameplate rating) utilizing a system designed primarily for aggregating capacity.

If SPP requires generating resources that do not meet the criteria above to report their *Outages* and/or *Derates* in the CROW tool, then SPP shall send a written notice to the responsible entity stating their obligations and identifying the specific generating resources.

For the generating resources under the functional control of a Generator Operator (GOP) registered with NERC, the GOP shall be the responsible entity for reporting *Outages* and *Derates* in the CROW tool. For all other generating resources not under the functional control of a registered GOP, the resource owner shall be the responsible entity for reporting *Outages* and *Derates* in the CROW tool.

#### 3.1 Forced Generation Outages and Derate Submission Requirements

Forced outages or capability limitations in the form of *Derates* should be submitted within 30 minutes or as soon as practical after the outage or capability limitation occurs. *Forced Generation Outages* and *Derates* are required to be accompanied by a reason for the outage or limitation. Each *Outage* or *Derate* submission must be accompanied by a *Planned End Time*, a



*Forced Outage Priority, Outage Request Type, and an Outage Cause. Forced Outage Priority* requests will be assumed to be *Non-Recallable*. At the time of submission, forced outage reasons may not be known so a reason of Unknown may be selected. The *Planned Start Time* of the outage should reflect the best known time of the actual outage. The CROW tool will ensure that the *Actual Start Time* and *Planned Start Time* are equal. Any known updates to the *Planned End Time* and/or reason for the outage shall be submitted promptly to the CROW tool. This outage submission shall be in addition to any other notifications made to SPP such as through a reserve sharing event, or resource plan submission. SPP shall accept each forced outage within 30 minutes of submission.

## **3.2 Scheduled Generation Outages and Derate Submission Requirements**

*Scheduled Outages* or capability limitations in the form of *Derates* should be submitted as soon as possible and to the extent possible on an annual rolling basis. *Planned Generation Outages* are required to be accompanied by a reason for the outage or limitation. Each *Outage* or *Derate* submission must be accompanied by a *Planned Outage Start Time* and *Planned End Time*, an associated *Outage Priority*, an associated *Outage Request Type*, and an *Outage Cause*. Each outage request must also be designated as *Non-Recallable*, or provide an expected *Recall Time* if directed. Once the actual outage takes place, the *Actual Start Time* of the outage must be submitted to the CROW tool. SPP shall respond to all scheduled outages or capacity limitation changes in the CROW tool within 30 minutes from the time of submission for changes that are effective within the next 48 hours. When the outage has ended, the *Actual End Time* of the outage must be updated. This outage submission shall be in addition to any other notifications made to SPP such as through a reserve sharing event or resource plan submission.

### **3.2.1 Reserve Shutdown**

Resources in SPP are considered to be in a *Reserve Shutdown* outage status when SPP has approved an outage request via the CROW tool, making the resource unavailable for SPP commitment and dispatch due to reasons other than to perform maintenance or to repair equipment. These resources will be reflected in *Planned Outage* for a reason of *Excess Capacity/Economic*.

Resources that are offline for economic or excess capacity reasons and can be recalled, started, and synchronized to pick up load within 7 days are not required to request an outage via the CROW tool. However, these resources may request and be shown in *Reserve Shutdown* outage status if the outage is approved by SPP.

### 3.3 Generation Outage and Derate Priority and Timing Requirements

Each *Generation Outage* or *Derate* submitted must include one of the following *Outage Priorities*. Forced outages of equipment must be submitted with a *Priority* of *Forced* as defined below. The CROW tool will enforce the lead time requirements of each *Outage Priority*.

Priority	Definition	Minimum Lead Time	Maximum Lead Time
<b>Planned</b>	Equipment is known to be operable with little risk of leading to a forced outage. As required for preventive maintenance, troubleshooting, repairs that are not viewed as urgent, system improvements such as capacity upgrades, the installation of additional facilities, or the replacement of equipment due to obsolescence.	<b>14 Calendar Days</b>	<b>None</b>
<b>Opportunity</b>	Lead time may be very short or zero. An outage that can be taken due to changed system conditions (ie Loading conditions allow planned work to occur with short lead time).	<b>None</b>	<b>14 Calendar Days</b>
<b>Operational</b>	Equipment is removed from service for operational reasons. This could include outages or derates due to reliability directives or other operational concerns not necessarily related to the generating equipment or capability, and outages entered to correct system topology in operating models.	<b>None</b>	<b>None</b>
<b>Urgent</b>	Equipment is known to be operable, yet carries an increased risk of a forced outage or equipment loss. The equipment remains in service until maintenance crews are ready to perform the work.	<b>24 Hours</b>	<b>48 Hours</b>
<b>Emergency</b>	Equipment is to be removed from service by operator as soon as possible because of safety concerns or increased risk to grid security.	<b>None</b>	<b>24 Hours</b>
<b>Forced</b>	Equipment is out of service at the time of the request.	<b>None</b>	<b>1 Hour</b>

### 3.4 Generation Outage and Derate Request Type

Each *Generation Outage* or *Derate* request submitted must include one of the following *Outage Request Types*.

Request Type	Definition	Modeling Assumption
<b>Out of Service</b>	Generator or Resource is out of service.	SDX = offline EMS = offline

<b>Derate</b>	Generator or Resource maximum capability is lowered from normal operation. A new maximum capability is required to be submitted with each Outage Request Type of Derate.	SDX = online, with new lower PMAX EMS = online, with new lower PMAX
<b>Informational (INF)</b>	Used for communicating and documenting information to SPP regarding the resource. This status is not interpreted as a loss of capability or capacity. This status may be used to communicate anticipated fuel delivery issues.	None – Informational Only

### 3.5 Generation Outage and Derate Request Reasons/Causes

Each *Generation Outage* or *Derate Request* must be submitted with one of the following reasons for the outage.

Reason/Cause	Definition
<b>Equipment Failure</b>	Failure in station generation, prime mover, or other equipment has occurred. Does not include failure of GSU transformers or interconnection facilities. Does include equipment related to fuel delivery considered a part of the resource (such as a coal mill).
<b>Imminent Equipment Failure</b>	Expected failure in station generation, prime mover, or other equipment. Does not include failure of GSU transformers or interconnection facilities. Does include equipment related to fuel delivery considered a part of the resource (such as a coal mill).
<b>BES Reliability</b>	Removal from service or limitation to preserve or correct Bulk Electric System reliability issues either through action of a Special Protection System, runback scheme, or as mitigation of another reliability event.
<b>Loss of Interconnection</b>	Failure in interconnection equipment such as GSU transformers or other interconnection facilities. Does not include loss of synchronization due to stability or islanding type events.
<b>BES Stability</b>	Removal from service or limitation due to Bulk Electric System stability issues. Includes loss of synchronization due to transient stability and/or islanding issues.
<b>Fuel Supply</b>	Removal from service or limitation due to fuel supply interruption. Does not include local equipment failures related to fuel supply. Includes loss of gas pressure due to offsite issue, coal supply exhaustion, lack of headwater issues for hydro, etc.
<b>Regulatory/Safety/Environmental</b>	Removal from service or limitation due to Regulatory/Safety/Environmental restrictions such as emission limits, OSHA, NRC, or other regulatory body limitations. Includes damage caused by weather including but not limited to lightning, flood, earthquake, etc. This may also include limitations to hydro due to low dissolved oxygen in tailwater or to control downstream flooding.
<b>Unknown</b>	The default Forced Outage/Derate reason will be pre-populated with Unknown at the time of submittal. Either during the initial outage submittal or at a later time, the Unknown reason must be changed to reflect the actual experienced issue.

<b>Routine Generator Maintenance</b>	Removal from service or limitation in order to perform repair or inspection of generation equipment.
<b>Supporting Transmission Outage</b>	Removal from service or limitation in order to support a scheduled transmission outage.
<b>Excess Capacity/Economic</b>	Removal from service or limitation due to seasonal or system capacity need. This includes peaker units not expected to be used during winter months.
<b>Upcoming Model Change</b>	Outages created for the purpose of correcting system topology related to pending model changes. This cause should only be used by SPP operations personnel.

## 4. Outage Review and Approval Process

All outages submitted will be studied to determine if any potential reliability conflicts are found. The general study method employed by SPP staff involves building representative models of the study time period and implementing all outage requests submitted for that time period. The resulting modeled system is then studied to determine if any reliability issues can be identified. If issues are identified, various mitigation steps are then studied including but not limited to, generation redispatch, system reconfiguration, rescheduling of lower priority outages, and facility rating reviews. If mitigations are unsuccessful in resolving the conflict, an outage request may need to be rescheduled or denied. *Priority* of outage requests is reviewed based upon initial submission time, outage priority category, reason for the outage, and impact to reliability. To the extent possible, higher priority category requests will be given preference, but ultimately it is up to the SPP RC to resolve any scheduling conflicts.

In the event that a conflict occurs with another Reliability Coordinator’s outage, a priority of the outages will be determined based on submitted time, reason for outage, and impact to reliability. The determination will be reviewed and agreed upon by each Reliability Coordinator. The outage that is deemed a higher priority will be approved.

An outage that has been studied will receive a status change to one of the following statuses: *Approved*, *Denied*, or *Pre-Approved*. *Pre-Approval* will be provided in certain cases where an outage has been submitted, but for various reasons SPP is unable to adequately study the outage or determine that no reliability conflicts exist. The *Pre-Approval* may also be dependent upon a specific operating condition that may need to be met but cannot be guaranteed at the time the *Pre-Approval* is issued such as but not limited to a load forecast threshold, simultaneous outage, new facilities in-service, etc. When the outage request can be adequately studied to determine that no reliability conflict exists, the status will be changed to *Approved*.

All outages submitted within the appropriate advance timeframe will be reviewed as soon as possible by SPP Operations staff. The review timelines for SPP are as follows:

- 1) Transmission
  - a. For all BES outage requests submitted 30 days or more prior to scheduled start time, *Pre-Approval* or *Denial* will be provided within 5 business days.
  - b. For all BES outage requests submitted 14 days or more but less than 30 days prior to the scheduled start time, *Pre-Approval* or *Denial* will be provided within 3 business days.
  - c. For all BES outage requests submitted 14 days or less prior to scheduled start time, *Pre-Approval* or *Denial* will be provided within 2 business days.
  
- 2) Generators
  - a. For all *Generator Outage Requests* submitted 30 days or more prior to scheduled start time, *Pre-Approval* or *Denial* will be provided within 5 business days.
  - b. For all Generator Outage Requests submitted 14 days or more but less than 30 days prior to the scheduled start time, *Approval*, *Pre-Approval* or *Denial* will be provided within 3 business days.
  - c. For all Generator outage requests submitted 14 days or less prior to scheduled start time, *Approval*, *Pre-Approval* or *Denial* will be provided within 2 business days.
  - d. SPP will provide their best effort for *Outages Submitted* within 2 business days.

## 5. Outage Status Changes

All outages submitted will reside in one of several status types throughout the life cycle of the outage. These status types and their associated definition are:

Status	Definition
<b>Proposed</b>	The outage request has been saved in the CROW tool and remains under the full revision control until the outage is entered into a Submitted state by the requestor. If the requestor does not move a proposed request to the submitted status within 30 days of the planned start date, the outage is automatically Withdrawn. Proposed outage request status dates DO NOT qualify for outage queuing in conflict resolution. Proposed outage requests are not provided to external systems such as NERC SDX/IDC or SPP's EMS.

<b>Submitted</b>	The outage request has been submitted into the CROW tool and is ready for review by SPP. The outage requestor does not possess revision control of the outage in this status. A revision request may be submitted to SPP regarding an outage in Submitted status. Outage requests in this state are provided to external systems such as NERC SDX/IDC or SPP’s EMS.
<b>Study</b>	SPP will change the status type to Study once the active study process begins. Outage requests in this state are provided to external systems such as NERC SDX/IDC or SPP’s EMS.
<b>Preliminary Approved</b>	Outage requests with Preliminary Approved status have been approved based on long lead studies and may need additional analysis closer to the planned start date or finalization of an Operating Guide. Once the restudy is complete or final opguide posted, the outage status is changed to Approved. Outage requests in this state are provided to external systems such as NERC SDX/IDC or SPP’s EMS.
<b>Approved</b>	Approved state indicates SPP has completed the study process and the outage request is ready for implementation. Outage requests in this state are provided to external systems such as NERC SDX/IDC or SPP’s EMS.
<b>Implemented</b>	Once the outage request actual start time has been entered, signifying that the outage has begun, the outage status is changed to Implemented. Outage requests in this state are provided to external systems such as NERC SDX/IDC or SPP’s EMS.
<b>Completed</b>	Once the outage request actual end time has been entered, signifying that the outage has ended, the outage status is changed to Completed. Outage requests in this state are NO LONGER provided to external systems such as NERC SDX/IDC or SPP’s EMS.
<b>Denied</b>	Denied state indicates that the outage request was not approved for implementation. A new outage with rescheduled dates must be submitted in order for the outage work to be reconsidered.

## 6. Using CROW to Submit Other Types of Information to SPP

The CROW tool can be used as a mechanism to submit information to SPP other than outage and or status information on lines, transformers, circuit breakers, disconnect and generators. All other types of information exchange made using the CROW tool not previously described in this SPP RC Outage Coordination Methodology will follow the guidelines below.

*For Reactor, Capacitor, and Protection Scheme (Special Protection System) Equipment Types,*

- 1) All CROW tool submissions for these equipment types will be made in accordance with SPP RC Outage Coordination Methodology Section 2
- 2) SPP RC Outage Coordination Methodology Section 4 Outage Review and Approval Process will not apply to these equipment types
- 3) These equipment types will not progress through the various states described in SPP RC Outage Coordination Methodology Section 5 Outage Status Changes

*For Generator Automatic Voltage Regulator (AVR) and Power System Stabilizers Equipment Types*

- 1) All CROW tool submissions for this equipment type will be made in accordance with SPP RC Outage Coordination Methodology Section 3
- 2) SPP RC Outage Coordination Methodology Section 4 Outage Review and Approval Process will not apply to these equipment types
- 3) These equipment types will not progress through the various statuses described in SPP RC Outage Coordination Methodology Section 5 Outage Status Changes