

**Southwest Power Pool, Inc.
Model Development Working Group
Net Conference
February 6: 8:30 A.M. – 12:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 8:35 a.m. The following MDWG members were in attendance:

MDWG Members present:

| MDWG Member | Proxy | Company | Present |
|----------------|-------|---------------------------------------|---------|
| Nate Morris | | Empire District Electric Company | Yes |
| Derek Brown | | Westar Energy | Yes |
| Jason Bentz | | American Electric Power | Yes |
| Dustin Betz | | Nebraska Public Power District | Yes |
| John Boshears | | City Utilities of Springfield | Yes |
| Jerad Ethridge | | Oklahoma Gas & Electric | Yes |
| Joe Fultz | | Grand River Dam Authority | Yes |
| Wayne Haidle | | Basin Electric Power Cooperative | Yes |
| Holli Krizek | | Western Area Power Administration | Yes |
| Reené Miranda | | Southwestern Public Service | Yes |
| Scott Schichtl | | Arkansas Electric Cooperative Company | Yes |
| Jason Shook | | GDS Associates | Yes |
| Brian Wilson | | Kansas City Power & Light | Yes |
| Liam Stringham | | Sunflower Electric Power Corporation | Yes |
| Anthony Cook | | Southwest Power Pool, Inc | Yes |

The following guests were also in attendance:

- James Nail, City of Independence, Missouri
- Kevin Foflygen, City Utilities of Springfield
- Alan Burbach, Lincoln Electric System
- Aravind Chellappa, Southwestern Public Service
- Chris Colson, Western Area Power Administration
- Bruce Doll, Municipal Energy Agency of Nebraska
- Steve Hohman, Omaha Public Power District
- Edgardo Manansala, Midwest Energy
- Gimod Olapurayil, ITC Great Plains
- Jeremy Severson, Basin Electric Power Cooperative
- Dona Parks, Grand River Dam Authority
- Jarrod Wolford, Northeast Texas Electric Cooperative
- John Turner, Board of Public Utilities
- John Payne, Kansas Electric Power Coop

Mark Reinart, Golden Spread Electric Cooperative
John Weber, Missouri River Energy
David Sargent, Scott Mijin – Southwestern Power Administration
Syed Ahmad, FERC
Andrew Berg, Minnkota Power Cooperative
Michael Odom, Moses Rotich, Moe Shahriar, Mitch Jackson, Theva Chanthaseny,
Southwest Power Pool

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. Anthony Cook stated additions for Annual Engineering Data Request Schedule, MOD Anomalies, and 2017 MDWG Powerflow model build status. Chris Colson requested to add an update for TPLTF efforts. Jerad Ethridge motioned to approve the agenda as amended; Derek Brown seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20170206.docx)

Meeting Minutes

The September 20, 2016 and January 17, 2017 minutes were open for review. Nate postponed approving the January 17, 2017 minutes to allow Wayne Haidle to submit a written reason for his abstention to the vote. Derek Brown motioned to approve the minutes from the September 20, 2016 meeting; Brian Wilson seconded the motion. The motion passed unopposed.

(Attachment 2 - MDWG Minutes September 20, 2016.docx)

Agenda Item 2 – Transmission Planning Improvement Task Force (TPITF) Initiative:

Michael Odom presented language on renewable dispatch for the new common models. He stated that the language for the summer renewable dispatch had already been approved by the TPITF and TWG by proxy. The TWG will be discussing the winter and light load renewable dispatch language at their next meeting. Derek expressed concern with 100% dispatch in the light load models especially when running compliance studies. Alternatives that were provided were to do the same as for the summer or winter, or use a flat value for the SPP region. There was also concern of not getting a complete picture if minimum and maximum scenarios (similar to S0 and S5) were not provided. Michael stated that more discussion would be had at the next TWG meeting. Many on the group did agree that the Base Reliability and the MDWG Models should be kept separate.

(Attachment 3 - Modeling of Firm Transmission Service_MO.docx)

Anthony Cook stated that per the TPITF whitepaper, the MDWG and Base Reliability powerflow models are to be built in parallel. He gave a brief presentation on a proposal to build the MDWG models after the Base Reliability models to prevent having two model sets being built and reviewed at the same time. Reené Miranda asked for a slide that illustrates the different data being requested (i.e. loads, generation, etc.) and which models each will be applied to. There was concern about having two model sets being built/reviewed simultaneously and staying on schedule since history has proven it to be difficult to keep one model set build on schedule. Derek Brown asked if the Base Reliability models will be used for Generation Interconnection and Transmission Service processes. Anthony confirmed that the Base Reliability models will be the starting point for those processes as well as used for compliance. Anthony asked the members to consider the proposal for further discussion at future meetings.

Michael Odom announced that SPP would be sending out an Annual Engineering Data Request Schedule next week. He stated that this is to give the members tentative dates when specific data would be requested throughout the year. Reené Miranda stated that some processes ask for the same data that is already being provided with the model data submission and asked if those data requests could just utilize that which is already provided. Michael stated that Staff would work try and minimize the duplicate requests where possible. The example given was related to MW-Mile transmission line ownership, which could be extracted from model data. Chris Colson did state that this method wouldn't work for all companies since the owner column is not always the actual transmission owner.

****Action Item**:** SPP Staff to create and provide a slide to illustrate which models will utilize the different data requests.

Agenda Item 3 – TPLTF Efforts Update:

Chris Colson gave a quick presentation on TPL-007-1. Reené asked if it would be included in the annual data request schedule discussed earlier. Staff stated that it would be included as part of the annual data request schedule. Chris stated that the request would be for 200 kV and above. He stated it would be appreciated for anyone to review the TPL-007-1 Guidance document by March 1st and provide any feedback.

Agenda Item 4 – Data Submittal Workbook:

This item was postponed to a later meeting.

Agenda Item 5 – Model On Demand Talks:

Anthony Cook demonstrated that individual MOD users can now export the MOD project table into an excel file for viewing.

Anthony Cook and Moses Rotich stated that an anomaly was recently discovered in MOD version 8.1.0.1 dealing with bus assignments in the raw data. The anomaly is that MOD will sort the From/To buses in numerical order upon uploading into the database but doesn't honor bus references for other data. For example, if a branch has 234561 as the From bus and 123456 as the To bus and assigns the To bus as the metered end, MOD will switch the configuration so that 123456 is now the From bus and 234561 is the To bus leaving the metered end still referencing the To bus. Anthony stated that the only way to fix this issue in the current version was to delete the affected elements from MOD and re-upload them in numerical order with the corrected referencing. Siemens has confirmed the anomaly and stated that it was corrected in version 9.1. Anthony stated that Staff will check with SPP IT to see what the possibility of moving to the latest version of 9 before the next series of models are to be built. Anthony also stated that corrections for this issue could be submitted in the form of idevs until the model build is complete; however, all other corrections need to be submitted through MOD.

****Action Item**:** SPP Staff to discuss the possible timeframe of moving to MOD version 9.

Agenda Item 6 – 2017 MDWG Powerflow Model Build Status:

Anthony Cook stated that the latest pass was posted on Friday, February 3, 2017; however, the posted email did not specify a deadline for data submissions. This is because this is the last pass of the model build according to the schedule and SPP Staff prefers the MDWG decide how to proceed. The group discussed the issues reported in the latest docucode report and decided to allow for updates to be submitted until 8:00 A.M Monday, February 13, 2017. SPP Staff will have until 8:00 A.M. Monday, February 20, 2017 to post the next pass. Subsequent pass will

follow the same two week structure until the models are clean for finalization. Moses requested that entities notify SPP if they don't have any changes.

Agenda Item 7 – Procedure Manual Task Force Participation:

This item was postponed to a later meeting.

Agenda Item 8 – Frequency of MDWG Meetings:

This item was postponed to a later meeting.

Agenda Item 10 – Administrative Items:

Summary of Action Items

SPP Staff to create and provide a slide to illustrate which models will utilize the different data requests. SPP Staff to discuss the possible timeframe of moving to MOD version 9.

Future Meetings

- TBD

Adjourn Meeting

With no further business to discuss, Nate asked for a motion to adjourn. Reené Miranda motioned to adjourn the meeting, Jerad Ethridge seconded the motion. The motion passed unopposed. The meeting adjourned at 12:35 p.m.

Respectfully submitted,
Anthony Cook
SPP Staff Secretary

Southwest Power Pool, Inc.
MODEL DEVELOPMENT WORKING GROUP

February 06, 2016

Net Conference

• A G E N D A •

8:30 a.m. – 12:00 p.m.

1. Administrative Items Nate Morris (15 min)
 - a. Call to Order
 - b. Introductions
 - c. Proxies
 - d. Agenda Review (**Action Item**)
 - i. Meeting Materials
 - e. Previous Meeting Minutes (Action Item)
 - i. September 20, 2016 Face to Face
 - ii. January 17, 2017 Email Vote

2. Transmission Planning Improvement Task Force (TPITF) Initiative All
 - a. Common Model (**Action Item**)
 - i. Renewable Dispatch Michael Odom
 - b. Future of MDWG Models
 - i. Build in Parallel with ITP Models Anthony Cook
 - ii. Modeling Practices due to Common Model All
 - c. Annual Engineering Data Request Schedule

3. TPLTF Efforts Update Chris Colson

4. Data Submittal Workbook (**Action Item**)..... All
 - a. Review all tabs: Looking to clean up the workbook for use in the new online database.

5. Model On Demand Talks Anthony Cook/Moses Rotich
 - a. Project report function
 - b. Discovered Anomaly in Version 8.1.0.1
 - i. From/To bus configuration in basecase upload
 - ii. From/To bus configuration in “modifying” projects

6. 2017 MDWG Powerflow Model Build Status Nate Morris

7. Procedure Manual Task Force Participation All
 - a. Primary: Reené Miranda (Aravind Chellappa), Edgardo Manansala, John Turner
 - b. Alternate: Wayne Haidle

8. Frequency of MDWG Meetings All

9. Administrative Items Nate Morris

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

- a. Summary of Action Items
- b. Future Meeting
- c. Adjourn

**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

2.a.v. Modeling of Firm Transmission Service

Commented [AC1]: To be discussed further at TWG.

The base reliability model shall meet the requirements of Attachment O of the SPP OATT and NERC Standard TPL-001-4 both of which require firm transmission service to be modeled. SPP will model firm transmission service reservations in the Light Load, Summer Peak, and Winter Peak seasons for Years 2, 5, and 10. Each season will have its own unique methodology for how transmission service will be modeled. The objective of the methodologies is to model a reasonable dispatch based upon approved firm transmission service for the applicable season. In general, the methodology will differentiate between conventional resources, such as gas or coal generation, and renewable resources, such as wind or solar. Units that do not have approved transmission service reservations will not be dispatched in the base reliability model, however they will be included in the model if they meet the requirements detailed in Section 2.a.i. All other reservations between companies are set to maximum firm service on a pro rata basis as limited by load.

Light Load

Renewable resource output will be dispatched to utilize 100% of approved firm service.

Summer Peak

Renewable resource output with firm service will be modeled in the summer peak base reliability scenario model at each facility's latest 5-year average for the SPP coincident summer peak¹, not to exceed each facility's firm service.

Winter Peak

Renewable resource output with firm service will be modeled in the winter peak base scenario model at each facility's latest 5-year average for the SPP coincident winter peak, not to exceed each facility's firm service.

For renewable facilities in commercial operation less than 5 years:

- 1) Data from a single reference facility can be used following these guidelines:
 - a. Nearest reference facility ~~5-year summer/winter peak average~~ will be used for any year of missing data.
 - b. Reference wind towers beyond 50 miles or reference solar facilities beyond 200 miles are subject to Transmission Working Group approval.
 - c. Must be in commercial operation and have been for the last 5 years.
 - d. Reference facility resource output data must be made available for SPP review.
 - e. For reference facilities that have an average output above the pmax of the newer facility, the 5-year averaged summer/winter peak value will not exceed the pmax of the newer facility.

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¹SPP coincident summer peak equals the highest demand including transmission losses for energy measured over a one clock hour period.