SOME THOUGHTS ON APPROACHES TO PATH CONGESTION ANALYSIS

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I. Past Practice in West - INFORMATION ANALYZED and REPORTED in 2000 and later Biennial Transmission Plans

A. In the **1998 Biennial Transmission Plan**, the following information was analyzed to assess Path Congestion:

1. MW Flow on major paths

   - Used the hourly MW flow data in the WECC EHV Data Pool database
   - Seasonal (Spring, Summer, Winter), Peak and Off-Peak

2. Net Schedule on major paths

   - Used the hourly net schedules in the WECC EHV Data Pool database
   - Seasonal (Spring, Summer, Winter), Peak and Off-Peak

3. Transmission Congestion Survey

   - A questionnaire was sent to Transmission Customers asking for their experience with having requests for firm capacity denied. (See excerpt from Report.)

4. Unscheduled Flow Mitigation Events (UFAS events)

   - Tabulated the number of Loop Flow curtailment events for the Qualified Paths. (See excerpt from Report)

5. OASIS ATC postings

   - Yearly Firm ATC for the major transmission paths. Data was gathered for a single month (April 2000) (See excerpt from Report)

A figure of merit was calculated for each path, defined as the Percentage of Time that a path exceeds 75% and 90% of its OTC. Information was presented in tabular form.

In **subsequent years (2000 and 2003)**, the last of which was dated February 2003, the following were analyzed and presented for all major paths in the West:

1. MW Flow expressed on PU basis relative to OTC. Plotted as frequency distribution curve for each path by season or year.

2. Net Schedule, expressed on PU basis relative to OTC. Plotted as frequency distribution curve for each path by season or by year.

3. Summary graphics were also presented for the "75%" figure of merit and for peak path flows (use 99%probablility to avoid using bad data points)

II. Path Congestion Analysis using ATC Data (This work has not been done due to the current lack of ATC data)

Hourly Data from WECC & OASIS Sites:

MW actual
Net Schedule
OTC or TTC
ATC – "long term firm" 1-year
ATC – hourly

Possible Congestion Measures – hourly data can be analyzed statistically over a season or a year, with results plotted as frequency distributions

1. **RELIABILITY CONGESTION (RC) - MW act. / OTC** - Higher ratios indicate higher flows (usage), same calculation as has been done in previous Biennial Plans. A path with actual flow = OTC would have a value of 1.0.

2. **COMMERCIAL CONGESTION (CC) - 1 – ATC/OTC** - Higher numbers indicate higher commercial use. This can be done for both short term and long term ATC and for ATC in both path directions. A fully subscribed path (ATC=0) would have a value of 1.0.

3. **RATIO OF POSTED ATC TO PHYSICAL ATC - ATC / (OTC – MW)** The ratio would normally vary between 0 and 1.0. If the ratio = 1.0, this means that the posted ATC equals the apparent available capacity based upon the actual MW flow. If the number is less than 1.0, this means the posted ATC is less than the apparent available capacity based upon the actual MW flow. This is the West of Hatwai situation. If the ratio is greater than 1.0 (not likely) this means more capacity is posted than is actually available.

   This calculation can be done each hour, for long and short term ATC, in the path direction of actual flow for the hour.

II. RECOMMENDATIONS TO IMPROVE THE WECC EHV DATA POOL DATABASE

1. Recommendations

   The following are suggestions for improving the coordination of transmission planning and the collection and dissemination of planning data in the Western Interconnection:

   Suggested improvements to the EHV Data Pool transmission data base:

   - Develop and document "Data Reporting Guidelines" for submitting data into the EHV Data Pool to achieve consistent data reporting.

   - All submitters of data into the EHV Data Pool should review and verify that the data submitted is being done correctly. During preparation of this report, data errors were found in the following:

     - Path 53 (Billings Yellowtail) data is actually the Montana Southeast path
     - Schedule data being submitted for Path 15 (Midway- Los Banos) is not correct according to the California ISO. Also the OTC data reported is not correct according to the California ISO.
     - OTC data being submitted for Path 3 (Northwest to Canada) is incorrect.

   - All paths should report net schedules on all transmission paths on which schedules exist. Several paths are not reporting net Schedule data on scheduling paths (Paths 17, 15, 46, 5, 14, 26, 5, 50, 4, 51, 24, and 45).

   - All paths should report OTC. As a minimum, this should be the seasonal OTC. This value should change when system conditions (outages, etc.) cause the path OTC to change. Several paths are not reporting path limits or are reporting the TTC as the path OTC limit.

   - Use consistent directional polarity nomenclature for all paths. This needs to be standardized and documented in the Data Reporting Guideline document suggested above.

Frequency Distribution - Posted ATC/Actual ATC