

TOT-2A OPERATING PROCEDURE SUMMER SEASON 2004

Effective Date: 6/1/2004

DEFINITION: TOT-2A or WECC Path 31 is made up of the following 3 transmission elements:

1. Hesperus – San Juan 345-kV Line
2. Lost Canyon – Shiprock 230-kV Line
3. Durango – Glade Tap 115-kV Line

This procedure operates within the existing guidelines of the TOT 2 Operating Procedure (PCC-007) which is managed by Pacificorp.

The above mentioned transmission lines connect Southwest Colorado to Northwest New Mexico. The prevailing flow for most of the year is southbound. However, when the generation level at Craig/Hayden area is light and there is heavy generation at Four Corners/ San Juan area the actual flow can be northbound.

Western Area Power Administration (WACM Control Area) is the path operator. The path owners are:

- Western Area Power Administration
- Tri-State Generation and Transmission Association
- Public Service Company of Colorado

In addition to the above owners, Pacificorp has rights to use TSGT & PSCO's share of TOT-2A to move some of their generation at Craig & Hayden to the south. PACE can schedule up to 100-MW during the off-peak and 67-MW during the on-peak hours. When PACE schedules energy across TOT-2A, ½ of the schedule is added to PSCO and the other ½ is added to TSGT total schedules.

TOT-2A is a thermally limited path. The maximum TOT-2A simultaneous Transfer Capability for the 2004 Summer operating season has been determined to be 660MW. With Nucla generating 80 MW and the southwest Colorado load at 178 MW the transfer capability is 660 MW; With Nucla generation offline and the southwest Colorado load at 199 MW the transfer capability is 340 MW; (refer to the TOT 2A Heavy Summer Nomogram for corresponding capability values). The non-simultaneous transfer capability can be as high as 690 MW in either direction. The actual transfer capability is independent of the status of the Durango-Glade Tap line. The limits are calculated based upon the outage of Montrose – Grand Junction 345-kV line, maintenance of the acceptable voltage in southwest Colorado, and preventing overload of any underlying 115-kV line. The actual transfer limits are dynamic and highly dependent upon the load in southwest Colorado and the generation levels at Nucla power plant.

OPERATING PROCEDURE:

Refer to TOT-2A SCADA Display for the following information. There is a transmission map of the region on the left-hand side of the display. The computer uses the real time data from this region to determine the north to south & south to north limits. In the top and middle of the display, the computer posts the value and limit of the actual flows and schedule flows. The difference between the actual limit and the schedule limit is the amount of inadvertent flow on the path. If the actual flow or schedule flow exceeds the limit, an alarm will be issued and the quantity outside of the limit will be indicated in red video. Also, the algorithm calculates the transfer capability limit for the owners of the path based upon their percentage ownership. Those values get compared with each owner's schedule on the path. The schedules for TSGT & PSCO are all static, while WAPA's schedule is comprised of the static schedule and the CRSP northern generation. Should the individual entity's schedule exceed the limit an alarm will be issued. The participants' share of the transfer capability for north to south direction is calculated across the

northern boundary or TOT-2A'. Western owns 60.87% of the total capability while TSGT & PSCO share equally the remaining capability across the path (19.57% each). For south to north, the transfer capability gets calculated across the boundaries of TOT-2A. Western share of the transfer capability is 60.87% while PSCO's share is 29% and TSGT's share is 10.13%.

ABNORMAL LOADING OR SCHEDULING CONDITIONS (NORTH TO SOUTH)

A – Schedule Overload of an Individual Owner (TOT is not over)

- **TSGT, PSCO, or WAPA (CRCM) Over Schedule:**

Contact the entity or entities responsible for the over schedule and ask them to bring their schedule under their limit by the next scheduling hour. They can either purchase transmission from another TOT-2A owner, or reduce their schedule.

B – Schedule Overload on the Path

If the path's total schedules exceed the path's limit, contact the entity or entities that have exceeded their limit and ask them to bring their schedule down to their limit within **30 minutes**.

C – Actual Overload of the Path

- If the path's actual flow exceeds the path's actual limit, use the Shiprock and Waterflow phase shifting transformers independently to reduce the flow on the path (this is the step one of the WECC Unscheduled Flow Reduction Procedure). Tapping up the phase shifters will decrease the North-to-South flow on TOT-2A. However, reducing the North-to-South flow on TOT-2A increases the East-to-West flow on TOT-1A and West-to-East flow on TOT-5. Watch the flow on the other paths (TOT-1A, and TOT-5) while you are changing the phase shifters' tap. Make sure you are not increasing TOT-1A and TOT-5 actual flow beyond their limits. Coordinate PST operation with the RDRC. The RDRC will allow certain violations to WECC MORC under emergency conditions. Western dispatch shall make a log entry for any operations that violate established WECC/MORC procedures.
If the overload continues, and you are accommodating the appropriate amount of unscheduled flow proceed to step 3 of the WECC UFRP and ask the Reliability Coordinator for the coordinated phase shifting transformer operation.
- Curtail all non-firm schedules on TOT-2A, effective immediately.
- Curtail all firm schedules on TOT-2A, effective immediately.

The Reliability Coordinator shall direct all further actions.

ABNORMAL LOADING OR SCHEDULING CONDITIONS (SOUTH TO NORTH)

A – Schedule Overload of an Individual Owner (TOT is not over)

- **TSGT, PSCO, or WAPA (CRCM) Over Schedule:**

Contact the entity or entities responsible for the over schedule and ask them to bring their schedule under their limit by the next scheduling hour. They can either purchase transmission from another TOT-2A owner, or reduce their schedule.

B – Schedule Overload on the Path

If the path's total schedules exceed the path's limit, contact the entity or entities that have exceeded their limit and ask them to bring their schedule down to their limit within **30 minutes**.

C – Actual Overload of the Path

If the path's actual flow exceeds the path's actual limit (this should be a very rare occasion), use the Shiprock and Waterflow phase shifting transformers to reduce the flow on the path. Tapping down the phase shifters will decrease the south to north flow on TOT-2A. However, reducing the south to north flow on TOT-2A increases the east to west flow on Shiprock-Glen Canyon 230-kV line and Shiprock-Four Corners 345-kV line. Watch the power flow on these lines while you are changing the phase shifter's tap.

OUTAGE OF AN ELEMENT AFFECTING TOT-2A

If one of TOT-2A transmission lines or an element outside the path (which affects the total transfer capability) becomes unavailable, the program automatically detects that and adjusts the actual and schedule limit for the correct configuration. Notify the owners of the path and advise them of the new limit and ask them to adjust their schedule to match the new limits.

SYSTEM INTACT - TOT2A NOMOGRAM

