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Purpose

Addresses specific requirements associated with operating and Scheduling the Eldorado Intertie and the Moenkopi – Willow Beach - Eldorado 500 kV path, external to the ISO Balancing Authority Area (BAA), as a result of SCE's former rights across the Arizona Public Service Company's (APS) BAA out to Four Corners.

1. Limits, Ratings, & Effectiveness Factors

Table 1 - Normal and Emergency Operating Limits – Not applicable to this procedure.

Table 2 - Ratings – Not applicable to this procedure.

Table 3 - Generation Effectiveness Factors – Not applicable to this procedure.

2. Contingency Operations

2.1 Transmission Lines Outages

To schedule Outages on the various transmission equipment which comprise the Eldorado Intertie, take the following actions:

ISO Operations Planning & APS
1. **Coordinate** all transmission Outages for the Eldorado-Moenkopi 500 kV transmission lines and associated scheduling point at Willow Beach.

2.2 APS Terminal Equipment Outages

APS
1. **Coordinate** Outages on terminal equipment that effect the East-of-River (EOR) rating, with the ISO Operations Planning group.

2.3 SCE Terminal Equipment Outages

SCE
1. **Coordinate** any Outages associated with the terminal equipment at Eldorado with the ISO Operations Planning group.

ISO Operations Planning
1. **Coordinate** these Outages with APS and other transmission operators with responsibility for the EOR transmission path Interconnections.

2.4 Eldorado to Willow Beach to Moenkopi Path Outages & ENTA

For purposes of network modeling and Congestion Management, the Eldorado-Willow Beach-Moenkopi System to and from the Eldorado Intertie with APS is modeled as a single, external ISO transmission path, when in fact the transmission path consists of two distinct transmission segments, which can be independently scheduled in the ISO markets, as Interchange Schedules.

Therefore, during Outages to sections or components of this external transmission path, a manual work-around is necessary to accurately reflect, the acceptable tagged paths and Hourly TTCs, under various Outage scenarios in the ISO's Interchange transaction scheduler.

This procedure section clarifies:

- The workarounds required to accurately determine Hourly TTC for the Eldorado Intertie and the associated Eldorado_ITC limits
- The correct application of the Eldorado Intertie Hourly TTC to properly calculate the Available Transfer Capability (ATC) published in the Day-Ahead and HASP markets and
- The correct Interchange Scheduling process.

Note: *The Eldorado-Moenkopi 500 kV line is partially located within the APS BAA, up to the mid-point of the Colorado River (WILLOWBEACH tie point). The parallel McCullough-Crystal-Navajo 500 kV line operates within the LDWP BAA, with interconnection to NEVP at Crystal. During scheduled or Forced Outages of either line, the ENTA parties may use SCE's former pre-existing entitlement in the* ***E****dison* ***N****avajo* ***T****ransmission* ***A****greement (ENTA), in accor*dance with the calculations documented within the Arizona Security Monitoring Manual.

During an Outage of any component of the Eldorado-Moenkopi or McCullough-Crystal-Navajo 500 kV transmission lines, this exchange agreement specifies alternate transmission rights for use, (i.e. available for use on the other parties parallel 500 kV system).

2.4.1 Eldorado-Moenkopi 500 kV Line Outage

Take the following steps for an Eldorado-Moenkopi 500 kV Line Outage:

APS is the transmission operator for the Eldorado-Moenkopi 500 kV transmission segment.

Note: *For an Eldorado-Moenkopi 500 kV line outage, the ENTA calculator will not be used. The ENTA calculator is only used for a Navajo-Crystal or Crystal-McCullough 500 kV line outage. APS manages the ENTA calculator.*

ISO Operations Planning or Transmission Desk
1. **Set** the Eldorado Intertie Hourly TTC to "0 MW" to reflect the open Intertie with APS, for the duration of the Moenkopi-Eldorado 500 kV line Outage.

ISO Transmission Desk
1. If the ISO Day-Ahead Market (DAM) or HASP has already run with the new "0 MW" Hourly TTC value for the Eldorado Intertie, • **Perform** no manual curtailments OR 2. If the ISO DAM or RTPD has run with the current (non-zero) Hourly TTC value for the Eldorado Intertie, • **Initiate** Interchange Schedule curtailments to reduce the Schedules on the Eldorado Intertie to "0 MW" to be within the new Hourly TTC limits.

2.4.2 Crystal-Navajo 500 kV Line Outages

LDWP and NEVP are the transmission operators for this external, parallel non-ISO transmission segment. In the event of a line Outage, the ENTA Agreement allows LDWP, NEVP, and WALC to exercise their rights to reroute their Navajo Schedules onto the ISO/SCE transmission rights between Moenkopi and Eldorado, then back to LDWP at McCullough.

In this situation, the LDWP, NEVP, and WALC rights to ISO capacity from Moenkopi-Eldorado 500 kV line are reserved by use of TORs and CRNs, which are normally set to 0 MW. These CRNs must be reset to the external parties ENTA right, to allow each party access to ISO transmission capacity as an import at Willow Beach to Eldorado, through the ISO BAA, to an export at McCullough. APS will manage the ENTA calculator and participant rights at Moenkopi to Four Corners.

The ISO's remaining transmission rights on the Eldorado 500 Intertie (Eldorado_ITC) with APS are determined from the Arizona Security Monitoring Manual.

APS will calculate each ENTA parties' rights in the event of an adjacent BAA McCullough-Crystal-Navajo 500 kV line Outage.

ISO Operations Planning or Day-Ahead Market Operator

1. Prior to Implementing LDWP, NVE or WALC ENTA rights through the ISO BAA,
   - **Verify** ENTA Party shares of the Eldorado Hourly TTC with APS.
   - **Set** the ENTA parties CRN MW values to the respective ENTA party Eldorado Hourly TTC share calculations.
   - **Change** the LDWP/ NEVP/WALC ENTA CRN MW values from "0 MW" to the APS calculated ENTA parties Eldorado Hourly TTC shares, using the ETCC.
   - **Enter** the sum of LDWP/ NEVP/WALC shares into the ETCC for the ELDORADO_ITC (import side) CRN ENTA_1101 and the MCCULLGH_ITC (export side) CRN ENTA_2101

Note: *When the market runs it will run with the Eldorado 500 Hourly TTC established by operating conditions (normal Hourly TTC is 1,555 MW) and with the LDWP, NEVP, and WALC ENTA CRNs set to reserve back their respective shares or Eldorado 500 capacity allocations.*

ISO Transmission Desk

1. **Contact** LDWP, NEVP and WALC schedulers and
2. **Determine** the amount they wish to Schedule on their ENTA rights.
3. If the DAM or RTPD was run without the ENTA parties TOR capacity rights,

   OR

   The ISO SCs Interchange Schedules in Interchange transaction scheduler exceed the Eldorado Intertie ATC limits,

ISO Transmission Desk

OR

The line is forced out,

- **Calculate** and **initiate** pro-rata curtailments to reduce the ISO Interchange Schedules on the Eldorado Intertie to within the new ISO ATC limits, to create capacity for the ENTA parties' rights on the path.
- **DO NOT INITIATE** curtailments until the entity has submitted tags utilizing ENTA rights.

Note: *Following a forced outage entities may use Emergency tags to allow the energy to flow. As soon as the outage begins the contract rights become effective.*

4. **Create** six market awards (three sets of wheels) in Interchange transaction scheduler to reflect the change of Energy flow for the effective hours.
5. **Enter** the market awards in Interchange transaction scheduler equal to the amount of the tagged energy profile for each ENTA participant.
6. **Refer** to the following pre-established Master File market wheel Schedules:

Intertie Point	SC ID	Energy Type	ITIE/ETIE Resource ID
(Import) WILLOWBEACH	ZISO	F	CISO_ WILLOWBEACH_I_WHL_ENTALA
(Import) WILLOWBEACH	ZISO	F	CISO_ WILLOWBEACH_I_WHL_ENTANV
(Import) WILLOWBEACH	ZISO	F	CISO_ WILLOWBEACH_I_WHL_ENTWLC
(Export) ELDORADO500	ZISO	F	CISO_ ELDORADO500_E_WHL_ENTALA
(Export) ELDORADO500	ZISO	F	CISO_ ELDORADO500_E_WHL_ENTANV
(Export) ELDORADO500	ZISO	F	CISO_ ELDORADO500_E_WHL_ENTWLC

7. If The outage returns early,
   - **Allow** the ENTA wheel tag **to remain** whole until the SC can submit a new tag for the next scheduling hour under the timing constraints of tagging deadlines.
   - Notify the SC to make adjustments.

Note: *ENTA Interchange schedules may be either dynamic or static. LDWP, NEVP, & WALC may adjust their Dynamically Scheduled Interchange tags after-the-fact because these Schedules include Navajo Power Plant Dynamics.*

ISO Transmission Desk
Note: *The Eldorado 500 Hourly TTC remains un-changed and the ENTA parties' wheeled Energy is accommodated by implementation of a TOR CRN capacity right between Moenkopi and McCullough, via the ISO Eldorado 500 kV system.* *The pre-assigned CRNs for the parties' ENTA rights are:* *ENTA_1101, ENTA_2101 and ENTA_5101* ***Note****: The CRN that the parties will need to show on their E-Tag is ENTA_5101. All parties share the same TOR CRN's.* *The ISO implements these TORs during ENTA events, as "CISO" Interchange Schedules, to prevent any ISO settlements charges being applied to the ENTA parties, per the ENTA.*

McCullough – Crystal – Navajo Outage

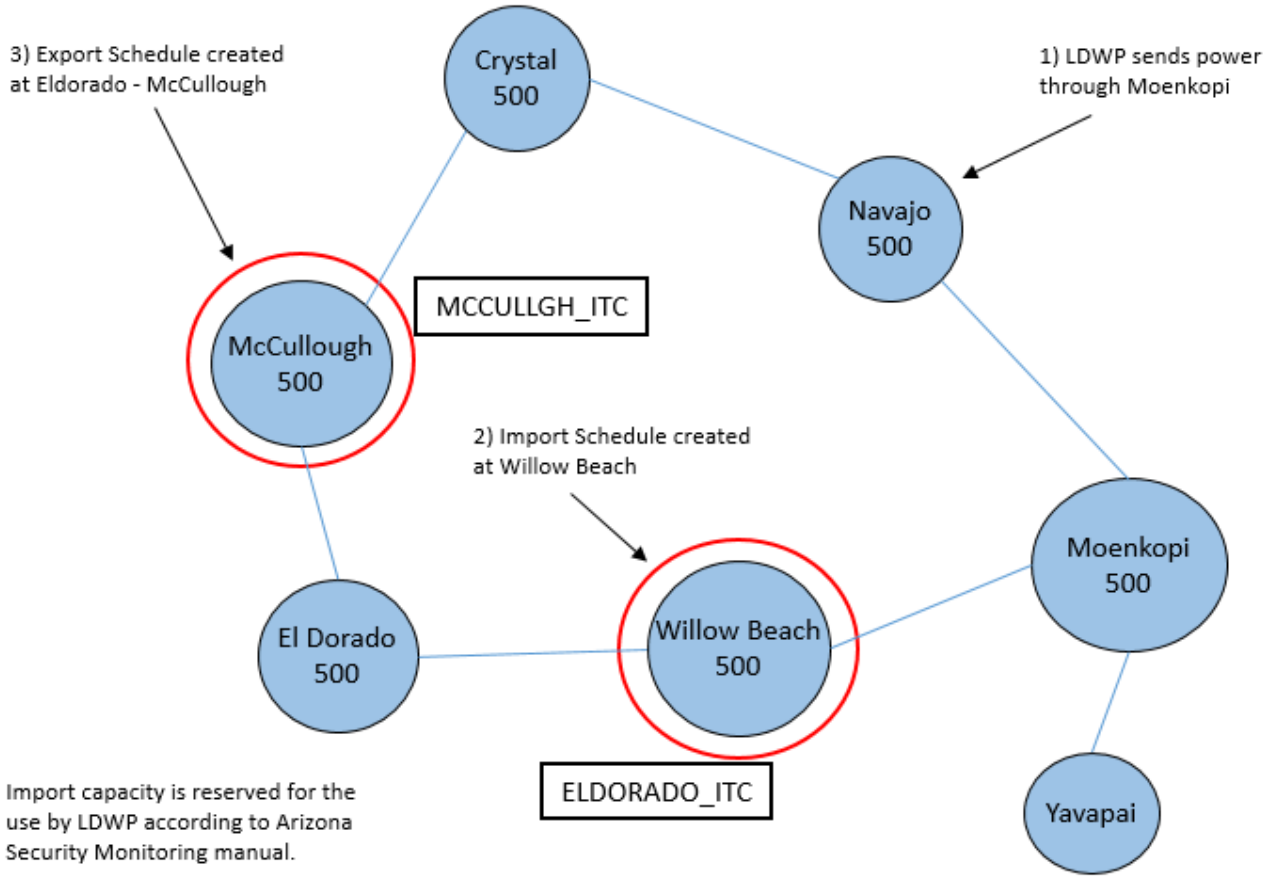

Figure 1

2.4.3 Crystal-McCullough 500 kV Line Outages

LDWP is the transmission operator for this external, parallel non-ISO transmission segment. In the event of a line Outage, the ENTA Agreement allows LDWP and WALC to exercise their rights to reroute their Navajo Schedules onto the ISO/SCE transmission rights between Moenkopi and Eldorado, then back to LDWP at McCullough.

In this situation, the LDWP and WALC rights to ISO capacity on Moenkopi – Eldorado 500 kV line are reserved by use of Transmission Ownership Rights (TORs) CRNs, which are normally set to 0 MW. These CRNs must be reset to the external parties ENTA right, to allow each party access to ISO transmission capacity as an import at Moenkopi to Eldorado, through the ISO BAA, to an export at McCullough.

NEVP does not receive ENTA rights. The load is served through the Navajo-Crystal line.

APS will manage the ENTA calculator and calculate each ENTA party's rights in the event of an adjacent BAA McCullough-Crystal 500 kV line Outage.

ISO Day-Ahead Market Operator

1. **Verify** ENTA parties' rights with APS to implement Eldorado Hourly TTC, under the ENTA agreement, when any segment of Navajo-Crystal-McCullough is out of service.
2. **Include** the actual Eldorado Intertie Hourly TTC value in the comments section of the Total Transfer Capability (TTC) sheet:

   Actual Hourly TTC value = SCE + LDWP + WALC

3. **Document** the individual shares in the outage management system Outage card for the line Outage.
4. Prior to Implementing LDWP or WALC ENTA rights through the ISO BAA,
   - **Verify** ENTA Party shares of the Eldorado Hourly TTC with APS.
   - **Set** the ENTA parties CRN MW values to the respective ENTA party Eldorado Hourly TTC share calculations.
   - **Change** the LDWP/WALC ENTA CRN MW values from "0 MW" to the APS calculated ENTA parties Eldorado Hourly TTC shares, using the ETCC.
   - **Enter** the sum of LDWP/WALC shares into the ETCC for the ELDORADO_ITC (import side) CRN ENTA_1101 and the MCCULLGH_ITC (export side) CRN ENTA_2101

Note: *When the market runs it will run with the Eldorado 500 Hourly TTC established by operating conditions (normal Hourly TTC is 1,555 MW) and with the LDWP and WALC ENTA CRNs set to reserve back their respective shares or Eldorado 500 capacity allocations.*

ISO Transmission Desk

1. **Contact** LDWP and WALC schedulers and
2. **Determine** the amount they wish to Schedule on their ENTA rights.
3. If the DAM or RTPD was run without the ENTA parties TOR capacity rights,

   OR

   The ISO SCs Interchange Schedules in Interchange transaction scheduler exceed the Eldorado Intertie ATC limits,

   OR

   The line is forced out,
   - **Calculate** and **initiate** pro-rata curtailments to reduce the ISO Interchange Schedules on the Eldorado Intertie to within the new ISO ATC limits, to create capacity for the ENTA parties' rights on the path.
   - **DO NOT INITIATE** curtailments until the entity has submitted tags utilizing ENTA rights.

Note: *Following a forced outage entities may use Emergency tags to allow the energy to flow. As soon as the outage begins the contract rights become effective.*

4. **Create** six market awards (three sets of wheels) in Interchange transaction scheduler to reflect the change of Energy flow for the effective hours.
5. **Enter** the market awards in Interchange transaction scheduler equal to the amount of the tagged energy profile for each ENTA participant.
6. **Refer** to the following pre-established Master File market wheel Schedules:

Intertie Point	SC ID	Energy Type	ITIE/ETIE Resource ID
(Import) WILLOWBEACH	ZISO	F	CISO_ WILLOWBEACH_I_WHL_ENTALA
(Import) WILLOWBEACH	ZISO	F	CISO_ WILLOWBEACH_I_WHL_ENTWLC
(Export) ELDORADO500	ZISO	F	CISO_ ELDORADO500_E_WHL_ENTALA
(Export) ELDORADO500	ZISO	F	CISO_ ELDORADO500_E_WHL_ENTWLC

7. If the outage returns early,
   - **Allow** the ENTA wheel tag **to remain** whole until the SC can submit a new tag for the next scheduling hour under the timing constraints of tagging deadlines.
   - **Notify** the SC to make adjustments.

Note: *ENTA Interchange schedules may be either dynamic or static. LDWP & WALC may adjust their Dynamically Scheduled Interchange tags after-the-fact because these Schedules include Navajo Power Plant Dynamics.*

ISO Transmission Desk

Note: *The Eldorado 500 Hourly TTC remains un-changed and the ENTA parties' wheeled Energy is accommodated by implementation of a TOR CRN capacity right between Moenkopi and McCullough, via the ISO Eldorado 500 kV system.*

The pre-assigned CRNs for the parties' ENTA rights are:

ENTA_1101, ENTA_2101 and ENTA_5101

Note*: The CRN that the parties will need to show on their E-Tag is ENTA_5101. All parties share the same TOR CRN's.*

2.5 Manual Calculation

The following are instructions to determine the most limiting ENTA contract MW rights for LDWP, NEVP and WAPA's use of SCE's Eldorado 500 rights to follow when the ENTA calculator is unavailable;

ISO Operations Planning or Transmission Desk

1. **First**, **determine** the most limiting ENTA contract MW rights for LDWP, NVE and WAPA's use of SCE's former Eldorado 500 rights;
   - **Take** the sum of LDWP share + NVE share + WALC share as determined by APS and/or Table 1 of the Arizona Security Monitoring Manual.
   - **Then** contrast this sum with the **Maximum ENTA parties' rights of** 1,125 MW (maximum ENTA rights for LDWP+ NEVP+ WALC).
   - **Compare** the two values to determine which value to use in determining the ENTA parties pro-rata shares of the Eldorado 500 Hourly TTC, using the lower total.

   Note: *Under most conditions it will be the 1,125 MW value.*

   - If it is the 1,125 MW value,
     - **Determine** the relative proportions for each of the ENTA parties' rights (see example below).
2. **Then** calculate each ENTA party's percentage share of the Eldorado 500 Hourly TTC;
   - **Multiply** the SCE North system allocation by 1,555 (the Eldorado Hourly TTC with all lines in service Hourly TTC of the Eldorado-Moenkopi 500 kV line) and
   - **Divide** by the sum of the SCE allocation and the value determined from "c" above.
     This calculation determines SCE's former share of the ENTA Scheduling rights on the Eldorado-Moenkopi 500 kV line during a Navajo – Crystal – McCullough 500 Outage.
   - **Repeat** the same process for LDWP, NEVP, and WALC.

ISO Operations Planning or Transmission Desk

- **Check** that total of all four shares add up to 1,555 MW, or the Eldorado 500 Hourly TTC.

3. Sample ENTA party rights calculation:

Situation; All lines in service at full series compensation and the Crystal-McCullough 500 kV line is scheduled out.

- **Consult** Table 1 of the Arizona Security Monitoring Manual to find the following Arizona – California EHV Transmission Capacity Northern System Allocations:
  SCE Northern System share = 1,416 MW
  LDWP Northern System share = 891 MW
  NEVP Northern System share = 476 MW
  WALC Northern System share = 455 MW
- **Calculate** the sum of LDWP, NEVP and WALC Table 1 allocations - 891+455 = 1,346 MW.

Note: *Since this example is for the Crystal-McCullough 500 kV line, NEVP shares do not need to be added in – because they can take delivery at Crystal Substation.*

- **Contrast** this sum with the maximum ENTA party rights, 1125 MW.
- Since the maximum ENTA rights of 1,125 MW is less than 1,346 MW,
  - **Use** 1,125 MW value to calculate the relative LDWP and WALC shares.
- **Determine** each ENTA parties share of the maximum ENTA party rights, as follows:

  For LDWP, multiply LDWP's Table 1 capacity allocation 891/1,346 (Sum of LDWP, NEVP and WALC shares) = 66.2 %. Multiply .662*1125 = 745 MW
- **Repeat** for NEVP and WALC

  LDWP's share of the 1,125 MW = 745 MW or 66.2%
  WALC share of the 1,125 MW = 380 MW or 33.8%
- Finally, **determine** the pro-rata shares of the Hourly TTC on the Eldorado-Moenkopi line (usually 1,555 MW) for each ENTA participant, including SCE.

  Result: SCE former Hourly TTC share = 1,416 * 1,555/2,541 = 867 MW
  LDWP share = 745*1,555/2,541 = 456 MW
  WALC share = 380*1,555/2,541 = 232 MW
  Sum of shares = 1,555 MW (867+456+232)

Note*: the ENTA parties' CRN values (for step below) in this example are LDWP = 456 MW and WALC share = 232 MW.*

4. Supporting Information

Background

The Moenkopi – Willow Beach - Eldorado path consists of the Moenkopi - Eldorado 500 kV line. The midpoint of the Colorado River located between Moenkopi and Eldorado substations represents the boundary between the ISO and APS transmission systems. This midpoint is represented by the WILLOWBEACH tie point.

The ISO-APS BAA boundary is metered at the Eldorado Intertie, which constitutes the ISO physical Intertie with APS. SCE's former external entitlements on this line were turned over to ISO operation for ISO Market Participant use. The line is operated in accordance with the Arizona Security Monitoring Manual. The Moenkopi - Eldorado line segments of this path are subject to a pre-existing operating agreement, the ENTA (Edison Navajo Transmission Agreement) a transmission exchange agreement between SCE, LDWP, NEVP, and WALC, known as "the parties." This agreement requires the ISO to honor the ENTA entitlements for the ENTA parties.

This external ISO transmission path is Scheduled in the ISO market using the Eldorado Intertie Constraint (ITC), comprised of a single market Scheduling Point, WILLOWBEACH. The physical Intertie is at the Eldorado 500 Substation. Interchange Schedules from/to WILLOWBEACH cannot exceed the contractually derived Hourly TTC at the physical Eldorado Intertie the ISO Interchange check-out point with APS.

Operationally Affected Parties

Shared with Public.

References

Resources studied in the development of this procedure and that may have an effect upon some steps taken herein include but are not limited to:

CAISO Tariff	Section 34.3 Real-Time Dispatch
APS Procedures	Arizona Security Monitoring Manual (Table 1, 2 & 3) TD-TO-PRD-T509 Path 23 - FC 1 AA Transformer
ISO Operating Procedure	3210 Outage Coordination Activities 3630 Modeling – Scheduling ETC and TOR Rights

Definitions

Unless the context otherwise indicates, any word or expression defined in the Master Definitions Supplement to the CAISO Tariff shall have that meaning when capitalized in this Operating Procedure.

The following additional terms are capitalized in this Operating Procedure when used as defined below:

None.

Version History

Version	Change	Date
6.6	Changed North Gila 69 to North Gila 500 due to APS boundary change, aka HANG2. Changed "Outage Management" tasks/actions to "Operations Planning" throughout.	7/24/15
6.7	Changed MSL to ITC throughout - Final identity change across systems (ETCC) from _MSL to _ITC resulted from removing need for MSLs from Spring 2014 Dynamic transfer market enhancement. Updated Figure 1 & 2 with MSL to ITC change.	11/04/15
7.0	For the transition of Four Corners/Moenkopi to Willow Beach from SCE/ISO to APS: Deleted/added such verbiage in Purpose, 2.1, 2.2, 2.4 Completely deleted 2.4.2, as SCE no longer has rights over LDWPs system; 2.6, as CAISO/SCE no longer has rights at Four Corners; 3.1 & 3.2, as there are no special instructions for Normal Operations; 3.3, as ISO no longer needs to pay back losses to APS. For clarification when a line is forced out added verbiage Step 8. Swapped Steps 5 and 6. For clarification when a line returns early added verbiage Step 6. (Sections 2.4.3 & 2.4.4) NEVP does not require rights verbiage added. 2.4.4; Removed ENTA Calculator references, as APS will be responsible for calculating. **9/15/16 - Errata change - not captured above:** Removal of Figure 1 (Eldorado – Moenkopi Outage) as it no longer applies with update of Version 7.0, effective 7/06/16.	7/06/16

Version	Change	Date
7.1	Sections 2.4.1, 2.4.2 & 2.4.3: Replaced all Interchange Scheduler Actions with Transmission Desk Actions. Replaced CAISO with ISO in most instances. Replaced e-Tag with E-Tag Replaced Peak RC with the RC. Minor format and grammar updates. Removed version history prior to 5-years.	5/09/19
8.0	Periodic Review: Removed "the RC" from Operationally Affected Parties, since this is a Public Procedure. Updated reference to APS Path 23 procedure. Removed version history prior to 5-years. Minor format and grammar updates.	10/02/20

Technical Review

Reviewed By Content Expert	Date
Operating Procedures	9/30/20
Real-Time Operations	9/08/20
Operations Planning - South	9/11/20
Market Operations	9/28/20

Approval

Approved By	Date
Director, Real-Time Operations	9/30/20
Director, Operations Engineering Services	9/30/20

*Signed previous version only, changes to this version were minor and did not require full signature approval.

Appendix

No references at this time.