

**Assess Transmission Future Needs Standard Drafting Team**

**August 6, 2007**

**Conference Call Notes**

**1. Administrative Items**

**a. Introductions and Quorum**

John Odom, Chair, brought the call to order at noon on August 6, 2007. The call participants were:

<b>Members:</b>		
Darrin Church	Doug Hohlbaugh	Bob Jones
Brian Keel	Tom Mielnik	Bob Millard, Vice Chair
John Odom, Chair	Bernie Pasternack	Bob Pierce
Paul Rocha	Bob Snow	Chifong Thomas
Bob Williams		
<b>Observers:</b>		
Bill Harm	Hari Singh	
<b>Guests:</b>		
Gilbert Coulam, PacifiCorp	Dana Cabbell, SCE	Donald Davies, WECC
Tony Jablonski, RFC	Mark Maher, WECC	Chuck Matthews, BPA
Louise McCarren, WECC	Steve Rueckert, WECC	Kevin Thundiyl, FERC

**b. NERC Antitrust Compliance Guidelines — Ed Dobrowolski**

There were no questions raised on the NERC Antitrust Compliance Guidelines.

**c. Review Meeting Agenda & Objectives — John Odom**

The main objective of this call was for WECC to make a presentation on the operation of and reasoning behind its Remedial Action Schemes (RAS)/Special Protection Systems (SPS) and for the team to ask questions and discuss this issue. The secondary objective of the call was to review the tables and determine the final formatting, and to discuss the standards language as time permits.

**2. Discussion with WECC Representatives on RAS**

Steve Rueckert led this discussion using a Power Point presentation (**Attachment A**). The desire was to help the SDT to an understanding of Remedial Action Schemes (RAS). (Note: RAS and SPS are used interchangeably here.)

The WECC rules state that if you haven't studied a situation, then you can not operate there.

If an SPS mis-operates, then system performance must be the same as if the contingency it was protecting against had actually occurred, (i.e., system performance must still be within limits). A mis-operation is treated the same as a single event. The number of mis-operations over the years has been few:

Year	# of Mis-operations
'98	1
'99	0
'00	0
'01	3
'02	1
'03	0
'04	1
'05	3
'06	0
'07 (to date)	0

It was noted that these mis-operations did not cause any system problems but it was not known if any of them occurred when the system was stressed.

It was noted that all generation in the WECC-1 scenario is hydro and that dispatchers must manually arm the SPSs, since they are not automatically set in any case.

A question was raised as to how much firm load was dropped in these scenarios. The response was that it is different in each scheme. In the WECC-1 scheme, it is only done at an n-3 condition. In the path 26 scheme, between 1400 and 2500 MW can be shed.

Generators included in SPS are treated the same as any other generators.

It was noted that the SDT is attempting to address the statement in FERC Order 693 that there should be no loss of firm transmission service for any single event except where load is attached to the outaged element(s).

Where does SPS mis-operation (or failure) fall in the list of probable events? The current table only addresses single relay operations, not multiple operations in redundant SPS. The SDT needs a number for this if it is to properly categorize SPS. Brian and Tom offered to work on this.

**AI** — Brian and Tom will work on coming up with a probability number for SPS so that it can be properly ranked in the tables. This is due no later than the Atlanta meeting.

A question was asked as to how many of the 65 SPS schemes actually have a loss of firm load and generation as part of their process? The answer was not available at

this time. Chifong will look into this and report back to the SDT no later than the Atlanta meeting.

**AI** — Chifong will provide an answer as to how many of the 65 SPS schemes involve actual loss of firm load or generation no later than the Atlanta meeting.

Another question was when and how the determination was made to actually build to correct a situation versus just going with an SPS. There was no single clear answer to this but at PG&E, for example, they perform a 'value of service' analysis to make this determination.

The SDT has not really addressed the cost of making the TPL requirements more stringent than the current set of requirements.

The SDT needs to determine if and when the loss of non-consequential load will be allowed for n-1 conditions.

Bob Snow reminded the group that the eventual solution can not be a least common denominator solution.

### **3. Review the Tables**

Formatting and appearance items were covered under this agenda item. Content of the tables will be finalized at the Atlanta meeting.

#### **a. Steady State — Chifong Thomas**

Columns 3 and 4 should be eliminated.

The loss of two circuits on a single tower was dropped in the last revision but it needs to be put back in the table. Tom Mielnik will provide the probability number for this condition so that it can be slotted correctly in the table.

**AI** — Tom Mielnik will provide a probability ranking number for the loss of two circuits on a single tower. This will be completed no later than the Atlanta meeting.

#### **b. Stability — Bob Jones**

Bob had some concerns with the re-formatting that John performed. While we certainly want to combine some events in order to eliminate rows, this can only be done if the probabilities were the same.

The SDT still wants the tables to look and feel the same to the maximum extent possible.

Bob Jones will look at the two tables and try to come up with a common look and feel while retaining and combining rows based on the probabilities. This will be ready for the Atlanta meeting.

*AI* — Bob Jones will re-work the two tables to provide a common look and feel while grouping the conditions according to probabilities. This will be ready no later than the Atlanta meeting.

#### **4. Review Revised Language for TPL-001-1 — John Odom**

The three bucket concept has not been written up yet. As a reminder, the three buckets were basically:

1. Firm contracts and market rules
2. Reasonably stressed case
3. Sensitivities, e.g., weather

Bucket #1 would include peak load conditions plus firm and economy transfers. RAS/SPS would be needed here in WECC and thus they are not sure that they can produce such a case.

The question was raised as to whether any n-1 events in WECC will result in non-consequential load loss. The answer was not known but Chifong will look into this and report back no later than Atlanta.

*AI* — Chifong will provide the answer as to whether any n-1 conditions in WECC result in loss of non-consequential load. This response will be provided no later than the Atlanta meeting.

It is no longer clear that the three bucket approach will work if it can't handle the WECC situation. We would still need buckets #2 and #3 however; we must do something with the sensitivity cases.

SPS is a defined term in the NERC Glossary.

In a quick poll of the SDT members on the call, it was determined that the SDT may be willing to accept loss of non-consequential load in n-1-1 or n-2 situations where an SPS is deployed. No limits or reporting requirements would be placed on such solutions.

#### **5. Develop Questions for First Posting**

Drafting Team members were asked to think of questions that could go out for the first posting and to have them ready for discussion in Atlanta. The questions should probably be centered on significant changes, clarifications, or the closing of loopholes being made in the new, revised standard.

## **6. Next Steps — John Odom**

Any discussion on next steps was deferred until we see what progress is made in Atlanta. The goal is to post TPL-001 in September.

## **7. Schedule Next Meetings**

- a. Wednesday, August 22, 2007 in Atlanta, Georgia at GA Power facilities from 1–5 p.m. EDT; Thursday, August 23, 2007 — 8a.m.–5 p.m. EDT; Friday, August 24, 2007 — 8a.m.–noon EDT. Details have been forwarded to the mailing list.
- b. Conference call and WebEx will be on Thursday, September 6, 2007 — noon–4 p.m. EDT.

## **8. Review Action Items and Schedule — Ed Dobrowolski**

Action items developed during the call were:

- Brian and Tom will work on coming up with a probability number for SPS so that it can be properly ranked in the tables. This is due no later than the Atlanta meeting.
- Chifong will provide an answer as to how many of the 65 SPS schemes involve actual loss of firm load or generation no later than the Atlanta meeting.
- Tom Mielnik will provide a probability ranking number for the loss of two circuits on a single tower. This will be completed no later than the Atlanta meeting.
- Bob Jones will re-work the two tables to provide a common look and feel while grouping the conditions according to probabilities. This will be ready no later than the Atlanta meeting.
- Chifong will provide the answer as to whether any n-1 conditions in WECC result in loss of non-consequential load. This response will be provided no later than the Atlanta meeting.

Doug Hohlbaugh reported that his open action item on the 693 cross reference will be completed for Atlanta.

While we are still months behind the original published schedule for this project, there is a possibility that we can make the stated goal of posting in September if we can make reasonable progress in Atlanta towards resolving the remaining open issues.

## **9. Adjourn**

John Odom, Chair, adjourned the call at 4 p.m.



*Western Electricity Coordinating Council*

# *System Protection Systems (SPS) in the WECC*

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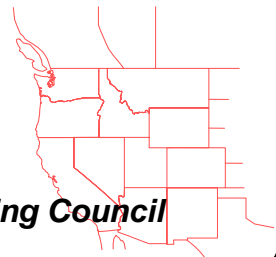
**ATFNSDT Drafting Team  
Conference Call**

August 6, 2007

## *Purpose of Discussion*

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- Goal is to achieve common understanding and the development of a standard that is mutually acceptable to **all** interested parties
- Educate the ATFNSDT on the use, design, and reliability of SPS in the Western Interconnection
- Educate/update Western Interconnection call participants on the intent and proposed direction of the ATFNSDT



## *SPS – A Proven Track Record in the Western Interconnection*

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- WECC has utilized SPS in the planning and operation of the interconnected system in the west for a long time
  - Currently 65 SPS listed in the WECC SPS Catalog
    - Catalog is updated annually
  - Many dating back to 1986 or 1987
- SPS have a proven track record of successful use by Transmission Planners and Planning Authorities for meeting the performance requirements of TPL-001 through TPL-004
  - Tool that should not be prohibited by modifications to the old standards in developing the new standard
  - Performance Standard should focus on results, not methods for achieving results

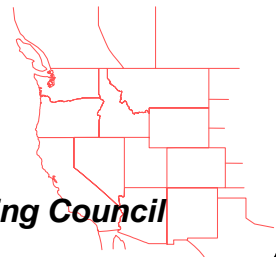




## *Need for continuation of SPS in the Western Interconnection*

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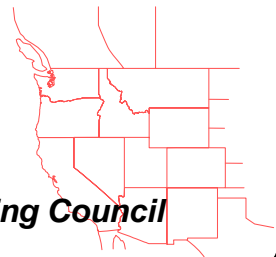
- Many system limits in the WECC are stability limited owing to:
  - Remote generation
  - Long (500 to 1000 miles) transmission lines needed to deliver remote generation to load centers
  - Physical attributes, stability limits that are often substantially below any thermal limits
  - Need for reliable and feasible 'non-wires' alternative to increase system capabilities



*SPS in the WECC*  
*SPS are Reliable*

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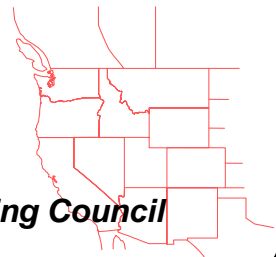
- Redundancy
  - Failure of any one component will not cause a failure of the scheme
  - Most components can be removed from the scheme for test or repair while the rest of the scheme remains in service
- Two out of three voting schemes
  - Two of three controllers must agree
  - If one fails, two remaining must agree
- Controllers that prevent arming or initiation if conditions are below specified levels



*SPS in the WECC*  
*SPS are Reliable*

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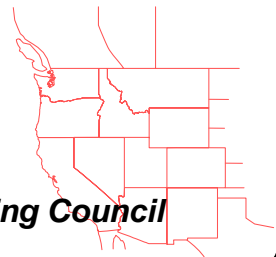
- WECC Remedial Action Scheme Reliability Subcommittee (RASRS)
  - **Mission:** to review the reliability aspects of existing and planned remedial action schemes (RAS) and to enhance grid performance within the WECC region by promoting a uniform evaluation and approval process
  - **Scope:** promote the reliability of remedial action schemes (RAS) within the WECC region by providing a multidisciplinary evaluation.



## *RASRS Procedure to Submit a RAS for Assessment*

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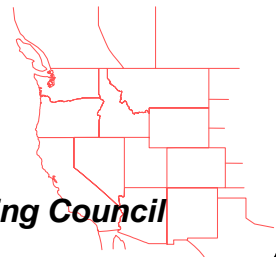
- Existing framework for the submission of a SPS to the RASRS for evaluation
- For those schemes for which failure would result in bulk transmission system performance in a neighboring facility outside the limits of the WECC performance requirements
  - Includes NERC standards performance requirements



## *RASRS Procedure to Submit a RAS for Assessment*

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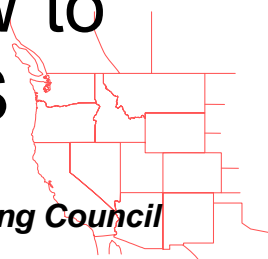
- **Must be completed:**
  - Prior to installation and commissioning
  - Before significant modifications or extensions
  - In the event of failure of the scheme
  - Every five years
  
- **Reliability of SPS is comprised of:**
  - Dependability – operates when it should
  - Security – does not misoperate when not needed
  
- **Failure of an SPS is not considered credible if the SPS is fully redundant**



## *Examples of SPS – WECC-1*

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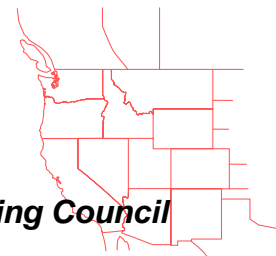
- For outages of the California-Oregon Intertie (COI)
  - Prevents overload, low voltage, and instability in the connected system should one or more lines between BPA (Oregon-Washington) in the north and SCE (southern California) in the south trip for whatever reason
  - Selected 500 kV lines have line loss logic to initiate SPS for specific operating conditions
- COI limit potentially reduced from 4800 MW to something less than 1000 MW without SPS



## *Examples of SPS – WECC-1*

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- Tripping armed generation in the northwest U.S. and in Canada
- Tripping PG&E and the California Department of Water Resources (CDWR) generation
- Dropping pump load at Helms (PG&E) and the CDWR and USBR aqueduct pump load
- Applying the braking resistor at Chief Joseph (BPA)
- Suspending automatic generation control (AGC) at BPA and BCHA
- Inserting mechanically switched capacitors and shunt reactors
- Bypassing series capacitors
- Sending signals for intertie separation
- Removing shunt capacitors and shunt reactors
- Tripping firm load at the transmission level

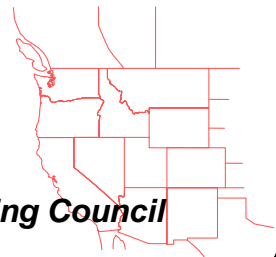


## *Examples of SPS – Midway Vincent Path 26*

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- **Purpose 1**

- Increase Path 26 capability from 500 MW to 2000 MW when critical lines are out of service
- Protects against thermal overload of TOT 2 (Ut/Colo – SW)
- Arms up to 2500 MW of load for dropping



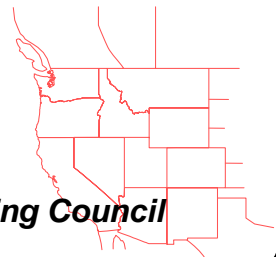


## *Examples of SPS – Midway Vincent Path 26*

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### ● Purpose 2

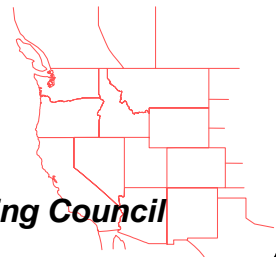
- Increases Path 26 rating from 3700 MW to 4000 MW
- Protects against thermal overloads of Midway-Vincent #3 for loss of the #1 and #2 lines
- If Path 26 Flows are above 3700 MW, arm 2-230 kV SCE substations to drop 1200-1400 MW of load
- Trip 1400 MW generation in PG&E Area if flow on Path 26 above 3700 MW



*Examples of SPS – High Desert Power Project*

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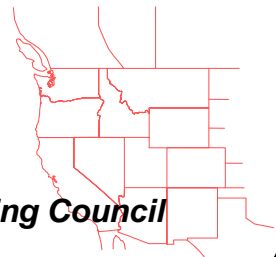
- Trips between 0 and 840 MW of High Desert generation, depending upon the contingency and precontingency loading, to prevent thermal overload and system instability
- Operates for N-1 or N-2 Lugo-Victor 230 kV lines
- Operates for N-1 or N-2 Lugo 500/230 kV Transformer Banks



*Examples of SPS – Bridger West*

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- Path rating relies on generator tripping at the Jim Bridger plant for loss of a single 345 kV line
- Without Generator Tripping scheme, the Bridger West (3 -345 kV lines) path rating would be reduced by approximately 700 MW (from 2200 MW to approximately 1500 MW)



## *WECC's Position and Proposal*

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- WECC seeks formal clarification of the intent behind (some members of) the drafting team's revisions to the TPL standards
- WECC's position is that the revisions, as currently drafted, do not reflect the interests of its members.
  - E.g. Is there an intent to limit SPS applications?
- WECC seeks a mutually acceptable solution by offering proposals for the performance table

