WESTERN ELECTRICITY COORDINATING COUNCIL
PowerWorld Users Group Meeting (and Workshop) #3

15 to 16 October August 2012 (1000 to 1700, 0900 to 1700)
Tacoma Power
Tacoma, WA

AGENDA MEETING #3

15 October 2012

1000-1015
Welcome to Tacoma (Tracy Rolstad and Joe Wilson)
Arrangements, breaks, agenda, purpose of group, and introductions. Per WECC practice this will be a PAPERLESS meeting. Presentations shall be posted at the WECC website. Forum is User's Group on Day 1, group directed workshop day 2. Discuss use of workshop hours and presentations versus interactive seminar format. **Thank you Tacoma for hosting this meeting!**

1015-1030
Bug Reporting, Patches, Support, On-Line Training (Tracy Rolstad and Matt Davis)
Support: (see http://www.powerworld.com/company/customer-support)
Patches: (see http://www.powerworld.com/DOWNLOAD/patches.asp),
All training now available on-line (see http://www.powerworld.com/training/online-training)

1030-1100
RAS/SPS & Macro that converts power flow ctgs to transient elements (Khanh Thai)
RAS/SPS functions in powerflow solutions: Existing Functions and Opportunities
Applying a macro to convert PWS contingencies to PWS - Transient contingencies

1100-1200
FERC 754 and PowerWorld Simulator (Tracy Rolstad)
Leveraging numerous PowerWorld tools to address the study requirements of FERC Order 754. Using Excel concatenate features as a tool, and as a setup for comparison with String Expression tool of PWS.

1200-1300 Break for Lunch

1300-1500
Modeling Remedial Action Schemes (Matt Davis)
Use of new tools in PWS that provide a global RAS modeling capability and advanced logic that enables/disables RAS based on "system normal" lines status, etc.

1500-1600
Use of Time Step Simulation for Advanced Power flow studies (Eric Heredia)

1600-1700
What is new in version 17 (Matt Davis)

16 October 2012

0900-1200
Workshop
We can work on topics demonstrated in day one in detail or go to the ON Deck Presentations

1200-1300 Break for Lunch

1300-1700
Workshop

<u>On Deck</u>

Transient Stability Comparison and Testing Methods for Verification

Geographic tools in PWS, sources of data, where to find data, purpose of geographic tools in PWS

Best practices for inputting modeling data, how to sort out modeling tap changers, example documentation procedures and modeling data based on PWS as an input tool.

1. Vice-Chair's Report (David Franklin)

A. Review of TSS Meeting Action Items

B. Meeting Schedule/Locations

i. April 20-22, 2011 – Denver, CO

ii. August 24-26, 2011– Seattle or Bellevue, WA

iii. January 2012 – San Diego, CA

iv. August 24-26, 2012 – Portland OR "Columbia grid to host"

2. SRWG Report (Kent Bolton)

A. 2010 Annual Study Report ***Approval Item***

Two of the Category D outages "failed" to meet any specific performance requirement. Comment (Mark H) was made that the language "failed to meet the performance requirements" is incorrect since there are no performance criteria to meet in category D. In other words as long as it does not cause cascading outages it cannot fail. Discussion on how to evaluate cascading.

Discussion on outage D1032 – A three-phase Valley 500 kV fault and loss of the Valley-Serrano 500 kV line**.** Listed as a performance log item but it appears to be a representation issue. Recommendation is to list it as a performance log item and if the generator is not accurately represented than the generator owner must correct the modeling data. If they do not it is presumably a MOD violation.

Comment (Tracy R): On how this could become a more common occurrence going forward as independent/merchant generators get introduced into the base cases without accurate modeling. It should be the responsibility of the Transmission Owners to get the generator owners to provide accurate modeling because they signed the Interconnection Agreements with them. This is done at the System Impact Study stage. The generator owner should review the results for this case and inform TSS regarding its plans to provide updated dynamic models for the Panaero 115kV unit. The language in the body of the report was updated in the results section to reflect this.

Comment (Kyle K): On the need for a ***task force*** to review and revise the intent of the annual study program and to make the determination that we have we met the intent of the Annual Study assessment Program Report. Do we need to modify the intent to better align with the intent of the TPL-005 assessments that WECC (as the RRO) needs to comply with? ***Should the annual study program explicitly state that it IS the RRO's method of complying with TPL-005?***

Comment (Branden S): What is the Annual Study Report used for? Does WECC really need to be doing this study (as it exists today)? Or can the individual TPL assessments meet the intent of the Annual Study Program? Does WECC need to start collecting the 5 and ten year TPL assessments?

B. 2012 Base Case Descriptions and Survey **(Sarah Majok)**
Survey to solicit disturbances study focus is on the southern Nevada/Arizona/New Mexico.

Input on Scenario basecases for the 2012 study program

C. Performance Log Review
No new log items, TriState's previous log items were resolved

D. Representation Log Review
An improvement in the PSS representation over last year
Reminder to members to get various exemption letters in so those exemptions can be noted in the Rep Log/Exceptions List.

E. UFLS Task Force Recommendations – update
September 30th conference call agreed to create a template for submittal of relay data.
Working on creating a UFLS input template.

F. DPM - PSS Data Submittal Requirements

Day 2, January 20, 2011

3. TEPPC Report (Marv Landauer)

A. 2010 TEPPC Study Program – update
In 2010 the group looked at four study cases. The presentations for these are available on the TADS website. See URL below:

http://www.wecc.biz/committees/BOD/TEPPC/TAS/Shared%20Documents/Forms/AllItems.aspx

Premise - 2019 Resource Relocation Scenarios took 12,000 GWh of renewables from California replaced the 12,000 GWh of resources relocated elsewhere in WECC
Goal - to observe pattern of transmission congestion under different resource portfolios

Eight resource relocation scenarios were identified to study the shift of resource from CA. COI loadings indicate that SWIP project would make a great deal of sense (if all the renewable resources develop outside of California) as COI is loaded nearly 30% of the time and this is well above today's current operation. Marv's presentation will be available on the TSS website (http://www.wecc.biz/committees/StandingCommittees/PCC/TSS/TSS%20Meeting/default.aspx?InstanceID=1)

Reliability Subcommittee

i. Currently looking into the adjacent circuit criteria. WECC has looked at the actual outage data of common corridor and common tower and has discovered that there is not a lot of difference between the outage data. The group is currently thinking that the distance should not be the longest span but should be by the height of the tallest tower but this would eliminate most all common corridors. The group is also considering that the criteria should be a distance only criteria and not dependent on what is between. For example a 500kV 230kV 500kV all within a 200ft corridor would be all credible outages.

ii. Discussion on considering a change for adjacent circuit criteria such that circuits may be in a common corridor for a cumulative distance of up to 2 miles anywhere along the route. This is a change from the existing criteria of five spans out of the substation.

4. M&VWG Report (Dmitry Kosterev)

A. 2011 MVWG Priorities
B. Load Modeling Task Force
i. Composite Load Model Structure
Discussion: When do we need to start using this model for operational studies? When will WECC issue updated stability data with the new composite load model?

The major features of this model are the inclusion of the distribution system, and motor, air conditioner, electronic and static loads. Still in question is the AC stalling under low voltage conditions. Benchmarking is needed along with EMTP-level

analysis.

ii. Load Model Data
M&VWG is comfortable with the existing methodology. The end use model is ok. The load composition is still a challenge, i.e. motor and electronic load protection is still a challenge, but we are making great progress with the work done under WECC

- MVWG will provide a tool for calculating load composition, including data sets.
- MVWG will provide regional defaults for the composition for load model data
    - Summer, winter, shoulder periods will have regional default data sets.

iii. Tools for Managing Load Data
A sequence of EPCL program exists for PSLF program working to develop another in excel spreadsheet

iv. Load Model Validation and System Impact Studies
Discussion:
Lack of disturbance recording data to test model against
Make model available to study engineers for testing. MVWG will prepare CMPLDW files for 2011 study program
Fault Induced Delayed Voltage Recovery (FIDVR) needs to be addressed since it is known to occur for faults with normal clearing
Define the performance requirement for the system for events causing FIDVR then performance objectives relate with the simulations
How well can the power system model predict the FIDVR performance?
Industry outreach:

- Made a presentation to SRWG workshop in Nov 2010
- Iterations with the RS to redefine what the performance requirements should be

C. System Model Validation
Discussion:
From WSM powerflow case (Node-breaker-element code) to WECC base case (bus branch number ID) WECC dynamic database (bus number ID):
Option 1:
Convert WECC dynamic database to element code definition consistent with WSN (one time effort)
Option 2:
Map generation load and equipment status from WSM powerflow case and the new dynamic data file
Validation studies are done using WECC powerflow case and existing WSM
Vendor proposed solution RFP

i. Statement of Work for System Model Validation Project *Approval Item*
******Approval Item:* Deferred until next meeting***

D. Renewable Generation Modeling **(**Dmitry Kosterev**)**

i. Wind Power Plant Modeling

*(1)*WECC Wind Plant Dynamic Modeling Guide *Approval Item*

Manufacture models are okay for SIS studies but are unsuitable for grid studies for several reasons. Generic models are preferred because they are designed for the study of electrical (not wind) events

Revisions to wind models:

WT1 – Needs modification to aerodynamic control model

WT3 needs cover more manufacturers (most important)

Active power control needs to added to WT3 and to WT4

Model validation/ verification and model improvement will continue over time

******Approval Item Complete:*** Motion carried to approve WECC Wind power plant dynamic modeling guide which includes the four generic wind turbine models under the following conditions

- The model improvement will continue
- The generic models are the best alternative at this time

ii. Central PV Power Plant Modeling

*(1)*WECC Guide for Representation of Photovoltaic Systems *Approval Item*

iii. Distributed PV Modeling

Discussion:

Integrating distribution side PV in load models adds another bus to the distribution system separate from the composite load model

Different models for residential PV…these are very simple and trip off quickly for low voltage

******Approval Item Complete:*** Carried the motion to approve the "WECC Guide for representation of PV systems in large scale Load Flow Simulation"

E. Generator Model Validation

i. Model Data Review

ii. Synchronous Machine Model

*(1)*Remove GENSAL model from approved model list *Approval Item*

Discussion:

The GENSAL model is not adequately representing generator units. MVWG wants to pull it out of the database and replace with GENTPJ. GENTPJuses the same parameters/coefficients but GENSAL ignored saturation in the quadrature axis. Recommendation to replace GENSAL model with GENTPJ saturation parameter "Kis" is set to zero by default will be updated based on the V-curve reactive limits if tested.

A conversion program developed by John Undrill can do a bulk conversion for the MDF

******Approval Item Complete:*** Carried motion for the following:

To remove the GENSAL model from the WECC approved model list

Convert legacy excitation models to IEEE-approved excitation models

Discussion:

IEEE and legacy models are identical except that IEEE models have interface points for OELs and UELs
OELs and UELs are essential for FIDVR risk analysis
Next step to get GENSAL remove from the WECC approved model list
Little Goose is up due to re-validation, but they are planning to replace excitation systems in 2011, USCOE is asking to defer re-validation until the exciters are replaced
MVWG voted in favor of granting the exceptions by majority vote, however there were several abstentions
The deferral request to MVWG is to replace the exciters and then test and revalidate
TSS doesn't have to approve this because the authority lies with MVWG

iii. Excitation System Models
(1)State of work for exciter model conversion project *Approval Item*

iv. Turbine Control Models

F. SVC Modeling

i. Addition of SVSM01 model to approved model list *Approval Item*
Documentation is available
******Approval Item Complete:*** Motion carried to add SVSMO1 to the list of WECC-Approved Models and replace SVCWSC

Discussion on MSS01 – Model for mechanically switched shunt capacitors

G. HVDC Modeling
Discussion:
IPP DC model
- The model is available in both PSSE and PSLF
- Model was tested and approved
- Model issues have been reported

MVWG workshop held in Salt Lake City at WECC office June 11th
PDCI
- Continue looking into S to N model issues

H. GE PSLF, PSS/E and PowerTech TSAT program updates

I. Long Transmission line modeling discussion (Peter Mackin P.E.)
Short transmission line model from Stevenson is good up to 50 Miles long.
Transmission lines greater than 150 miles using the per mile impedance times the line length can result in an inaccurate representation of the transmission line
Example #1 200 mile long line
Horizontal 32' spacing
Using the PowerWorld TransCalc uses long line equations
Aspen line constants calculates a per mile impedance
Could affect rating studies as much as 2-3%
Example #2 200 mile long line
5 series of segments on a line in GE PSLF

SRWG will review this material and representatives will be reviewing the data to make a determination everyone should go back and discuss this with their SRWG member it may be that the data prep manual updated to require hyperbolic correction for the R, X and B quantities that get submitted.

Should entities be using consistent algorithms for lines longer than 50 miles (i.e. long line hyperbolic model) this detail is not specified in the data prep manual. Strictly speaking NOT using the hyperbolic line calculation could be viewed as a FAC or MOD violation.

5. Base Case Coordination System (David Franklin)

i. Vendor Recommendation ***Approval Item***

Discussion:

Software Requirements

- Centralized system
- Notifications, coordination between areas
- All corrections are made at once
- Data entry checks
- Project files in service dates and out of service dates, power flow and dynamics data
- One common starting case
- Be able to export data in user-definable reports
- Recreate any previously produced base case

Agreed to the scoring techniques before reviewing the vendors' presentations
The group followed the critical analysis technique by defining the decision matrix upfront and did not change it in the end (after a consensus has been reached for scoring).

Reminder that the BCCS should provide WECC with a capability of providing more base cases available every year.

Scoring was based on:

- The functional requirements (If the vendor has something off the shelf) – 40%
- Time score– 40%
- Cost score–15%
- Vendor experience– 5%
- Developmental milestones requirements (yes/no)

BCCS needs to meet the minimum critical requirements of the WECC data-prep-manual but be an automated system that can interface with the WSM and produce solved cases. A higher weighting is attributed to a vendor that has a product available or can modify what they have versus a vendor that doesn't have anything (but promises to develop a product at a cost).

Vendor B had the architecture of a three tier web based application: client, business logic, and database using Oracle which was highly prized by the reviewers
Eventually WSM need to be the basis for all the planning cases this goal cannot be lost at TSS while we are discussing picking the vendor for this first draft of a solution many concerns were expressed that the only vendors that scored high were the ones that had already developed software and did not consider the best design database for WECC's needs therefore no score was given for development timeline and the vendors that could develop software within a reasonable time in other words they

were not given the same chance as the ones that had software available. The risk to WECC is that the development costs are unknown at this time if the vendors were not

SRWG/PTS is seeking approval of the recommendation of vendor for the selection of developing BCCS software

* ***Approval Item Complete:*** One NO vote against the BCCS recommendation since that party felt that vendor A has a better product. Motion carried with on no vote.

6. WECC Staff Report (Kent Bolton) 4:15-2:00

A. Status of Data Bank
   i. Case Development Schedule
      Much better than
   ii. Late Data Log
B. Log of Projects Undergoing Project Coordination and Rating Process
C. 2011 Path Rating Catalog
   WECC staff was directed to change the use of OTC to SOL in the language in the Path Rating Catalog. WECC staff will replace this and send it out over review of changes and a week to get corrections back to Kent
D. 2011 Annual Progress Report

* **Action Item:** Comments on any projects that are listed on the "Annual Progress Report Spreadsheet"

Discussion on:
WECC Regional Criteria

I. WECC-055 (RAS Criteria) –OC Craig Quist
   a. LAPS (Local area protection scheme) vs. WAPS (wide area protection scheme)
II. WECC-065 (Under Frequency Load Shedding) - OC/PCC -
III. WECC-70 (Governor droop Criterion) OC
IV. WECC-71 (System Performance Criteria) - PCC RS Marv L.
V. WECC-74 (Steady state and dynamic data criterion)

Day 3, January 21, 2011

7. Bulk Electric System Material Impact Assessment (Johnny Hernandez)

Framework for Assessing Material Impact – discussion:
TPL -004 performance levels with losing an entire substation as a starting point. This turned out to be to harsh even for some of the smaller stations when compared to the methods proposed. Decided that TPL -002 and TPL-003 should be used as a performance based study method for identifying BES. Participants in this task force looked at 100 kV and above. WECC is seeking positions on a NERC standards drafting team will be formed shortly. TSS will not do any more study work on BES definition.

8. Document Categorization Assignment (Tom Green)

BOD approved seven categories for documents to fall into. Most guidelines fell into "guidelines" also all of the documents needed to be formatted into a predetermined

template. But most of our document did not fit well into the template so that effort was tabled for now.
Members are reminded top review the WECC Library for categorization changes and document retirements.

9. PCC/TEPPC Project Coordination and Path Rating Task Force

A. Project Coordination **(Tom Green)**
Currently revising the regional planning project coordination. The name has changed, and the eleven guidelines are down to four guidelines (many of the eleven were repetitive). It is now mandatory to go through the regional planning process for any and all projects 200 kV and above unless you file for and receive a waiver. This is posted for comment on the PCC website comments are due today! Projects can be removed from the phase rating process if there is 18 months of inactivity.

B. Phase 1-3 Sub-Team **(Craig Quist)**
Group is working to define a new Phase 2a and Phase 2b. These phases are where projects need to make a higher level of commitment to meet the qualifications. Also, a project sponsor in Phase 2b may have the option of studying a phase 2a project. The TSS chair can remove projects that are inactive. Similarly situated projects are classified by their in-service date and not when they entered Phase 2. The "new" rating process document is located here:

http://www.wecc.biz/committees/StandingCommittees/PCC/Shared%20Documents/ProjectCoordination_ProjectRating_ProgressReports_approved%203-11.pdf

10. NERC (Various)

A. Status of NERC activities (SAR's, etc.) **(Joe Seabrook)**
NERC is reprioritizing all of the standards. The VAR standards moved all the way to the bottom (essentially mothballed for now). Most on the committee are mystified by this because VAR issues are what caused the August 2003 blackout. This blackout was the outage that triggered the standards becoming mandatory. The change in focus to the top ten standards the top three are Cyber security, protection maintenance and testing, and system protection coordination. Nnumber four is the TPL standards and the hold up for finalizing TPL-001 is footnote b which basically says you can't use load tripping as a planning tool. This language passed the balloting pool this will be added into TPL-001-1 which will replace all the others TPL- 001-004.

i. VAR SAR **(Joe Seabrook)**

B. Generator Standards / PRC-024-2 (**Craig Quist)**

C. TPL Issues (**Joe Seabrook)**

D. FAC Issues (**Eric Egge)**

E. AVR Issues **(Shawn Patterson)**

F. MOD -001 Implementation **(Tom Duane)**
Delay Request filed at FERC (by utilities in western interconnection footprint) for 18 month delay filed on Dec 30th. The largest issue is the loss of ATC with MOD-029

methodology.
MOD -029 is the rated system path methodology…traditionally the path rating methodology is based on an interface that you can measure. MOD-029 is referring to a ATC Path which is a POR and POD flow limited element. This approach has never been through the path rating process and it is very difficult to define what the flow on this path is. There is a concern that many WECC members may difficulty demonstrating capacity using this method.

11. PTI PSS/E & PTI PUWG Report (Craig Quist)

A. PTIPUWG Update
Next revision will be available after the first quarter of this year

12. GE PSLF & GE PUWG Report (Mark Graham)

A. GEPUWG Update
WECC has not tested revision 17.07 but expects to complete testing by the end of the month. Revision 18 is under-testing and will be out sometime this year.

13. PowerWorld Report (Tracy Rolstad)

Comparison of results stability studies for the same outages run on PSAT, PowerWorld Simulator, and GE-PSLF the results give very much the same answer but somewhat different in the range of the valleys and troughs, however its impossible to say which one is truly correct. Recommendation that WECC compare each platform with data from a real outage and see which correctly simulates the outage.

14. Reactive Margin Presentation

Northwestern Energy (Rikin Shaw)
Covered quite a bit of the background history on NWE and the transmission system in Montana.
PV analysis show that NWE has very little reactive margin on its system and the worst condition is when BPA takes a line out under light loading. This is mitigated by the use of generation tripping performed by the Colstrip Acceleration Trend Relay (i.e. the ATR).

15. Review New Action Items

**** **Action Item:*** Comments need to be provided on: WECC standards /under development / team sites /comments

****** Action Item:*** Comments on any projects that are listed on the "Annual Progress Report Spreadsheet"

16. Informal Reports

Coulee currently has 600 MW of pumped storage capability there is currently a project to determine if that can be increased

Colorado has recently passed legislation to allow utilities to make transmission investments in renewable development areas and recoup those investments in the rate base as long as generator do connect to the line within ten years of construction if not they will have to reimburse the ratepayers

Wind power could be used to run the re-heat cycle on a gas turbine!
Pro – can balance out put of wind with gas instantaneously
Con - have to locate the gas plant on the wind farm