



**Southwest Power Pool, Inc.
OPERATING RELIABILITY WORKING GROUP**

Little Rock Face to Face

Wednesday May 3rd 2017 8:00 AM – 5:00 PM (CDT)

Thursday May 4th 2017 8:00 AM – 12:00 PM (CDT)

• Action Items and Voting Record •

1. Action Item: Make an electronic version of the SPP PSR Plan that contains editable PDF form fields.
2. Action Item: SPP Staff to provide ORWG with a recommendation for potential policy changes regarding how supplemental and spinning energy are utilized.
3. Action Item: SPP Staff send out a PMU survey to ORWG members.

Consent Agenda Items: April 4, 2017 ORWG Meeting Minutes

Jeff Wells (Grand River Dam Authority) moved to approve the consent agenda and Todd Gosnell (Omaha Public Power District) seconded the motion. The motion carried without opposition or abstention.

SPP PSR Plan

Jeff Wells (Grand River Dam Authority) moved to approve the SPP PSR Plan as modified with an implementation date of July 1st, 2017. Ron Gunderson (Nebraska Public Power District) seconded the motion. The motion carried without opposition or abstention.

ITP Manual

Ron Gunderson (Nebraska Public Power District) moved to approve the Operational Model Development language in the ITP manual, and Kyle McMenamain (Xcel Energy) seconded the motion. The motion carried without opposition or abstention.

RR210 Contingency Reserve Deployment Test

Todd Gosnell (Omaha Public Power District) moved to approve RR210 Contingency Reserve Deployment Test, and Craig Speidel (Western Area Power Administration) seconded the motion. The motion carried without opposition or abstention.

Update on Reliability Communication Tool Project

Ron Gunderson (Nebraska Public Power District) moved to endorse the Reliability Communication Tool Project pursuing the operating instruction and load shed functions of the tool as an initial phase, and the ORWG believes the functions are critical to reliable operations of SPP. Craig Speidel (Western Area Power Administration) seconded the motion, and the motion carried without opposition or abstention.

PMU Project Update

Kyle McMenamain (Xcel Energy) moved to support the basis of the cost within the PMU presentation, and Jeff Wells (Grand River Dam Authority) seconded the motion. The motion carried without opposition or abstention.

RR162 PMU for New Generator Interconnection

Jeff Wells (Grand River Dam Authority) moved to approve RR162 as modified, and Abu Elteriefi (ITC Holdings) seconded the motion. The motion carried without opposition or abstention.

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• M I N U T E S •

Administrative Items / Attendance / Agenda Review

Agenda Item 1 – Call to Order

Chairman Allen Klassen (Westar Energy, Inc.) opened the meeting at 8:04AM on 5/03/2017.
Chairman Allen Klassen (Westar Energy, Inc.) opened the meeting at 8:01AM on 5/04/2017

Agenda Item 2 – Attendance

Jason Tanner (Southwest Power Pool) called attendance and a meeting quorum was reached on both days.

Agenda Item 3 – Agenda Review

Allen Klassen (Westar Energy, Inc.) reviewed the agenda and noted the items that would require action. Allen stated that we would likely have to proceed through the agenda out of order due to the availability of the presenters.

Consent Agenda

Agenda Item 4 – For Consent Action

Allen Klassen (Westar Energy, Inc.) discussed the consent agenda item, which included the April 04, 2017 ORWG Meeting Minutes.

Jeff Wells (Grand River Dam Authority) moved to approve the consent agenda and Todd Gosnell (Omaha Public Power District) seconded the motion. The motion carried without opposition or abstention.

Liaison Reports

New ORWG Member Announcements

Allen Klassen (Westar Energy, Inc.) welcomed Keith Carman (Tri-State G&T) as a new voting member to ORWG, and stated that John Stephens (City Utilities of Springfield) would be stepping down from ORWG. Allen stated that ORWG is currently soliciting TU nominations to fill John's seat.

2017 Deliverability Study Scope

Allen Klassen (Westar Energy, Inc.) stated that ORWG, TWG, and SAWG held a joint conference call to discuss the scope for the 2017 Deliverability Study. Allen commented that we will attempt to discuss this item during the meeting if time permits, however it may be tabled until our next scheduled conference call due to the volume of items on our agenda. Ron Gunderson (Nebraska Public Power District) stated

he was concerned about how units would be incremented in the study. Jeff Wells (Grand River Dam Authority) stated he was concerned with the way generation is modeled outside SPP that is physically located inside SPP.

Agenda Item 5 – SPP PSR Plan.

Ron Gunderson (Nebraska Public Power District) discussed the OTWG comments in the SPP Power System Restoration Plan (PSR). The ORWG discussed the meaning of a slow moving synchroscope needle, and decided to leave the language proposed by OTWG. The ORWG also discussed and modified number 15 such that a unit will be identified and set to Frequency control prior to synchronization, and before interconnections are made steps should be taken to ensure only one unit is on isochronous control. Ron provided a spreadsheet that would replace attachment 2 in the SPP PSR plan, and the ORWG decided to strike ITC Great Plains from the SPP PSR plan.

Action Item: Make an electronic version of the SPP PSR Plan that contains editable PDF form fields.

Jeff Wells (Grand River Dam Authority) moved to approve the SPP PSR Plan as modified with an implementation date of July 1st, 2017. Ron Gunderson (Nebraska Public Power District) seconded the motion. The motion carried without opposition or abstention.

Agenda Item 6 – ITP Manual

Will Tootle (Southwest Power Pool) discussed the Operation Model Development language in the ITP Manual, and stated that State Estimator snapshots are archived following every valid state estimator solution. Will stated that certain snapshots would be converted from a node-breaker to a bus-branch representation as needed. Will stated that after the conversion, the topology, generation and load values would be in a .RAW formatted case. Will stated that time periods will be identified and selected by SPP Operation engineers to verify Persistent Operational Issues and to validate proposed solutions.

Ron Gunderson (Nebraska Public Power District) moved to approve the Operational Model Development language in the ITP manual, and Kyle McMenamin (Xcel Energy) seconded the motion. The motion carried without opposition or abstention.

Agenda Item 7 – RR210 Contingency Reserve Deployment Test.

Jerry Stone (Southwest Power Pool) discussed RR210 Contingency Reserve Deployment Test and stated the purpose of this RR is to modify the duration of the cap imposed on resources that fail the spinning, supplemental, or offline supplemental threshold. Jerry stated this RR improves both reliability and efficiency of the Marketplace by limiting the Contingency Reserve capability the Resource can offer to the response observed in testing or actual Contingency Reserve deployments. Jerry explained the language edits in section 6.1.11.1, which explains the Contingency Reserve Deployment test instructions and associated Out-Of-Merit-Energy instructions to resources. Jerry explained that the improved testing and capping described in this RR will better ensure that Resource capacity set aside for system contingencies is more likely to be physically capable of responding as expected while also ensuring that Market Clearing Prices for Contingency Reserve are reflective of Resources physically capable of providing the service.

Todd Gosnell (Omaha Public Power District) moved to approve RR210 Contingency Reserve Deployment Test, and Craig Speidel (Western Area Power Administration) seconded the motion. The motion carried without opposition or abstention.

Agenda Item 8 – Update on Reliability Communication Tool Project.

Scott Aclin (Southwest Power Pool) explained the need for a Reliability communications tool, and stated that the proposal was declined at PRPC. Scott stated that was duplicating certain functions from the portal. Scott stated that the creation of a real-time, web-based, two-way communication tool is needed for Reliability Coordination for relaying messages to members. The information could be communicated to individual entities or multiple simultaneously. Along with saving time on notifications, this tool would also aid in documentation for three-part communication and eliminate the dependency on email for relaying critical, real-time messages. Scott explained that when we conducted the most recent load shed test, it took approximately 15 minutes with 3 operators to issue load shed instructions to 21 entities and receive confirmation. MISO, using their communications tool, can issue their load-shed test instructions and receive confirmations from their 36 LBAs in approximately 2 minutes with their communications system. Scott stated if we are to get this off the ground then it will need to become a load shed communications tool as a phase 1, and additional functionality could be added in subsequent phases.

Ron Gunderson (Nebraska Public Power District) moved to endorse the Reliability Communication Tool Project pursuing the operating instruction and load shed functions of the tool as an initial phase, and the ORWG believes the functions are critical to reliable operations of SPP. Craig Speidel (Western Area Power Administration) seconded the motion, and the motion carried without opposition or abstention.

Agenda Item 9 – RR228 SPP SOL Methodology.

Casey Cathey (Southwest Power Pool) explained that RR228 is still within the 18 day comment period and ORWG could vote to expedite this RR if they were comfortable with the language. Casey stated that once ORWG voted to expedite the RR then ORWG would have to take a second vote to approve the RR. The ORWG decided they would like to review the language prior to taking any votes. Ron Gunderson (Nebraska Public Power District) asked if the ORWG was the primary working group for this revision request, and Neil stated that we are with TWG. Allen stated that he wants this revision request to have time in RCWG, RTWG, SAWG, and TWG. Jason Tanner (Southwest Power Pool) reviewed the meeting calendar and scheduled a special meeting to discuss RR228 on May 10, 2017 from 2:00PM until 5:00PM.

Agenda Item 10 – Peak HAA Demo.

Derek Book (Platte River Power Authority) provided a demonstration of the hosted advanced applications (HAA) service offered by PEAK RC and explained the pros and cons of the HAA. Derek explained that state estimated studies could be performed by logging into the HAA, and they have the capability to see what PEAK RC is looking at. Derek explained that the system has increased communications, and has made it easier to discover anomalies in the system. Derek explained the differences between the RTCA and STCA and how to differentiate between the two. Derek showed how the models could be modified for special studies, and he showed how the cases could be shared. The ORWG expressed interest and would like SPP to pursue moving forward with offering a HAA service to the SPP members.

Agenda Item 11 – Macomber Map Demo.

Cody Parker (Southwest Power Pool) explained how the Macomber map provides a wide area system overview of the system, and Jeff Parker (Southwest Power Pool) provided a demonstration of the Macomber map and explained how it could be offered alongside the HAA. Jeff showed the functionality of the tool, and how efficiently details of system elements could be acquired. Jeff explained how the Macomber could be used in conjunction with the HAA. Cody stated that SPP would like direction from ORWG prior to going any further with the project. The ORWG stated they were very interested and would like to participate in beta test when offered. Jason Tanner (Southwest Power Pool) requested e-mails from ORWG members interested in participating in a beta test.

Agenda Item 12 – Wind Turbine Capabilities Frequency/Voltage.

Jason MacDowell (GE Energy Consulting Group) provided ORWG with a presentation over the voltage and frequency capabilities of type 3 wind turbines. Jason explained that a wind turbine converter can deliver reactive power (kVAR) without wind (kW). Jason showed test results to demonstrate the system voltage effects as the wind turbines regulate active and reactive power. Jason discussed the system impacts of frequency control and showed results of turbines without frequency sensitive controls, with governor controls, with inertial controls, and with both inertial and governor controls. Jason explained that plant level voltage control with ample reactive capability is widely available for wind plants today, and is required by NERC VAR-002 and FERC. Jason explained that for the conditions they studied, system-wide frequency response can be maintained with high levels of wind and solar generation with both traditional and non-traditional approaches.

Divya Kurthakoti (Siemens Power Technologies International) provided ORWG with a presentation over the voltage and frequency capabilities of type 4 wind turbines. Divya explained that wind plants using full-converter wind turbines have the ability to regulate voltage, change modes in real-time, and produce VARs when the wind is not blowing. Divya explained how a full-converter wind park compares with a synchronous generator for steady-state voltage control. Divya explained Frequency droop control, and simulations performed in ERCOT. Divya explained that Wind turbines respond directly to system frequency, not speed, and are not constrained by mechanical governor constraints.

Allen Klassen (Westar Energy, Inc.) and the ORWG thanked both Jason MacDowell and Divya Kurthakoti for presenting.

Agenda Item 13 – Dynamic Ratings for DA studies.

Jonathan Marmillo (Genscape) discussed the benefits of using dynamic line ratings, and explained the differences in methods used throughout the industry. Jonathan explained the variables that go into calculating dynamic line ratings, and discussed the impacts of wind direction along or across a transmission line. Jonathan also discussed the impacts for using temperature based dynamic line ratings. Jonathan explained how dynamic ratings impact reliability, and discussed barriers such as how adjusting line rating can create potential issues with forward looking studies like the SPP market.

Agenda Item 14 – Review of CR Event.

Derek Hawkins (Southwest Power Pool) discussed the review of the CR event. Derek explained the short term forecast, and Daniel Baker (Southwest Power Pool) explained how ramp sharing works. Casey Cathey (Southwest Power Pool) explained that the system inertia arrested the frequency however a

primary frequency was expected. Derek explained the remedial actions taken, and Neil Robertson (Southwest Power Pool) suggested making a change to allow supplemental energy to be used prior to using up spinning energy, which he suggested could provide reliability benefit.

Action Item: SPP Staff to provide ORWG with a recommendation for potential policy changes regarding how supplemental and spinning energy are utilized.

Agenda Item 15 – Comparison Outage Metrics.

This item was tabled for discussion at a future ORWG meeting.

Agenda Item 16 – PMU Project Update.

Cody Parker (Southwest Power Pool) discussed the PMU project and stated that phase one of the project is ahead of schedule and under budget. Cody explained that in phase one the PMU Data Exchange & Analysis Project is expected to analyze, develop, and implement new capabilities to address key grid operating and planning challenges and improve existing capabilities. Phase 2 will create a member facing PMU portal to share PMU data and displays, and phase 3 will develop operator procedures and CIP processes, move SPP PMU systems into ESP, and move PMU data feeds to SPPNET. Cody explained the SPP applications which include the enhanced wide-area awareness tool, voltage stability and angle monitoring tool, wide area oscillation stability monitoring, and data quality tool. Cody reviewed the SST activities, and stated that the SST worked on RR162, development of the SPP PMU communications handbook, and the SPP PMU Placement Approach whitepaper. Cody explained the minimum PMU architecture for TOs and discussed the cost breakdowns. Cody stated that the next steps will be to update the RCWG, SPCWG, and CWG, submit RR162 to MOPC, address MOPC action item related to PMU cost, deploy QA\PRD SPP PMU systems, demonstrate openECA, finalize PMU Placement Approach Whitepaper, and finalize PMU Communication Handbook.

Action Item: SPP Staff send out a PMU survey to ORWG members.

Kyle McMenamin (Xcel Energy) moved to support the basis of the cost within the PMU presentation, and Jeff Wells (Grand River Dam Authority) seconded the motion. The motion carried without opposition or abstention.

Agenda Item 17 – RR162 PMU for New Generator Interconnection

Cody Parker (Southwest Power Pool) discussed RR162 and explained that the revision request is designed to set requirements for new generators to install PMU equipment. The ORWG reviewed the language in the RR and made modifications to the document. The ORWG made a reference that points to the GIA for the cost allocations, and the ORWG adjusted the detailed requirements defined in the revision request and pointed to the PMU Communications Handbook.

Jeff Wells (Grand River Dam Authority) moved to approve RR162 as modified, and Abu Elteriefi (ITC Holdings) seconded the motion. The motion carried without opposition or abstention.

Agenda Item 18 – ICCP Survey

Tim Miller (Southwest Power Pool) discussed the ICCP survey and stated that SPP plans to issue a survey of our ICCP contacts on Wednesday May 17th, 2017. Tim stated that the Survey responses will be

collected by staff and distributed to the ORWG for discussion. Tim reviewed the system and process questions, coordination questions, SPP's services questions, TO/TOPs data availability questions, and GOP data availability questions. Tim commented that if the ORWG members would like additional questions added to the survey then would need to be submitted to iccprequest@spp.org by Friday May 12th.

Agenda Item 19 – ICCP GMD Alert Straw Man Proposal

Tim Miller (Southwest Power Pool) discussed the ICCP update: GMD and ICCP coverage status report. Tim stated that during the 3/1/2017 ORWG meeting the group indicated that use of ICCP as the notification of applicable GMD alerts in lieu of emails and/or phone calls from the RC seemed acceptable. Tim reviewed the proposed process and explained the details for how communication would work and compared it against our current process.

Agenda Item 20 – SPP Data Specification Enhancements

This item was tabled for discussion at a future ORWG meeting.

Agenda Item 21 – Overview of latest wind penetration record timeframe

This item was tabled for discussion at a future ORWG meeting.

Agenda Item 22 – MOD-033-1

This item was tabled for discussion at a future ORWG meeting.

Agenda Item 23 – 2017 Deliverability Study Scope

This item was tabled for discussion at a future ORWG meeting.

Agenda Item 24 – TOP OOME Process

Terry Oxandale (Southwest Power Pool) explained the TOP OOME process and discussed the importance of SPPs needs during OOME events. Terry discussed 4.4.2.5 of the market protocols which discusses the rules for local Transmission Provider to issue an OOME. The ORWG requested to add this topic to a future ORWG agenda for further discussion.

Agenda Item 25 – NERC Reliability Standard Activities Update

This item was tabled for discussion at a future ORWG meeting.

OTHER ITEMS:

Agenda Item 26 – OU Efforts.

Garrett Crowson (Southwest Power Pool) provided a brief overview of the ongoing OU efforts. Garrett stated that compiled results from the Oklahoma University Effort are posted and he has sent a link email and a separate e-mail with access information. Garrett stated he will scheduled meetings to discuss the results if the participants have any questions or concerns.

Action Item Review

Agenda Items 27/28 – Summary of Action Items

See Page 1 Action Item list.

Agenda Items 29 – Q&A/Open Forum

Agenda Item 30 – Meeting Schedule

- a. 6/1/2017 WebEx (Thurs) 0830-1200
- b. 6/28 – 6/29/2017 Face-to-Face (Dallas, TX AEP Offices) – CONFIRMED
- c. 8/3/2017 WebEx (Thurs) 0830-1200
- d. 9/7/2017 WebEx (Thurs) 0830-1200
- e. 10/04-05/2017 Face-to-Face (Detroit, MI) (ITC) - TENTATIVE
- f. 11/2/2017 WebEx (Thurs) 0830-1200
- g. 12/7/2017 WebEx (Thurs) 0830-1200

Agenda Item 31 – Adjourn

Chairman Allen Klassen (Westar Energy, Inc.) adjourned the ORWG at 5:00 PM (CDT) on 05/03/2017
Chairman Allen Klassen (Westar Energy, Inc.) adjourned the ORWG at 12:01 PM (CDT) on 05/04/2017

Respectfully Submitted,

Jason Tanner
Secretary

Day1	Day2		Name	Status	Company
x	x	1	Allen Klassen, Chairman	M	Westar Energy
x	x	2	Ron Gunderson, Vice Chairman	M	Nebraska Public Power District
x	x	3	Jim Useldinger	M	South Central MCN
x	x	4	Gary Plummer	M	City of Independence, MO
x	x	5	Kyle McMenamin	M	Xcel Energy
x	x	6	Laurie Gregg	M	Lincoln Electric System
P	P	7	Allan George	M	Sunflower Electric Power Corporation
x	x	8	Jeff Wells	M	Grand River Dam Authority
x	x	9	John Stephens	M	City Utilities of Springfield
x	x	10	Todd Gosnell	M	Omaha Public Power District
x	x	11	Bryn Wilson	M	Oklahoma Gas and Electric Co.
x	x	12	Dennis Sauriol	M	American Electric Power
x	x	13	David Pham	M	Empire District Electric Company
x	a	14	Matthew Stoltz	M	Basin Electric Power Cooperative
x	x	15	Chance Myers	M	Western Farmers Electric Cooperative
x	x	16	Craig Speidel	M	Western Area Power Administration
x	x	17	Abu Elteriefi	M	ITC Holdings
P	P	18	Jay Patel	M	Kansas City Power & Light
x	x	19	Tanner New	P	Proxy for Allan George
x	x	20	Harold Wyble	P	Proxy for Jay Patel
x	x	21	Douglas Webb	G	Kansas City Power & Light
x	x	22	Mike Anderson	G	American Electric Power
x	x	23	Andrew Ridley	G	Grand River Dam Authority
x	x	24	Ben Hammer	G	Western Area Power Administration
x		25	Jason Chaplin	G	Oklahoma Corporation Commission
x	x	26	Ernest Owens	G	ITC Holdings
x	x	27	Mark Eastwood	G	City Utilities of Springfield
x		28	Divya Kurthakoti	G	Siemens
x	x	29	Chris Lyons	G	Customized Energy Solutions
x	x	30	Jim Krajecki	G	Customized Energy Solutions
	x	31	Louis Guidry	G	Cleco
	x	32	Bryan Taggart	G	Westar Energy
	x	33	Mick Kirwan	G	Western Area Power Administration
	x	34	Don Hargrove	G	Oklahoma Gas and Electric Co.
	x	35	Austin White	G	Oklahoma Gas and Electric Co.
	x	36	Ron Thompson	G	Nebraska Public Power District
x		37	Jake Burger	G	Nebraska Public Power District
x	x	38	John Allen	G	City Utilities of Springfield
x	x	39	Carrie Dixon	G	Xcel Energy
x	x	40	Kevin Ma	G	Oklahoma Gas and Electric Co.
x	x	41	John Boshears	G	City Utilities of Springfield
x	x	42	Steve Gaw	G	The Wind Coalition
x		43	Derek Book	G	PRPA
x	x	44	Terry Gates	G	American Electric Power
x	x	45	Jamie Hajek	G	NorthWestern Energy
x	x	46	Keeth Works	G	Southwestern Power Administration
x	x	47	Tracey Stewart	G	Southwestern Power Administration
x		48	Gayle Nansel	G	Western Area Power Administration
x		49	Jeff Knottek	G	City Utilities of Springfield
x	x	50	Jason Mazigian	G	Basin Electric Power Cooperative
x		51	John Hare	G	Oklahoma Gas and Electric Co.
x		52	Mary Anderson	G	BP Wind Energy
x	x	53	Terry Volkmann	G	Volkmann Consulting
x		54	Seth Bury_WAPA UGP	G	Western Area Power Administration
x		55	Jason MacDowell	G	GE
x		56	Jerry Bradshaw	G	City Utilities of Springfield
x	x	57	Tom Mayhan	G	Omaha Public Power District
x		58	Chris Cranford	S	Southwest Power Pool
x	x	59	Jason Tanner	S	Southwest Power Pool
x	x	60	Neil Robertson	S	Southwest Power Pool
x	x	61	Casey Cathey	S	Southwest Power Pool
x	x	62	Derek Hawkins	S	Southwest Power Pool
x	x	63	Margaret Q Adams	S	Southwest Power Pool

x	x	64	Alex Crawford	S	Southwest Power Pool
x	x	65	Cody Parker	S	Southwest Power Pool
x		66	Patrick deLassus	S	Southwest Power Pool
x		67	Moses Rotich	S	Southwest Power Pool
x	x	68	Will Tootle	S	Southwest Power Pool
x		69	Michael Odom	S	Southwest Power Pool
x	x	70	Terry Oxandale	S	Southwest Power Pool
x	x	71	Charles Hendrix	S	Southwest Power Pool
x	x	72	Harvey Scribner	S	Southwest Power Pool
x	x	73	Austin Collier	S	Southwest Power Pool
x	x	74	Shannon Mickens	S	Southwest Power Pool
x		75	Daniel Baker	S	Southwest Power Pool
x	x	76	Scott Aclin	S	Southwest Power Pool
x	x	77	Garrett Crowson	S	Southwest Power Pool
x	x	78	Doug Bowman	S	Southwest Power Pool
x	x	79	Tim Miller	S	Southwest Power Pool
x	x	80	Scott Jordan	S	Southwest Power Pool
x		81	Jerry Stone	S	Southwest Power Pool
x	x	82	Erin Cathey	S	Southwest Power Pool
x		83	Jeff Parker	S	Southwest Power Pool
x		84	Raymond	S	Southwest Power Pool
	x	85	Brad Johnston	S	Southwest Power Pool
	x	86	Anthony Cook	S	Southwest Power Pool
x	x	87	Jon Langford	S	Southwest Power Pool