Final

2011 STUDY PLAN

Sierra Subregional Planning Group (SSPG)

Introduction

This study plan is proposed to support the Sierra Subregional Planning Group (SSPG) effort to ensure that adequate reliability studies are performed on the SSPG project requests. SSPG received two study requests:

- Lassen Municipal Utility District (LMUD)
- Great Basin High Voltage Direct Current (GBHVDC) project.

Both of these projects are 1000 MW trans-Sierra transmission lines. This study will result in a reliability analysis to interconnect the study requests in northern California and northwestern Nevada.

Background

The location of these study requests are likely to have an interaction with COI and may be influenced by other constraints in the Northwest, Northern California Hydro Generation, or Northern California load. Interactions will be determined and transmission, if necessary, will be proposed to mitigate reliability standard violations.

Methodology

SSPG requires use of a study methodology and criteria consistent with the following:

1) In the pre-contingency state and with all Facilities in service, the Bulk Electric System (BES) shall demonstrate transient, dynamic and voltage stability. Facility Ratings shall not be exceeded and uncontrolled separation shall not occur.

2) Following the single and double contingencies identified in the Contingencies section below, the system shall demonstrate transient, dynamic and voltage stability. Facility Ratings shall not be exceeded and uncontrolled separation shall not occur.

3) The single contingencies identified in the Contingencies section meet or exceed requirements R2.2 and R2.3 of FAC-010-2.1

4) The double contingencies identified in the Contingencies section meet and exceed the requirements Regional Difference E1 of FAC-010-2.1

Assumptions

Assumptions for this SSPG study are listed below. These assumptions are intended to be coordinated with the 2015 WECC summer approved base case.

1. Stress California Oregon Interface (COI), Path 66, to 4800 MW and Alturas to a high import level exceeding 235 MW.
2. Utilize a reasonable generation pattern for the NW, which will take into account any spill or run of river requirements.
3. Set the Northern California Hydro Generation level to 90%.
4. Hemingway – Summer Lake flows set to 575 MW East to West

5. Hemingway-Boardman 500 kV is assumed in operation for this case

COI flows at 4,800 MW and Alturas flows at about 250 MW are reasonable to use for the SSPG studies. This is due to the fact that the "old" 4,800 MW combined limit was based on system limitations in the Northwest and that the following upgrades have been made to the system in the past several months by BPA:

- 400 MVAR of MSCs have been added at Captain Jack
- The series caps on the John Day-Grizzly 500-kV lines have been upgraded
- 300 MVAR of shunt caps have been added at Slatt

Contingencies

The criteria used for paths in the California system to assess reactive performance of the system are the 5% and 2.5% tests for N-1 outages and credible N-2 outages respectively. In addition, all 500 kV buses must be above 480 kV and 15 kV above the nose point immediately after the outage.

The following outages will be investigated monitoring the critical buses using V - Q analysis. With all lines in service, the most critical N-1, common mode, or credible N-2 outages in the system include the following:

Powerflow Studies

Single contingencies:

1. Malin - Round Mt. #1 500 kV
2. Malin - Round Mt. #2 500 kV
3. Round Mt. - Table Mt. #1 or #2 500 kV
4. Table Mt. - Tesla 500 kV
5. Table Mt.- Vaca 500 kV
6. Vaca - Tesla 500 kV
7. Captain Jack - Olinda 500 kV
8. Olinda - Tracy 500 kV
9. Tesla - Tracy 500 kV

Double contingencies:

- Malin - Round Mt. #1 and #2 500kV
- Round Mt. - Table Mt. #1 and #2 500 kV
- Table Mt. – Tesla and Table Mt.- Vaca 500 kV
- Table Mt. – Tesla and Vaca – Tesla 500 kV
- Tesla – Los Banos and Tesla – Tracy 500 kV
- Tesla – Los Banos and Tracy – Los Banos 500 kV
- Bipole loss of the PDCI

Stuck-breaker contingencies:

- Round Mountain 500 kV CB 632
- Vaca-Dixon 500 kV one of any 500 kV CBs
- Tesla 500 kV CB 612

Stability Studies

Double contingencies:

- Round Mt. - Table Mt. #1 and #2 500 kV
- Table Mt. – Tesla and Table Mt.- Vaca 500 kV
- Table Mt. – Tesla and Vaca – Tesla 500 kV
- Bipole loss of the PDCI

Generator Outages

31. 2 Diablo Canyon Units
32. 2 Palo Verde Units
33. 2 SONGS Units

Voltage Control

Reactive capability of Northwest generation units will be based on the most recent information provided by plant operators.

Shunt capacitors will be modeled as shunt devices not as synchronous condensers.

Governors

For transient stability simulation, governors will be represented as requested by the Modeling and Validation Work Group. The GGOV1 (and LCFB1) thermal governor model will be utilized for dynamic simulation.

For post-transient analysis, governor actions for all generators are assumed to have the same droop rate, (Pmax method), unless specifically blocked in the powerflow based on the work by the Modeling and Validation Work Group.

Load Models

The load models for transient stability will be those provided by the utilities in the initial base case development or in modifications to the base case in the WECC review process.

The load models for post-transient analysis will be constant power.

Base Cases

The base case will start from the 2015 summer case developed and approved by WECC.

Operating Reserve

Evaluate at realistic generation pattern and document the operating reserve level in Northern California.

For Post-transient Governor Load Flow:

- NERC/WECC Planning Standards.
- A maximum of 7% voltage dip is allowed at any bus in Southern California Edison system under N-1 conditions.
- In California, the 5% reactive margin test will be followed for N-1 and the 2.5% reactive margin test will be followed for credible N-2.

- For G-2 of nuclear generation plants, only positive margin is required.

Transient Stability

Transient stability runs will be run out to 20 seconds to ensure the system is stable and positively damped.

~~**Schedule**~~

~~Study Plan submitted for review~~	~~September 21, 2011~~
~~single interconnect scenarios~~	~~September 22, 2011~~
~~LMUD report shell for Review from NV Energy~~	~~09/26/2011~~
~~Revised base cases for LMUD and GBHVDC~~	~~09/30/2011~~
~~SSPG Approval of the Study Plan (via e-mail)~~	~~10/03/2011~~
~~Revised base cases for LMUD and GBHVDC combined scenario~~	~~10/04/2011~~
~~Power Flows~~	
~~LMUD Study / GB HVDCX~~	~~10/11/2011~~
~~Stabilities~~	
~~LMUD Study / GB HVDCX~~	~~10/25/2011~~
~~GB HVDC report shell for Review from NV Energy~~	~~10/14/2011~~
~~Combined Studies~~	
~~Power Flows~~	~~11/2/2011~~
~~Stabilities~~	~~11/2/2011~~
~~GB HVDC report shell written~~	~~10/14/2011~~
~~Q_V Studies~~	~~10/ 25,/2011~~
~~Draft Report out for SSPG member review~~	~~10/27/2011~~
~~Report Bodies, Power flow appendices and Stability appendices for:~~	
~~LMUD and GB HVDC complete~~	~~11/1/2011~~
~~Power Flow Analysis for combined projects~~	~~11/3/2011~~
~~Stability Runs Completed combined projects~~	~~11/3/2011~~
~~Report Bodies, Power flow appendices and Stability appendices for:~~	
~~LMUD and GB HVDC complete~~	~~11/7/2011~~
Report Deliveries to WestConnect Annual Planning Workshop	11/10/2011
Report Summaries Presented to WestConnect Annual Planning Workshop	11/16/2011