



Northwest Power Pool Corporation
Under Frequency Load Shedding Results
2008-2009 Assessment

Background

NERC Standard PRC-006-0 requires each Regional Reliability Organization (RRO) to develop, coordinate, and document an Under Frequency Load Shedding (UFLS) program. The Western Electricity Coordinating Council (WECC) as the RRO has developed and documented such a program, WECC Off-Nominal Frequency Plan (Plan) in the WECC Minimum Operating Reliability Criteria.

In order to demonstrate coordination of UFLS program, a simplified analysis utilizing the method in the WECC publication "Under Frequency Load Shedding Relay Application Guide" and the General Electric Positive Sequence Load Flow "GE PSLF" program, as adopted and applied by the WECC, is performed to verify the results and confirm the adequacy of the UFLS program.

The Northwest Power Pool (NWPP) corporate staff performed such an analysis for the NWPP sub region geographic area.

Analysis

The NWPP staff analyzed the NWPP sub-region Off-Nominal Frequency Plan (NWPP sub-region Plan) and the three major island configurations within the NWPP geographic region. All analysis was conducted in accordance with the WECC Plan, which incorporates a near 30% generation resource loss.

Results

The results indicate the NWPP members' relay settings conform to the required performance of the Plan, both in arresting frequency above 58.0 Hz and in recovery of frequency to 59.5 Hz or higher. In addition, the results indicate before the UFLS relays activate, a cascade disturbance across multiple entities would have to happen. Also, single and dual most severe single contingency losses of generation resources will not place the NWPP sub-region in an off-nominal frequency event.

One observation, the current reported relay scheme may have some minor issues related to frequency recover. Additional analysis at the individual level may be required to address these issues.

Conclusion

The NWPP sub-region Plan and the supplied information associated with the individual's relays setting appear to conform fully to the required performance of the WECC Plan.

Improvements

In order to timely analyze and perform an assessment of the NWPP sub-region Plan and conformance to WECC Plan, the following is necessary:

- Data and documentation of relays' setting must be provided by all applicable entities within the NWPP area by the spring of each year;
- The NWPP Operating committee should evaluate re-alignment of the NWPP sub-region Plan to match identically to the WECC Plan;
- Incorporate a South-North Scenario into the WECC Plan through request of WECC TSS and SRWG; and,
- Agreement across all of WECC with respect to the handling of the non-conventional resources such as wind as they pertain to reserves