

**Southwest Power Pool, Inc.
Model Development Working Group
SPP Corporate Office
Little Rock, Arkansas
September 20: 8:00 A.M. – 12:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 8:05 a.m. The following MDWG members were in attendance:

Nate Morris, Chair – Empire District Electric Company
Derek Brown, Vice Chair – Westar Energy
Jason Bentz – American Electric Power
Dustin Betz – Nebraska Public Power District
John Boshears, Jerry Bradshaw - City Utilities of Springfield
Jerad Ethridge – Oklahoma Gas & Electric
Joe Fultz – Grand River Dam Authority
Wayne Haidle – Basin Electric Power Cooperative
Holli Krizek – Western Area Power Administration
Reené Miranda – Southwestern Public Service
Scott Schichtl – Arkansas Electric Cooperative Company
Jason Shook – GDS Associates
Brian Wilson – Kansas City Power & Light
Anthony Cook, Secretary – Southwest Power Pool

The following guests were also in attendance:

Ryan Baysinger – Kansas City Power & Light
Daniel Benedict – City of Independence, Missouri
Darryl Boggess – Western Farmers Electric Cooperative
Jerry Bradshaw - City Utilities of Springfield
Alan Burbach – Lincoln Electric System
Aravind Chellappa – Southwestern Public Service
Chris Colson – Western Area Power Administration
Jeff Crites – Empire District Electric Company
Bruce Doll – Municipal Energy Agency of Nebraska
Kyle Drees – Westar Energy
David Gustad – Tri-State Generation and Transmission
Steve Hohman – Omaha Public Power District
Edgardo Manansala – Midwest Energy
Alex Mucha – Oklahoma Municipal Power Authority
Gimod Olapurayil – ITC Great Plains
Dona Parks – Grand River Dam Authority
John Payne – Kansas Electric Power Coop
Mark Reinart – Golden Spread Electric Cooperative
James Vermillion – Associated Electric Cooperative
John Weber – Missouri River Energy
Eddie Watson, Moses Rotich, Moe Shahriar – Southwest Power Pool

Proxies

Derek Brown gave his proxy to Kyle Drees until his arrival.

Meeting Agenda

The group was asked if anyone had any issues or needed more time to review the posted materials. There were no concerns from anyone for this meeting.

The agenda was reviewed by the group. Jason Shook motioned to approve the agenda; Scott Schichtl seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20160920.docx)

Meeting Minutes

The June 7-8, 2016 minutes were open for review. Jared Ethridge motioned to approve the minutes; Jason Shook seconded the motion. The motion passed unopposed.

(Attachment 2 - MDWG Minutes June 7-8, 2016.docx)

Agenda Item 2 – Procedure Manual:

Anthony proposed several updates to the MDWG Procedure Manual. Many of the changes were simply “wording” issues so the group decided to focus on the “modeling practice” updates. The group discussed two of the updates; however, could not come to any consensus so Nate Morris decided to have a taskforce created to get the MDWG Procedure Manual updated.

Agenda Item 3 – MOD Project Matrix:

Anthony Cook presented updates to the MOD Project Matrix. He told the group that in the spirit of transparency, SPP was seeking feedback, both internally and from the membership, with regards to the MOD Matrix. Dustin Betz asked if changes would need to be made to legacy projects using these statuses. Anthony stated that the status would remain in MOD for those legacy projects; however, the status will be removed from the Matrix and should not be used for future projects. Anthony asked the group to individually take some time and make changes to the matrix and submit them to SPP. There are also going to be internal Staff meetings to make updates.

AI: Staff to update MOD Project Matrix and repost.

Agenda Item 4 – Modeling Practices Update:

Anthony rehashed from the last meeting that the members should be utilizing the PSS/E functionality to define scalable loads in the models. This will create efficiencies and accuracy within the various assessments that are performed each year.

Anthony rehashed that there has been an effort for correctly modeling windfarms with GSUs and utilizing the PSS/E functionality of identifying windfarms (WMOD) and use of power factor correctly. However, the effort needs to be completed and get all windfarms modeled correctly in order to create efficiencies and accuracy.

Nate Morris stated that the TWG discussed the topic of modeling generation planned for retirement and suggested that members adhere to the current practice as described in the MDWG Procedure Manual.

Anthony rehashed that an effort was needed to map generators to the auxiliary load(s) since in some situations the auxiliary load is not on the same bus as the generator.

AI: Members to update Data Submittal Workbook Generator Data worksheet with Aux Load Mapping.

There was more discussion on the need for consistency in auxiliary load id, but was tabled for a future meeting.

Agenda Item 5 – TPITF Initiative:

This topic was tabled for a future meeting.

Agenda Item 6 – Miscellaneous:

Before the meeting ended, Chris Colson briefly talked about the company workbooks. Chris asked the group if they wanted to do away with showing each individual transaction in the model and instead just aggregate the transactions. In other words, there would be only one transaction between two areas. Most members wanted to keep the individual transactions for accounting purposes. Chris then told the members that PSSE has a limit on how many specific area to area transactions there can be in the model.

Agenda Item 10 – Administrative Items:

Summary of Action Items

- **Staff to update MOD Project Matrix and repost.**
- **Members to update Data Submittal Workbook Generator Data worksheet with Aux Load mapping.**

Future Meetings

- TBD
- There will be a Taskforce assembled to update the MDWG Procedure Manual

Adjourn Meeting

With no further business to discuss, Nate asked for a motion to adjourn. Derek Brown motioned to adjourn the meeting, Scott Schichtl seconded the motion. The motion passed unopposed. The meeting adjourned at 12:25 p.m.

Respectfully submitted,
Anthony Cook
SPP Staff Secretary



Southwest Power Pool, Inc.
MODEL DEVELOPMENT WORKING GROUP
September 20, 2016
SPP Corporate Office Little Rock, AR

• A G E N D A •

8:00 a.m. – 12:00 p.m.

1. Administrative Items Nate Morris
 - a. Call to Order
 - b. Introductions
 - c. Proxies
 - d. Agenda Review (Action Item)
 - i. Meeting Materials
 - e. Previous Meeting Minutes (Action Item)
 - i. June 7-8, 2016 Face to Face

2. Procedure Manual All
 - a. Review Updates and Comments (Action Item)

3. MOD Project Matrix All
 - a. Review and Update

4. Modeling Practices Update All
 - a. Scalable Loads
 - b. Generator Modeling
 - i. GSUs
 - ii. Wind Machine Mode and Power factor
 - c. Generation Retirements
 - i. Update from TWG
 - d. Data Submittal Workbook
 - i. Generator Data: Aux Load Bus Mapping
 - e. Standardized Aux Load ID

5. TPITF Initiative SPP Staff

6. Administrative Items Nate Morris
 - a. Summary of Action Items
 - b. Future Meeting
 - c. Adjourn

Relationship-Based • Member-Driven • Independence Through Diversity
Evolutionary vs. Revolutionary • Reliability & Economics Inseparable

**Southwest Power Pool, Inc.
Model Development Working Group
OGE Office, Leadership Square Building
Oklahoma City, Oklahoma
June 7: 8:00 A.M. – 5:00 P.M.
June 8: 8:00 A.M. – 12:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 8:07 a.m. The following MDWG members were in attendance:

Nate Morris, Chair – Empire District Electric Company
Derek Brown, Vice Chair – Westar Energy
Dustin Betz – Nebraska Public Power District
Joe Fultz – Grand River Dam Authority
Holli Krizek – Western Area Power Administration
Reené Miranda – Southwestern Public Service
Scott Rainbolt – American Electric Power
Scott Schichtl – Arkansas Electric Cooperative Company
Jason Shook – GDS Associates
Liam Stringham – Sunflower Electric Power Corporation
Brian Wilson – Kansas City Power & Light
Anthony Cook, Secretary – Southwest Power Pool

The following guests were also in attendance:

Jason Bentz – American Electric Power
Mark Reinart – Golden Spread Electric Cooperative
Chris Colson – Western Area Power Administration
Alex Mucha – Oklahoma Municipal Power Authority
Bruce Doll, Armin Sehic – Municipal Energy Agency of Nebraska
Aravind Chellappa – Southwestern Public Service
Jerad Ethridge – Oklahoma Gas & Electric
David Gustad – Tri-State Generation and Transmission
Wayne Haidle – Basin Electric Power Cooperative
Gimod Olapurayil – ITC Great Plains
Dona Parks, Patrick McPhail – Grand River Dam Authority
John Weber – Missouri River Energy
Daniel Benedict – City of Independence, Missouri
Alan Burbach – Lincoln Electric System
Jeremy Harris – Westar Energy
Jerry Bradshaw - City Utilities of Springfield
Thomas Mayhan – Omaha Public Power District
Eddie Watson, John Mills, Jonathon Hayes, Scott Jordan, Mitch Jackson, Moe Shahriar
– Southwest Power Pool

Proxies

John Boshears gave his proxy to Jerry Bradshaw and Derek Brown gave his proxy to Jeremy Harris on day 2.

Charter Update

Anthony Cook stated that the TWG, MOPC, CHC, and BOD approved the MDWG Charter changes to add two additional members. He asked the group if they wanted to solicit applications to fill the additional two positions or leave the group with twelve members. The group decided to solicit applications for the two positions.

AI: SPP Staff to solicit applications for two open positions.

Meeting Agenda

The group was asked if anyone had any issues or needed more time to review the posted materials. There were no concerns from anyone for this meeting.

The agenda was reviewed by the group. There were a few changes made which were itemizing the Contact List into Staff Contacts and Modeling Contacts, added SPP Data Coordination Workbook, moved Review of MOD-016 to be item 7, and added 2016 Dynamic Build Update. Jason Shook motioned to approve the agenda with changes; Joe Fultz seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20160607.docx)

Meeting Minutes

The September 15, 2015, March 14, 2016, and April 18, 2016 minutes were open for review. Jason Shook motioned to approve all sets of minutes. Derek Brown seconded the motion. The motion passed unopposed.

(Attachment 2 - MDWG Minutes September 15, 2015.docx,

Attachment 3 - MDWG Minutes March 14, 2016.doc,

Attachment 4 - Finalization of Short Circuit Cases Email Vote 20160418.doc)

Review of Action Items

The action item list was reviewed starting with the most recent action items. The more notable items were #121 for Staff to see if an email had been sent from Nathan or Reené, #122 for Staff to add language to the MDWG Procedure Manual that Members will provide outage lists so that facilities are not placed in-service in the Max-fault short circuit case, #128 for Staff to discuss with Doug Bowman how windfarms should be modeled in short circuit analysis, and #130 for Nate Morris to request TPLTF for recommendation.

(Attachment 5 - SPP MDWG Action Items 20160607.xls)

Agenda Item 2 – 2017 Series MDWG Model Build:

Anthony stated that the 2017 Series would be utilizing PSS/E 33.5 at a minimum in order to utilize the enhancement of the WMOD capability. The group decided to utilize version 33.7.

The case list was presented to the group for discussion. After discussion on the number of models and the need for each one, it was decided that the 2018SH model would not be needed. Reené Miranda motioned to remove the 2018SH model from the powerflow and dynamics case list. Scott Schichtl seconded the motion. There was further discussion to treat the powerflow and dynamic case lists separately; so Reené motioned to edit the original motion to only be for the powerflow case list. Scott Schichtl seconded the motion. The motioned passed unopposed. There was further discussion to add a 2018S model to the short circuit case list. After further

discussion over the dynamics and short circuit case lists, Derek Brown motioned to remove the 2018SH from the dynamics list and add 2018S to the short circuit list. Brian Wilson seconded the motion. The motion passed unopposed.

(Attachment 6 - 2017 Series MDWG Model Selection.xlsx)

Anthony presented three options for the powerflow, short circuit, and dynamics schedule. Nate addressed the group of the perpetual lateness of the models each year. The discussion was tabled until day two to allow for everyone to review the options further before making a decision. Upon the start of day two, Nate asked for a straw poll to see which option the majority was in favor of. The results were in favor of option 1. Further discussion was tabled until after Chris Colson presented on Model Balancing. Upon resuming discussion, Nate asked everyone their preference for the Model Update Meeting dates. The majority wanted to move it to be October 18-20, 2016. Also, it was decided to lock loads down in Pass 3, and to hold conference calls each pass during the member review period for status updates. Based on the Model Balancing discussion the group decided to add an effort to coordinate Company Workbooks during the month of July. Liam motioned to approve the schedule with adding July Company Workbook coordination time frame, conference call during each pass, and moving the Model Update Meeting to October 18-20, 2016. Holli Krizek seconded the motion. The motion passed unopposed. Anthony will send out the schedule to Nate and Derek with changes for verification before posting as final.

AI: Mitch and Anthony make schedule changes and send to Nate and Derek for approval before posting.

Anthony then discussed the SPP Staff Contact list and the changes to the modeling group. He stated that Scott Jordan and Brandon Hentschel will no longer be working for Modeling so the list will be updated once their replacements have been identified.

Anthony asked the group to provide updates to the Modeling Contacts list for individual companies.

AI: Staff to send out request for Modeling Contact list updates.

AI: Members provide Modeling Contact list updates per request.

Scott Jordan presented on the Lean Accountability document that was created by SPP Staff and Member representation. He discussed the enhancements that were made to the previous effort by Staff in 2014. Due to the changes to the structure of the schedule for the 2017 Series, Staff will have to make revisions to the Accountability document and bring it back to the group.

AI: Staff to revise Accountability document based on schedule structure updates.

Chris Colson gave a presentation on model balancing. The premise is for each company to coordinate transactions and balance their individual load, generation, transactions, and losses at the beginning of the model building schedule and then make minor tweaks throughout the modeling process. **(Attachment 7 - MDWG Presentation June 2016.pptx)**

Nate Morris asked individuals for other ideas to create efficiencies. These ideas were: Prioritize and focus on Pass 1 & 2, Balance Pass 1, Impose penalties for late participants, Get topology updates earlier, Identify when entities receive load updates and hold them accountable for that time period, Build in stages per element or data type, Finalize the models per the schedule regardless of remaining issues, Build models rapidly, Require any changes submitted

after deadline to be reviewed and accepted by the MDWG, Allow only a certain number of changes to be submitted during later passes, Shift away from MOD, Require docucheck issues corrected sooner, Use language in data request to lean on MOD-032 and Tariff, Report on who submitted profiles for each pass, notify legacy BA when profile data is submitted by LSE, Provide data throughout the “off season”, LSE/GO entities submit data earlier than host BA, Verify transactions early, Balance models, Survey entities for reason for lateness, Create a data repository for data not contained in models, Create modeling areas for each entity, and Locking loads and interchange early.

Nate also asked for examples of known issues. These were: Unfamiliarity with MOD, Late submissions, SPP/MISO system representation getting overwritten, Staffing, and Unfamiliar with overall process.

AI: Members send Nate Morris entities they have had trouble with or reasons for why you have been late before.

The group decided to adopt the practice for the 2017 Series powerflow model build and asked for a conference call the week of June 27th to discuss the Company Workbook format and process.

AI: Staff schedule conference call for week of June 27th to discuss Company Workbook format and process.

Anthony stated that MOD will be in version 8.1.0.1 and using PSS/E version 33. He stated that he received some feedback from the UMZ companies as to what data should be in the MOD base case. He is currently working to consolidate the data and work with SPP IT to complete the MOD update. He stated that he was trying to get it completed by July 1.

Anthony stated that there were not any plans to hold MOD training this year; however, if there was a need then Staff could schedule a training session.

Anthony stated that Staff would be sending out Data Coordination Workbooks this year requesting who will be submitting data for whom. This is in an effort to establish who will be submitting data directly to SPP instead of working through the legacy BA to ensure all data entities are actively participating per MOD-032.

Agenda Item 3 – Procedure Manual:

This item was table for a future meeting.

Agenda Item 4 – Modeling Practices Update:

Anthony stated that the members should be utilizing the PSS/E functionality to define scalable loads in the models. This will create efficiencies and accuracy within the various assessments that are performed each year.

Anthony stated that there has been an effort for correctly modeling windfarms with GSUs and utilizing the PSS/E functionality of identifying windfarms (WMOD) and use of power factor correctly. However, the effort needs to be completed and get all windfarms modeled correctly in order to create efficiencies and accuracy.

Anthony stated that there have been recent situations where SPP was notified of generation retirements with very little lead time. He stated that the MDWG adopted a generation retirement

practice for the models; however, these particular units were not modeled per the practice. He asked the group if the practice needs to be revisited. The group stated that they believed the practice was fine; however, decided to ask the TWG for recommendations about a modeling practice for retiring units.

AI: Nate Morris to ask the TWG for recommendation about a modeling practice for retiring units.

Anthony stated that an effort was needed to map generators to the auxiliary load(s) since in some situations the auxiliary load is not on the same bus as the generator. Others expressed a need for consistency in auxiliary load id. The group asked staff to survey the load ids being used and establish possible load ids for auxiliary loads.

AI: Staff to survey the load ids being used and establish possible load ids for auxiliary loads.

The group decided to table the discussion on the DLTF update for a future meeting.

Anthony stated that the MOD Project Matrix needs to be updated. There are a few types/statuses that are no longer being used and need to be removed. Also, in an effort to create further efficiencies with MOD projects, Staff is requesting member feedback for potential updates to define new types and statuses.

AI: Members to provide Staff with potential MOD Project type and status updates.

AI: Staff to remove type/status that is not used.

Agenda Item 5 – Model Element Review Update:

Anthony asked the group to consider yearly selecting an element to audit for data accuracy. He stated that NERC has started performing data checks on the models and are looking for erroneous data. He asked the group to give is some thought and would add it to a future meeting for further discussion.

Scott Jordan gave an overview of the NERC case metrics reports.

Agenda Item 6 – Planning vs. Operations Models:

This item was tabled for a future meeting.

Agenda Item 7 – Review of MOD-016 and other Standards:

This item was in executive session. Jonathan Hayes discussed the spot checks that the SPP Compliance department performed this year. He spoke on MOD-016 for demand data, net energy for load, and controllable DSM for modeling. The group also discussed the collection of data for TPL-007 and the delay of the effective date of the standard.

AI: Jonathan to follow up with ITP and Markets to see the need of information for MOD-016.

AI: Jonathan to find out consideration comments as to whether DSM is “all activity” or “manual operation” to interrupt load.

AI: Staff to send out request of data information based on consideration comments outcome.

AI: Members to determine percent of DSM for individual systems for summer and submit to Anthony.

Agenda Item 8 – Machine Capability Curve Data Files:

Derek Brown discussed the functionality with PSS/E to read in capability curve data and adjust Qmax and Qmin values based on dispatch. He stated that this would be beneficially for the accuracy of the models. He gave an example of windfarms typically being dispatched at lower output in the cases and the Qmax and Qmin set accordingly and then special wind studies are performed to ramp up the wind and the VAr limits are not adjusted. This can cause voltage issues that are not legitimate.

Agenda Item 9 – Miscellaneous:

Anthony stated that the ITP models will continue to be built using the block dispatch and not the ECDI files. He stated that due to staffing changes, efficiencies within the dynamic model build will be looked into at a later time. Scott Jordan gave an update for the 2016 Dynamic model build. He stated that the build was slightly behind schedule; however, he planned to post full cases by end of June and reduced cases the week after.

Agenda Item 10 – Administrative Items:

Summary of Action Items

- **SPP Staff to solicit applications for two open positions.**
- **Mitch and Anthony make schedule changes and send to Nate and Derek for approval before posting.**
- **Staff to send out request for Modeling Contact list updates.**
- **Members provide Modeling Contact list updates per request.**
- **Members send Nate Morris entities they have had trouble with or reasons for why you have been late before.**
- **Staff schedule conference call for week of June 27th to discuss Company Workbook format and process.**
- **Nate Morris to ask the TWG for recommendation about a modeling practice for retiring units.**
- **Staff to survey the load ids being used and establish possible load ids for auxiliary loads.**
- **Members to provide Staff with potential MOD Project type and status updates.**
- **Staff to remove type/status that is not used.**
- **Jonathan to follow up with ITP and Markets to see the need of information for MOD-016.**
- **Jonathan to find out consideration comments as to whether DSM is “all activity” or “manual operation” to interrupt load.**
- **Staff to send out request of data information based on consideration comments outcome.**
- **Members to determine percent of DSM for individual systems for summer and submit to Anthony.**

Future Meetings

- **Conference Call week of June 27**
- **Face to Face October 18**

Adjourn Meeting

With no further business to discuss, Nate asked for a motion to adjourn. Scott Schichtl motioned to adjourn the meeting, Reené Miranda seconded the motion. The motion passed unopposed. The meeting adjourned at 12:08 p.m.



Respectfully submitted,
Anthony Cook
SPP Staff Secretary



Southwest Power Pool, Inc.
MODEL UPDATE MEETING
September 20-21-22, 2016
SPP Corporate Office/Little Rock, AR

• ATTENDANCE LIST •

Name	Company
John Payne	KEPCO
Jeff Crites	EDE
NATE MORRIS	EDE
Jason Shook	GDS/ETEC
Alex Mucha	OMPA
Dustin Betz	NPPD
Edgardo Manansala	MIDW
Ryan Baysinger	KCP&L
Brian Wilson	KCP&L
JERAD ETHRIDGE	OKGE
Daryl Huslig	OKGE
Dona Parks	GRDA
JASON BENTZ	AEP
Derek Brown	Westar
Zack Bearden	SPP
Anthony Cook	SPP
scott Schichtl	AECC
Moses Rotich	SPP