

Delisting of WECC Paths

Southwest Four Corners (Path 22), Four Corners 345/500 (Path 23), Cholla – Pinnacle Peak (Path 50), and Southern Navajo Transmission System (Path 51)

Arizona Public Service
SWAT Meeting
August 21, 2019

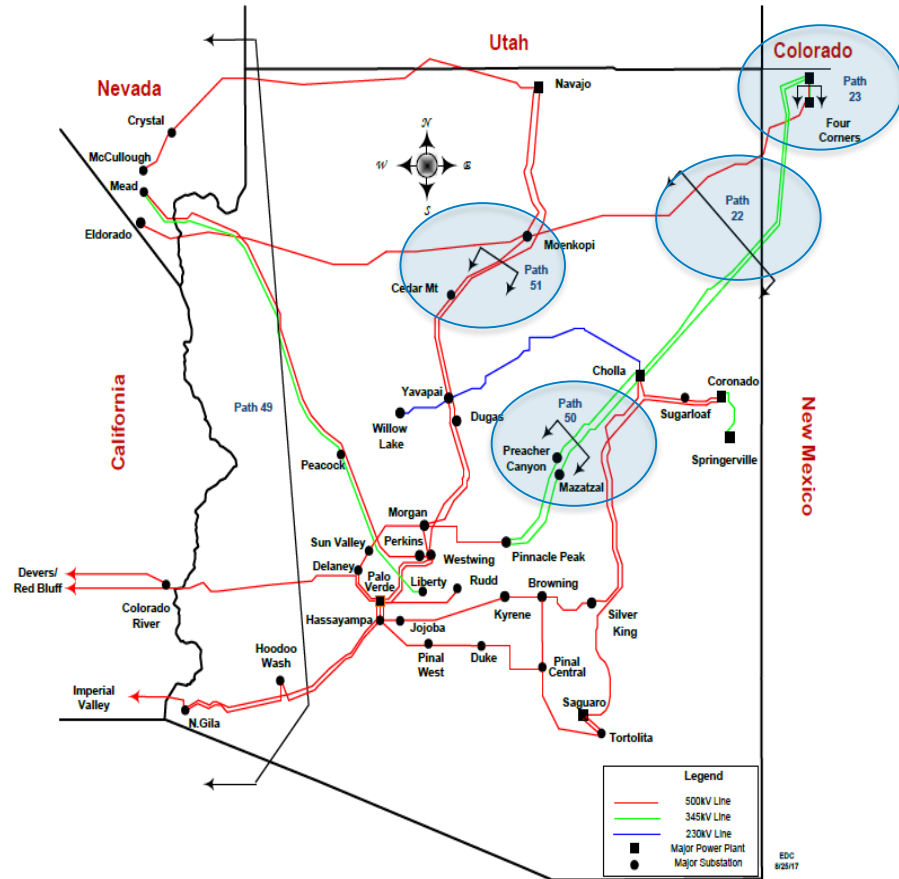


Request of APS to Delist WECC Paths 22, 23, 50 and 51



- Path 22 Limit:
 - 2,325MW East -> West
 - Loss of the Four Corners-Moenkopi 500-kV line causes low voltage in the Preacher Canyon area.
 - Loss of the Four Corners-Cholla #2 345-kV line causes post-disturbance flow on the Four Corners-Cholla #1 345-kV line to reach its emergency facility rating.
- Path 23 Limit:
 - 1420MW 345 -> 500 kV
 - 1420MW 500 -> 345 kV
 - Limited in both directions under N-1 conditions. Loss of one 345-to-500kV transformer loads the other 345-to-500 kV Transformer to its rating.
- Path 50 Limit:
 - 1,200MW East -> West
 - Due to rebuilding a 1.2 mile section north of the Mogollon rim in 2010, there is no critical disturbance that limits the path to its existing WECC rating. However, flows above 1200 MW are constrained due to the completion of the Morgan-Pinnacle Peak 500-kV line in 2010.
- Path 51 Limit:
 - 2,800MW North -> South
 - Loss of both Navajo-Dugas and Yavapai-Westwing 500-kV lines (N-2) causes post-disturbance flow on the Yavapai-Willow Lake 230-kV line to reach its emergency facility rating.
 - Loss of both Moenkopi-Yavapai and Navajo-Dugas 500-kV lines (N-2) causes post-disturbance flow on the Round Valley-Prescott 230-kV line to reach its emergency facility rating.

Illustrations of WECC Paths for Delisting



Primary Drivers for Delisting

- Coal retirements resulting in reduced WECC Path ratings
- Challenges with timely WECC Path rating changes
- Real-Time Contingency Analysis (RTCA) use in Operations
- APS: Publicly announced transition to MOD-030 within 2 years

Communication and Coordination in WECC Path Delisting

- After numerous meeting on the subject, the Navajo E&O (same owners of the transmission lines and plant) approved delisting of WECC Path 51 on April 22, 2019
- After a number of E&O meetings, the Four Corners E&O for Path 23 on June 14, 2019
- Mead-Phoenix Project (MPP) E&O was notified of WECC Path 51 on May 1, 2019 with no comments or concerns
- SRP one-on-one on Path on August 9, 2019
- Adjacent utility notification letter sent out on August 15, 2019
- StS notification and this StS presentation
- Final RAC notification after 30 day comment period from StS
- FAC-013 results to adjacent transmission owners after delisting approved

Current Planning and Operational Practices Ensure Grid Reliability and Provide Open Access



- Transmission Planning: APS coordinates with its neighbors for base case development and various studies including:
 - Identify any reliability standard violations, including the possibility of load shedding
 - Identify mitigation for any violations
 - FAC-013 studies
 - TPL-001-4 studies
- System Operations: APS operates system in accordance with applicable reliability standards
 - Schedules generation output and transmission outages to ensure acceptable pre- and post-contingency system performance, including the avoidance of load shedding
 - MOD-029 studies
- Enforcement of path limits has no effect on planning and operational practices and is therefore not useful for reducing the possibility of load shedding

Current Planning and Operational Practices Ensure Grid Reliability and Provide Open Access



- As a result of the retirement of TOP-007-WECC-1 in 2017, operation of a WECC path within the path rating or Total Transfer Capability (TTC) is no longer required with the exception of paths that are stability limited.
- WECC Path TTC studies are performed using offline tools with optimized generation patterns to maximize TTC. Real time generation patterns can lead to reliability concerns below the rated TTC
- The thermal and voltage operational concerns of the facilities making up WECC paths are more accurately identified with Real Time Contingency Analysis (RTCA) tools.
- Studies have shown that for APS paths 22, 23, 50 and 51 thermal and voltage violations would occur well before any stability concerns, and thus the path flow would be maintained below any stability limit.
- Operating with advanced online network analysis tools such as RTCA is a more conservative method of ensuring system reliability is maintained.

Effective Delisting Date

- Southwest Four Corners (Path 22), Four Corners 345/500 (Path 23), Cholla – Pinnacle Peak (Path 50), and Southern Navajo Transmission System (Path 51)
 - Effective delisting date January 1, 2020
 - Assumes all comments/concerns resolved

Questions/Comments/APS Contact?

- For general questions about the delisting, please contact David Wiley
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- For questions about the technical study effort please contact Chris Fecke-Stoudt
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- For OASIS transmission related questions, please send an email to
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