

## Detailed Methodology Examples

### RHC Methodology Steps Taken for OL75 NE to SPP-N Transfer Limit:

1. Target Capacity factor for total flow calculated = 81%
  - a. Average shadow price calculated for all hours = \$1.24
    - i. \$43,400 marginal congestion/35040 hours = \$1.24
  - b. Calculate capacity factor using Total Flow CF-Shadow Price Curve  
Parameter = 1.0
    - i.  $1/1.24 = 81\%$
2. Target Capacity factor for overload flow calculated = 20%
  - a. Average shadow price calculated for all congested hours = \$4.95
    - i. \$43,400 marginal congestion/8772 congested hours = \$4.95
  - b. Calculate capacity factor using Overload Flow CF-Shadow Price Curve  
Parameter = 1.0
    - i.  $1/4.95 = 20\%$
3. Calculate any increase in pipe capacity based on total flow target capacity factor-capacity curve = 0 MW
  - a. Total flows over line size X (assuming flow pattern remains identical)/potential total flows over line size X = line CF
  - b. Total flow target cf-capacity curve shows at 81% CF, transfer limit should be ~1500 MW
  - c. Actual baseline capacity is 1800 MW so no increase
4. Calculate any increase in pipe capacity based on overload flow target capacity factor-capacity curve = 1244 MW
  - a. Overload flows over overload line size X (assuming flow pattern remains identical)/potential total flows over overload line size X = line CF
  - b. Overload flow target cf-capacity curve shows at 20% CF, overload transfer limit should be 1244 MW
  - c. Calculate average of pipe increase due to total flows and average of pipe increase due to overload flows = 622 MW

### NGO Methodology Steps Taken for OL 75 NE to SPP-N Transfer Limit:

1. Flow duration curve created using total flows for all hours of the combined years
2. Pipe size equal to a designated cutoff to upper end of flow duration curve
  - d. Flow duration curve target parameter = 10%
  - e. Flows at 10% target cutoff = 3014 MW
  - f. Since pipe increase is greater than 1800 MW baseline capacity, pipe increased by 1214 MW

### Johnson Methodology Steps Taken for OL75 NE to SPP-N Transfer Limit:

1. Average total MW energy transfers calculated for combined years = 1665 MW
  - a. Total energy transfers = 58331 GWh divided by Total Hours = 35040 times 1000 = 1665 MW
2. Capacity utilization threshold applied
  - a. Average MW energy transfers divided by baseline capacity (1800 MW) = 92%

- b.  $92\% >$  threshold interface utilization parameter (default value of 90%)
  - c. Since pipe passes threshold, pipe is considered for expansion
- 3. Pipe size increase calculated = 420 MW
  - a. Average MW energy transfers 1665 MW divided by average capacity factor for total line parameter (default value of 75%) = 2220 MW
  - b. Since new pipe size is greater than baseline pipe (1800 MW), pipe increased by 420 MW