

**BPA Outage Planning and Coordination Policy  
For Tier 1 and Tier 2 Equipment**

**B O N N E V I L L E**  
**P O W E R A D M I N I S T R A T I O N**



**Bonneville Power Administration  
Transmission Operations**

**Effective: March 9, 2016**

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## Table of Contents

Section 1: Purpose .....	3
Section 2: Scope.....	3
Section 3: Definitions.....	3
Section 4: Policy.....	7
4.1 Outage Notification .....	7
4.2 Coordination and Communication .....	7
Section 5: Responsibilities .....	7
5.1 BPA Outage Offices (Dittmer or Munro).....	7
5.2 Outage Requestor.....	7
5.3 Transmission Operations Study Engineers .....	8
Section 6: Procedures .....	8
6.1 Scheduling an outage:.....	8
6.2 Review of planned outages: .....	8
6.3 Assess Scheduling Conflicts: .....	8
6.4 Coordinate final outage plan: .....	9
6.5 Publish Final Outage Plan: .....	9
6.6 Revisions to the Tier 1 or Tier 2 equipment list:.....	9
Section 7: References .....	9
Section 8: Policy Review and Revision Timelines.....	9
Appendix 1 - Outage Submission and Approval Timelines.....	11
Appendix 2 – Tier 1 and Tier 2 Equipment .....	12
Appendix 3 – Considerations for Requesting outages of Tier 1 and Tier 2 Equipment.....	13
Appendix 4 – Map of NW Constrained Paths (Major Interties/Flowgates).....	17
Appendix 5 – Seasonal & Simultaneous 500kV Line Outage to Avoid.....	18
Appendix 6 – Additional Information for BPA Equipment Outages .....	19

## **Section 1: Purpose**

Proposed transmission outages that impact the Bulk Electrical System (BES) and paths that BPA is responsible for must be planned and coordinated among Balancing Authorities, Transmission Operators, and Reliability Coordinators. This includes any equipment that may affect the reliability of interconnected operations for the region.

This document provides technical requirements and criteria for transmission operations, maintenance, and construction staffs related to the submission of transmission outages for tier 1 or tier 2 equipment.

The goal of the coordination process is to minimize cases where schedule curtailments, generation redispatch, and load management actions are likely to occur on paths BPA operates.

## **Section 2: Scope**

This policy addresses the roles, methods and procedures that inform BPA Outage Dispatchers of the equipment outages needed to support planned maintenance and construction as well as urgent and emergency work on the power system.

This policy only addresses needs for information relating to equipment that impacts the BES and when taken out of service, by itself or in conjunction with other equipment will require inclusion in a study. This information is conveyed to study personnel for modeling of the transmission system.

This policy does not address standards, methods and procedures used for next day studies or for the execution of the outages by real time dispatchers. This policy also does not supersede BPA's Accident Prevention Manual or BPA's Contractor: Clearance, Hold Order, and Work Permit Procedure.

## **Section 3: Definitions**

Bulk Electrical System (BES) - Aggregate of electric generating plants, transmission lines, and related equipment; may be one electric utility, or a group of interconnected utilities.

Constrained Path – An intertie or flowgate (a line or group of lines and/or transformers) on which power flow is monitored to ensure reliable operation of the transmission system.

COS – Peak Reliability Coordinated Outage System

DART- Daily Activity Record Tracking System, BPA's system used to request, and process outages.

Day – 00:01 – 24:00 Pacific Prevailing Time (PPT)

Facility Operator- Entity with jurisdiction and physical control over Tier 1 or Tier 2 equipment who is capable of taking the tier 1 or tier 2 equipment out of service.

Flowgates - A line or group of lines and/or transformers on which power flow is monitored to ensure reliable operation of the transmission system.

I-5 – Series of flowgates on I-5 corridor between Raver and Pearl substations

PA – Paul-Allston corridor

RP – Raver-Paul

SOA – South of Allston and Pearl-Keeler

SOC – South of Custer

NOEL – North of Echo Lake

NJD – North of John Day

NOH – North of Hanford

SOB – South of Boundary

WOCN – West of Cascades North

WOCs – West of Cascades South

WOJD – West of John Day

WOH – West of Hatwai

WOL – West of Lower Monumental

WOM – West of McNary

WOS – West of Slatt

CI – Columbia Injection

WI – Wanapum Injection

Generation Consideration – Generation restrictions that result due to a specific equipment outage.

Interties:

COI – California Oregon Intertie

ID-NW – Idaho to Northwest Intertie

MT-NW – Montana to Northwest Intertie

NI – Northern Intertie to Canada

NW-SPP – Northwest to Sierra Pacific Power Intertie

PDCI – Pacific Direct Current Intertie

Load and Voltage Consideration – An outage of this specific equipment may create load service or voltage control issues for the next contingency or in combination with another planned outage.

Off-peak Hours – Hours between 2200 PPT and 0600 PPT and all hours on Sundays and holidays.

On-peak Hours – Hours between 0600 PPT and 2200 PPT every day except on Sundays and holidays.

Outage request – An application for a period of time when tier 1 or tier 2 equipment (normally in service) is to be taken out of service.

Outage process participants – All facility operators responsible for operating the BES within their jurisdiction.

Outage week – Monday through Sunday

Outages -

Emergency Outage - An outage that must be taken immediately to alleviate a safety or reliability problem (there is no time to plan).

Urgent Outage - An outage that must be taken before the next outage planning cycle but isn't an emergency (there is time to plan).

Planned Outage - An outage that does not meet the criteria for Emergency or Urgent.

Peak loading period – Hours when loading on the specific area of the transmission system is consistently highest. Load areas typically have a short significant morning (0800 PPT) and late afternoon (1800 PPT) peak loading period that lasts a couple of hours in the winter. In the summer, the load often doesn't peak until early afternoon and may stay relatively high for 4-6 hours then back off and increase for a short period of time near sunset as lighting load comes on. Thermal generators operate most efficiently with a constant MW output. In a geographical area that has large amounts of thermal generation, this output is consumed by local loads during on-peak hours. During off-peak hours, the output can be exported to areas where generation can be easily reduced which results in the highest transmission loading during off-peak load conditions. The transmission between Montana and the Northwest that supports Colstrip generation is a good example of transmission that experiences its highest loading during off-peak conditions.

Rating - The maximum transfer capacity of an intertie or flowgate.

Study - Mathematical modeling of the transmission system that simulates generation and load levels, topology, equipment ratings, protection

schemes, planned maintenance/construction outages, and potential contingencies.

System Operating Limit (SOL) –The value (such as MW, MVar, 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:

- Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
- Transient Stability Ratings (Applicable pre- and post-Contingency Stability Limits)
- Voltage Stability Ratings (Applicable pre- and post-Contingency Voltage Stability)
- System Voltage Limits (Applicable pre- and post-Contingency Voltage Limits)

Tier 1 or Tier 2 equipment - Equipment that (when taken out of service) may impact the Bulk Electrical System (BES) or require a capacity reduction to assure reliable operation on a constrained path. This includes equipment outages that alone might not affect the electrical system or capacity, but under credible conditions, in combination with other outages, could have a significant impact or capacity reduction. For example, a 500kV Breaker outage may not force out a transmission line or transformer but the outage of that breaker can change the equipment forced out of service due to a breaker failure operation of another 500kV breaker in that station. Those impacts need to be included when determining transmission impacts and/or system capacity. If a circuit breaker can be bypassed on the same bus section, the Tier 1 / Tier 2 timeline can be ignored.

Tier 1 equipment outages by themselves will typically have an impact on the SOL for the paths/flowgates noted and are intended to be part of the monthly outage coordination meeting.

Tier 2 equipment outages when combined with other equipment outages may impact the SOL for the paths/flowgates noted and are intended to be included in planned outage studies.

Transmission Outage Request Timelines for Tier 1 or Tier 2 Equipment (see Appendix 1)

## **Section 4: Policy**

### **4.1 Outage Notification**

BPA requires notification of Urgent, Emergency, and Planned outages of all transmission elements which can impact the BES and/or reduce system capacity for paths within its jurisdiction, in order to:

1. Meet reliability;
2. Meet safety standards;
3. Meet compliance requirements;
4. Meet availability requirements.

### **4.2 Coordination and Communication**

BPA will coordinate and communicate outage plans so that:

1. Operating with a known and studied SOL, specific to the outage condition, is achieved;
2. Opportunities for maintenance and construction work for related equipment are known;
3. Operation of the system in a constrained condition is minimized.
4. Applications for planned outages of Tier 1 or Tier 2 equipment shall be made as far in advance as possible.

## **Section 5: Responsibilities**

### **5.1 BPA Outage Offices (Dittmer or Munro)**

BPA Outage Offices (Dittmer or Munro) ensures the work requested can be accomplished safely. In addition, they receive and review outage requests, assure that equipment nomenclature is accurate, assess conflicting outages, communicate with facility operators, and finalize the outage plan.

### **5.2 Outage Requestor**

An Outage Requestor is the facility owner or operator of the BES who requests an outage to perform planned maintenance, construction, urgent or emergency work.

### **5.3 Transmission Operations Study Engineers**

Transmission Operations Study Engineers provide studies that model the potential contingencies and determine appropriate SOL's.

## **Section 6: Procedures**

### **6.1 Scheduling an outage:**

1. Outage requests originating within BPA are submitted by Substation Operators and [Construction Coordinators] thru DART and the outage is submitted to COS.
2. Outage requests by facility operators other than BPA are submitted via COS and communicated (verbally and by email) to the impacted participant.

### **6.2 Review of planned outages:**

1. BPA Outage offices (Dittmer or Munro) review submitted outage requests to assess which equipment is involved, that all foreign clearances and hold orders are identified, and that the request meets the minimum advance notice requirement.
2. Requests that do not meet minimum timing requirements or are incomplete will be returned by the outage office to the requestor/submitter.
3. Note: BPA's determination of compliance with minimum time requirements, (See Appendix 1) based on request type, will be made by applying the time at which the request status becomes "submitted" in COS.

### **6.3 Assess Scheduling Conflicts:**

1. BPA Outage offices (Dittmer or Munro) develop a preliminary outage plan that includes all submitted outages for Tier 1 or Tier 2 equipment.
2. This preliminary plan will be used to assess impacts to the BES and identify potential outage scheduling conflicts.

#### **6.4 Coordinate final outage plan:**

1. BPA will facilitate a coordination meeting with outage process participants to identify and resolve conflicts in order to develop a final outage plan.

#### **6.5 Publish Final Outage Plan:**

1. BPA will determine the final outage plan and assure that participants are informed of all required changes to individual outage requests (if any).
2. This plan is then used to perform SOL studies.

#### **6.6 Revisions to the Tier 1 or Tier 2 equipment list:**

1. BPA may modify (add or delete equipment) the Tier 1 or Tier 2 equipment list as needs arise.
2. If the modification involves equipment not owned by BPA, the modification will be coordinated with the facility owner/operator.
3. For BPA equipment, the modification will be coordinated with the affected owner.
4. Additions to the Tier 1 or Tier 2 equipment will be effective according to the timeline in Appendix 1.

### **Section 7: References**

DART User Guide  
WECC COS User Guides  
NERC Standards  
WECC Standards

### **Section 8: Policy Review and Revision Timelines**

At a minimum, this policy will be reviewed annually.

## Version History

<b>Version</b>	<b>Date Revised</b>	<b>Description of Changes</b>
1.0	05/09/2014	BPA Outage Policy Publication
2.0	04/10/2015	Additional definitions; removed reference to OB-19; added Appendix 3 – Considerations for Requesting outages of Tier 1 and Tier 2 Equipment, including additional paths – SOC, NOEL, CI & WI; Appendix 4 – Map of NW Constrained Paths; Appendix 5 –Seasonal & Simultaneous 500kV Line Outage to Avoid
3.0	10/01/2015	Added Appendix 6 – Additional Information for BPA Equipment Outages
4.0	03/09/2016	Updated Appendix 2 - Tier 1 and Tier 2 equipment

## **Appendix 1 - Outage Submission and Approval Timelines**

45 day requirement: Tier 1 Equipment outage requests are required to be in a submitted status in COS (or BPA's DART system) 45 days prior to the month the outage is scheduled to start.

21 day requirement: Tier 2 Equipment outage requests are required to be in a submitted status in COS (or BPA's DART system) no later than 21 days prior to the outage week in which the outage is scheduled to start.

If BPA determines that the coincidence of planned outages represents an unreasonable risk to reliability, BPA will take steps to negotiate changes to the planned outages thereby reducing operational risk. To the extent possible, the submittal time that the outage request was received will be taken into consideration, earliest to latest.

### Additions/changes to Equipment in appendix 2:

If BPA determines that equipment must be added to the Tier 1 or Tier 2 Equipment listed in Appendix 2, BPA will allow 21 days until the change will be implemented.

Tier 1 or Tier 2 Equipment removed will take effect immediately.

### Outage requests for Tier 1 or Tier 2 Equipment that do not meet the submission timeline:

BPA has the sole discretion to accommodate late outage requests. However, if BPA is unable to accommodate a change to an existing request or a new request, BPA will mitigate using established procedures.

A change to an existing request includes modification of: start time; stop time; equipment; isolating points and/or constraints.

## **Appendix 2 – Tier 1 and Tier 2 Equipment**

Appendix 2 is located on Peak Reliability's secure website:

<https://secure.peakrc.org/Operations/SOL-Methodology>

Select the Credible Contingencies > Seasonal > BPA Outage Coordination

### **Appendix 3 – Considerations for Requesting outages of Tier 1 and Tier 2 Equipment**

The information below is provided to assist individuals in requesting outages of Tier 1 and Tier 2 equipment. Intertie and flowgate usage is considered when developing the final outage plans. Individuals should consider the “Best times to Schedule Outages” in determining their outage plans and whether they may be able to have an outage request approved in less than 45 days. This information is to be used as a guide as to the best times to take an outage of Tier 1 and Tier 2 equipment: it does not automatically mean an outage request will be granted. Keep in mind that flexibility for taking outages of Tier 1 or Tier 2 equipment outages may be available if system conditions permit. When planning outages of Tier 1 and Tier 2 equipment, consider both the identified “Best time to schedule outages” and any information under “Other considerations”.

#### **CI**

**Best time to schedule outages:** October through March.

**Other considerations:** Avoid the July-August time frame, as well as peak runoff periods from mid-April through May.

#### **COI**

**Best time to schedule outages:** October through April.

**Other considerations:** During the spring and summer months the Northwest exports heavily to California. It is conceivable for the Northwest to import heavily during winter months (November-February) during off-peak hours.

#### **I-5 (RP, PA, and SOA)**

The series of 500kV transmission lines on the westside of the Cascade mountains that extend between Raver to the north and Pearl to the south.

**Best time to schedule outages:** October through May before there are high north to south flows across the Northwest to serve high summer loads in California.

**Other considerations:** Outages that need to be taken during high north to south transfer periods should avoid the afternoon period when transfers are highest.

#### **ID-NW**

**Best time to schedule outages:** September through April when loads on the eastside of the WECC system are down.

**Other considerations:** Daily outages are preferred when outages are taken during periods of high off-peak east to west transfers.

#### **MT-NW**

**Best time to schedule outages:** March through May and September through October. If possible coordinate with maintenance outages of Colstrip generators which often occur in spring.

**Other considerations:** Daily outages are preferred when outages are taken

during periods of high off-peak east to west transfers.

#### **NJD**

**Best time to schedule outages:** October through April.

**Other considerations:** During the spring run-off (April-June) and summer months (July-September) the Northwest exports heavily to California and Idaho, which is supported by NJD. Outages that must be taken during high export conditions should avoid the higher loading period in the afternoon and early evening if possible.

#### **NOH**

**Best time to schedule outages:** October through May.

**Other considerations:** As spring run-off tapers off and ends (June-September), Canadian exports to California increase the NOH loading. Outages that must be taken during high NOH loading conditions should avoid the higher loading period in the afternoon and early evening if possible.

#### **NI**

**Best time to schedule outages:** March 15-April 30 and October 15- November 30.

**Other considerations:** High exports from the Northwest to Canada are typical during spring run-off conditions (April-June) in the Northwest. High imports to the Northwest from Canada are typical during summer peak load periods (July-September) after the Northwest run-off subsides.

#### **NW-SPP**

**Best time to schedule outages:** October through April when loads in Nevada are lower due to lower temperatures.

#### **NW WA Area Net Load (IROL)**

**Best time to schedule outages:** June through October outside of winter peaking conditions.

**Other Considerations:** The NW WA Area Net Load (IROL) is limited by imports into the greater Puget Sound Area and Olympic Peninsula. Typically, any 500/230kV Bk, 500kV shunt capacitor and/or line above 287kV in the area is considered significant to the IROL. Heavy imports occur when the load in the area is high, such as during cold snap conditions and when generation in the area is offline, such as during the spring runoff period in the spring.

#### **PDCI**

**Best time to schedule outages:** October through April.

**Other considerations:** During the spring run-off (April-June) and summer (July-September) months the Northwest exports heavily to California. It is conceivable for the Northwest to import heavily from California during offpeak conditions during the winter (November-February).

## **SOB**

**Best time to schedule outages:** September through March.

**Other considerations:** Heaviest flows on this path are during the spring runoff (mid-April through mid-July).

**Best time to schedule outages:** March 15-April 30 and October 15- November 30.

## **SOC/NOEL**

**Best time to schedule outages:** March 15-April 30 and October 15- November 30.

**Other considerations:** Avoid scheduling outages that impact NOEL when Seattle area loads are high during the winter and also during periods of high exports to Canada which typically occur in the late spring. Outages which impact SOC should be avoided in the July to September time period when imports from Canada may be high.

## **WI**

**Best time to schedule outages:** October through March.

**Other considerations:** Avoid the July-August time frame, as well as peak runoff periods from mid-April through May

## **WOCN**

**Best time to schedule outages:** September and October between the peak summer and peak winter load periods.

**Other considerations:** Heaviest flows on this path occur during spring run-off when there are heavy exports to Canada and Westside thermal generation is displaced by hydro and winter peak load periods.

## **WOCS**

**Best time to schedule outages:** The periods between winter and summer (April-May and September-October).

**Other considerations:** Heaviest flows on this path occur during winter peak load. Outages may also impact the COI, PDCI, and NJD so availability of summer outages is limited.

## **WOH**

**Best time to schedule outages:** March through April before the spring run-off in western Montana and September through October when western Montana hydro has subsided and prior to winter load periods.

**Other considerations:** Daily outages are preferred when outages are taken during periods of high off-peak east to west transfers.

## **WOJD**

**Best time to schedule outages:** Mid-September through the first week of April.

**Other considerations:** Daily outages are preferred when outages are taken during periods of high off-peak east to west transfers.

**WOL**

**Best time to schedule outages:** September through the first week of April.

**Other considerations:** Outages should be avoided during periods of high generation on the Lower Snake that is typically during spring run-off (April-June) and or heavy exports to California.

**WOM**

**Best time to schedule outages:** September through the first week of April.

**Other considerations:** Outages should be avoided during periods of high generation on the Lower Snake that is typically during spring run-off (April- June) and or heavy exports to California.

**WOS**

**Best time to schedule outages:** Mid-September through the first week of April.

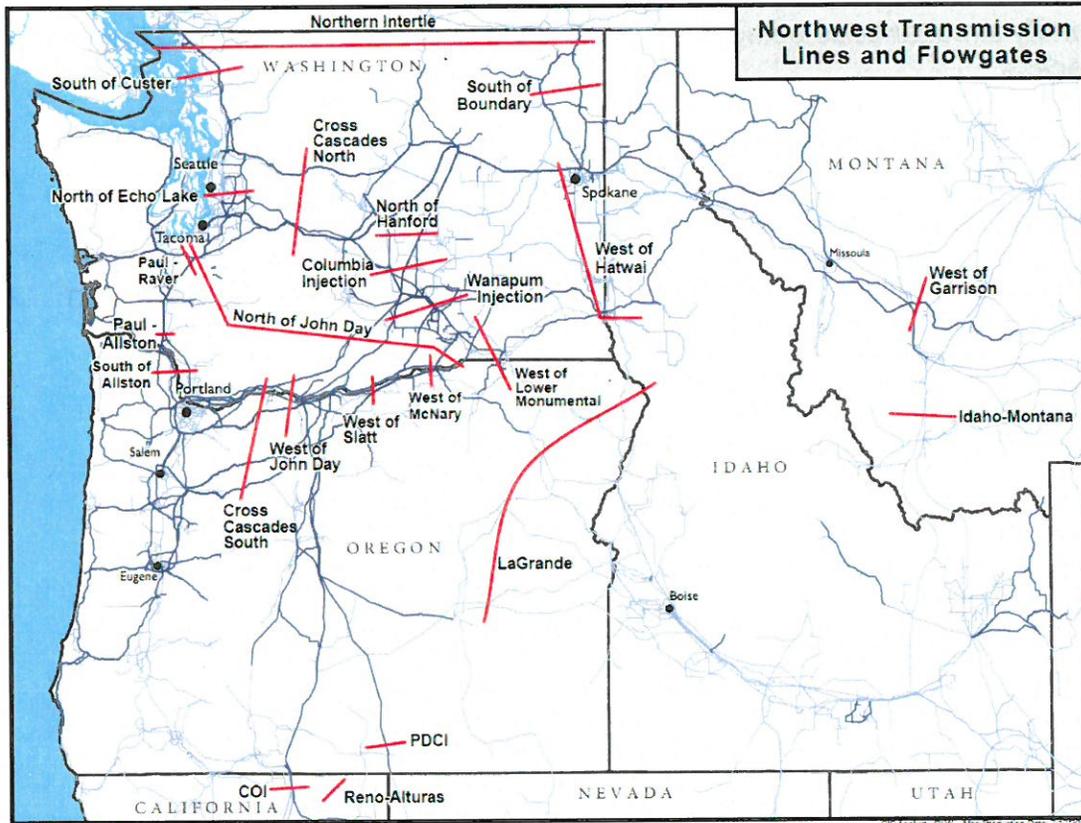
**Other considerations:** Outages should be avoided during periods of high generation on the Lower Snake that is typically during spring run-off (April-June) and or heavy exports to California.

**OTHER CONSIDERATIONS THAT MAY AFFECT YOUR REQUEST**

- Outages that need to be taken during heavy loading conditions on a constrained path should be coordinated to minimize curtailments during the peak transmission usage period of the day.
- Take into consideration the impacts of weather or fire may have on transfer capability during an outage.
- Generator outages may impact transfer capability or the ability to load a path and should be considered when planning outages.

## Appendix 4 – Map of NW Constrained Paths (Major Interties/Flowgates)

For outage scheduling purposes, the transmission system is divided into interties or flowgates and associated Tier 1 / Tier 2 equipment. Appendix 3 can be used to determine the location of the major flowgates in the Bonneville service territory.



### Legend:

COI – California Oregon Intertie  
 ID-NW – Idaho to Northwest Intertie  
 MT-NW – Montana to Northwest Intertie  
 NI – Northern Intertie to Canada  
 I-5 – Series of flowgates on I-5 corridor between Raver and Pearl substations  
 PA – Paul-Allston corridor  
 RP – Raver-Paul  
 SOA – South of Allston and Pearl-Keeler  
 SOC – South of Custer  
 NOEL – North of Echo Lake  
 NJD – North of John Day  
 NOH – North of Hanford

NW-SPP – Northwest to Sierra Pacific Power Intertie  
 PDCI – Pacific Direct Current Intertie  
 CI – Columbia Injection  
 SOB – South of Boundary  
 WI – Wanapum Injection  
 WOCN – West of Cascades North  
 WOCS – West of Cascades South  
 WOJD – West of John Day  
 WOH – West of Hatwai  
 WOL – West of Lower Monumental  
 WOM – West of McNary  
 WOS – West of Slatt

## **Appendix 5 – Seasonal & Simultaneous 500kV Line Outage to Avoid**

A matrix of 500kV lines is located on Peak Reliability's secure website. Use this matrix as a guide in conjunction with information in Appendix 3 to determine the best time of the year to plan outages on 500kV lines. It can also be used to identify simultaneous outages of 500kV lines to avoid in the outage planning process.

Link to Peak Reliability secure website:

<https://secure.peakrc.org/Operations/SOL-Methodology>

Select the Credible Contingencies > Seasonal > BPA Outage Coordination

## Appendix 6 – Additional Information for BPA Equipment Outages

- A. Applications for Clearances, Hold Orders and Work Permits for equipment affecting the operation or protection of the BPA power system shall be made with the appropriate Outage Dispatcher as far in advance as possible.

Timelines for Non-Tier 1 or Tier 2 Equipment:

### 30 Work Day Requirement:

- Power System Tests

### 7 Work Day Requirement:

- Customer Interruptions
- All other transmission circuits
- All other transmission circuits and bus outages not requiring a line outage (This includes all equipment 100kV and above that is to be bypassed or removed from service).
- All Hold Orders not requiring a line outage.
- All other outages including fiber optics.

Outages must be submitted to the appropriate Outage Office by 1200 hours, 7 working days prior to day of work.

Emergency equipment outage requests will be processed by the appropriate Dispatcher under real-time procedures.

- B. Applications for Clearances and Work Permits for equipment outages which do not affect the operation or protection of the BPA power system shall be made with District Substation Operations as far in advance as possible.

When applying for a Clearance or Work Permit, the following information is to be provided to the Outage Dispatcher or Chief Substation Operator:

1. The correct name designation of the line or equipment desired, using System Operations numbers and designations.
2. The date and time the work or test requiring the Clearance, or Work Permit is scheduled to begin.
3. The anticipated duration required for the Clearance or Work Permit.
4. The name of the person who will take the Clearance or Work Permit.
5. The type of Clearance desired.
6. A description of the work or test to be performed.

- C. Application for Clearances and Hold Orders from foreign utilities to facilitate BPA's work in proximity to the foreign utility's equipment (VI.5G and VII.3D) shall be made as far in advance as possible.

When applying for Clearances or Hold Orders from a foreign utility, the following information shall be provided to the Outage Dispatcher or Chief Substation Operator:

1. The correct name designation of the line or equipment as identified by the foreign utility.
2. The date and time the work requiring the Clearance or Hold Order is scheduled to begin.
3. The anticipated duration for the Clearance or Hold Order.
4. The name of the person who will take the Clearance or Hold Order.
5. A description of the work to be performed.
6. Whether the recipient will receive/release the Clearance or Hold Order directly through the foreign utility.
7. Contact information of the foreign utility.

For further information on application for Clearances or Hold Orders from a foreign utility, see BPA Work Standard BPA- WS-3-5, Clearances and Hold Orders from Foreign Utilities.

- D. All Craft supervisors shall keep informed of proposed/submitted/scheduled outages through the Daily Activity Record Tracking (DART). Chief Operators shall serve as consultants/coordinators for the details/possibilities of those outages. The scheduling of maintenance work must be coordinated to minimize the number of outages to BPA lines and equipment and to customers' points of delivery.