

Appendix 12: Outage Coordination Methodology

Change History:

8/16/2011	Initial version approved by ORWG
8/30/2011	Corrected typo on Generator Planned Outages Min Lead Time – corrected to “2 Days” from “None”.
9/22/2011	Added clarification on Reserve Shutdown submittals and created “Opportunity” outage Priority for Generators.
2/21/2013	Added clarification on business rules of outage priorities detailing which priorities are allowed to be entered in CROW with start times either in the future or in the past. Replaced “members” with Transmission Operators and Generator Operators. Added more language describing SPP’s outage request evaluation process. Added further language describing Reserve Shutdown resources.
6/26/2013	Added “Info” Informational Outage Request Type as an available type for Generation Outages.
12/18/2013	Added “Operational” priority and “Upcoming Model Change” as outage reason, misc clarification changes.
12/1/2015	Added language to comply with IRO-017-1. Updated planned lead time requirements.

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 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 generation 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 CROW. 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. 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.

a. 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 a 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.

b. 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. 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.

c. 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 a Priority of Forced as defined below. The CROW Outage Scheduler 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 installation of additional facilities, or the replacement of equipment due to obsolescence.	14 Calendar Days	None
Discretionary	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 2 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.	2 Days	14 Calendar Days
Opportunity	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).	None	7 Days
Operational	Equipment is removed from service for operational reasons such as voltage control, constraint mitigation as identified in an operating procedure, etc.	None	None
Urgent	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.	2 Hours	48 Hours
Emergency	Equipment is to be removed from service by operator as soon as possible because of safety concerns or increased risk to grid security.	None	2 Hours
Forced	Equipment is out of service at the time of the request.	None	1 Hour

d. Transmission Outage Equipment Request Types

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

Outage Request Type	Definition	Modeling Assumptions
Out of Service (OOS)	Equipment is out of service.	SDX = Open EMS = Open
Normally Open (NO)	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.	SDX = Closed EMS = Closed
Informational (INF)	Used for outage events that are not covered by one of the other Outage Equipment Request Types. Not an out of service event.	None – Informational Only
Hot Line Work (HLW)	Work is being performed on live or energized equipment.	None – Informational Only
General System Protection (GSP)	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.	None – Informational Only

e. Transmission Outage Request Reasons/Causes

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

Reason/Cause	Definition
Maintenance & Construction	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.
Third Party Request	Non-transmission facility related requests for clearance or work such as highway construction.
Voltage Mitigation	Operation of facilities to preserve or correct Bulk Electric System voltage.
SOL Mitigation (Thermal)	Operation of facilities to preserve or correct Bulk Electric System thermal loading issues.
Weather/Environmental/Fire (excluding Lightning)	Outages caused by wind, ice, snow, fire, flood, etc. All weather or environmental causes excluding lightning strikes.
Lightning	Outages caused by direct or indirect Lightning strikes.
Foreign Interference (including contamination)	Outages caused by blown debris, bird droppings, kites, falling conductors, airplanes, etc.
Vandalism/Terrorism/Malicious Acts	Outages resulting from known or suspected vandalism, terrorism, or other malicious acts.
Equipment Failure	Outages resulting from failure of facility related equipment.
Imminent Equipment Failure	Operation of facilities due to expected imminent facility rated equipment failure.
Protection System Failure including Undesired Operations	Operation of facilities due to failure or undesired operation of the facility protection systems.
Vegetation	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.
BES Condition (Stability, Loading)	Outages resulting from Bulk Electric System conditions such as islanding, cascading outages, sudden thermal loading due to other contingencies, transient stability conditions, etc.

Unknown	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.
Upcoming Model Change	Outages created for the purpose of correcting system topology related to pending model changes. This cause should only be used by SPP operations personnel.
Other	Operation of facilities due to a reason not listed here.

2. Generation Outages/Derates

For the purpose of identifying applicable reportable facilities, the generator or other Resource shall have a gross capability greater than 25 MW. Due to specific reliability reasons, SPP, upon written notice to the equipment operator or market participant, may require outages to be entered into the CROW tool where otherwise they may not be required. All Generation Outages and De-rates are required to be accompanied by a reason for the outage or limitation. NOTE: Derates in the CROW tool require a new maximum capability of the generator to be submitted. Historically, SPP's systems required the derate amount to be entered in the form of the amount of MW's the capability should be decremented by. This has changed with the implementation of the CROW tool.

a. Forced Generation Outages/Derate submission requirements

Forced outages or capability limitations in the form of Derates of all generation facilities 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, an Forced Outage Priority, Outage Request Type, and a 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.

b. Scheduled Generation Outages/Derate submission requirements

Scheduled outages or capability limitations in the form of Derates of all generation facilities that are modeled in the SPP regional models and have been modeled in the CROW tool should be submitted as soon as possible and to the extent possible on an annual rolling basis. Each outage submission must be accompanied by a Planned Outage Start Time and Planned End Time, an associated Outage Priority, an associated Outage Request Type, and a 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. 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.

1. Reserve Shutdown

Resources in SPP are considered to be in a Reserve Shutdown outage status when SPP has approved an outage request via theCROW 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.

c. Generation Outage/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 Outage Scheduler will enforce the lead time requirements of each Outage Priority.

Priority	Definition	Minimum Lead	Maximum Lead
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		Time	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 installation of additional facilities, or the replacement of equipment due to obsolescence.	14 Calendar Days	None
Opportunity	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).	None	14 Calendar Days
Operational	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.	None	None
Urgent	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.	2 Hours	48 Hours
Emergency	Equipment is to be removed from service by operator as soon as possible because of safety concerns or increased risk to grid security.	None	2 Hours
Forced	Equipment is out of service at the time of the request.	None	1 Hour

d. Generation Outage/Derate Request Type

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

Request Type	Definition	Modeling Assumption
Out of Service	Generator or Resource is out of service.	SDX = offline EMS = offline
Derate	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
Informational (INF)	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

e. Generation Outage/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
Equipment Failure	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).
Imminent Equipment Failure	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).
BES Reliability	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.
Loss of Interconnection	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.
BES Stability	Removal from service or limitation due to Bulk Electric System stability issues. Includes loss of synchronization due to transient stability and/or islanding issues.
Fuel Supply	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.
Regulatory/Safety/Environmental	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.
Unknown	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.
Routine Generator Maintenance	Removal from service or limitation in order to perform repair or inspection of generation equipment.
Supporting Transmission Outage	Removal from service or limitation in order to support a scheduled transmission outage.
Excess Capacity/Economic	Removal from service or limitation due to seasonal or system capacity need. This includes peaker units not expected to be used during winter months.
Upcoming Model Change	Outages created for the purpose of correcting system topology related to pending model changes. This cause should only be used by SPP operations personnel.

3. Outage Review / 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:

a. Transmission

1. 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.
2. For all BES outage requests submitted 14 days or more but less than 30 days prior to scheduled start time, pre-approval or denial will be provided within 3 business days.
3. 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.
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b. Generators

1. 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.

2. For all Generator outage requests submitted 14 days or more but less than 30 days prior to scheduled start time, Approval, Pre-approval or denial will be provided within 3 business days.
3. 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.
4. SPP will provide their best effort for outages submitted within 2 business days.

4. 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
Proposed	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.
Submitted	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.
Study	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.
Preliminary Approved	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.
Approved	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.
Implemented	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.
Completed	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.

Certain outage requests may result in a need by the outage requestor to withdraw or cancel the outage request. SPP's study results and coordination may also result in status changes to an outage reflecting the inability of the outage request to be approved or implemented. These status types are:

Status	Definition
Withdrawn	The outage requestor can withdraw an outage request while it is still in Proposed status. Once in Study or Approved status, the request must be Cancelled. Outage requests in this state are NOT provided to external systems such as NERC SDX/IDC or SPP's EMS.
Cancelled	The outage requestor can cancel a Submitted or Approved outage. Cancelled outages can be reinstated by the requestor, provided the planned start of the outage falls within the business rules for lead time submission. Outage requests in this state are NOT provided to external systems such as NERC SDX/IDC or SPP's EMS.
Denied	An outage request that is in Submitted or Study status can be Denied. If SPP denies the request, the status changes to Denied. This state indicates the outage request was not approved for implementation. Outage requests in this state are NOT provided to external systems such as NERC SDX/IDC or SPP's EMS.
Revoked	Once an outage request has been Approved, it can be Revoked at an time (ie, before or during the outage). Outage requests in this state are NOT provided to external systems such as NERC SDX/IDC or SPP's EMS.