

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP
May 16, 2013
Sheraton Arlington, Arlington, Texas
9:00 A.M. – 5:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 9:08 a.m. The following Model Development Working Group (MDWG) members were in attendance:

Joe Fultz, Chair – Grand River Dam Authority
Nate Morris, Vice Chair – Empire District Electric
Scott Rainbolt – American Electric Power
Nathan McNeil – Midwest Energy
Reené Miranda – Southwestern Public Service
Brian Wilson – Kansas City Power & Light
John Boshears – City Utilities of Springfield
Mike Clifton – Oklahoma Gas & Electric
Derek Brown – Westar Energy
Scott Schichtl – Arkansas Electric Cooperative
Dustin Betz - Public Power District

SPP Staff in attendance included Anthony Cook (Secretary), John Mills, Brandon Hentschel, Chris Haley, Jay Caspary, Mitch Jackson, Scott Jordan, Alan Wahlstrom (RE), and James Bailey.

The following guests were also in attendance:

Mo Awad – Westar Energy
Jason Bentz – American Electric Power
Jerry Bradshaw – City Utilities of Springfield
Martin Green – Grand River Dam Authority
Dona Parks – Grand River Dam Authority
Tim Smith – Western Farmers Electric Cooperative
Mark Reinart – Golden Spread Electric Cooperative
Shane McMinn – Golden Spread Electric Cooperative
Aravind Chellappa – Southwestern Public Service
Jeremy Pearman – Oklahoma Gas & Electric
Gimod Olapurayil – ITC Great Plains
David Sargent – Southwestern Power Administration
Patrick West – Southwestern Power Administration
Alan Burbach – Lincoln Electric System
Jon Mayhan – Omaha Public Power District
John Shipman – Omaha Public Power District
Chad Reed – Arkansas Electric Cooperative
Liam Stringham – Sunflower Electric Power Corporation

Meeting Agenda

The agenda was reviewed by the group. John Boshears asked to add a topic for CBA Dispatch in the MDWG Models Set. The addition was made to Item 8. Reené Miranda motioned to approve the agenda with the edit; Scott Schichtl seconded the motion. The motion passed unopposed. (**Attachment 1 - MDWG Meeting Agenda 20130516.doc**)

Meeting Minutes

The November 13, 2012, November 30, 2012, February 22, 2013, March 1, 2013, and March 15, 2013 minutes were open for review. Scott Rainbolt motioned to approve the previous meeting minutes; Nate Morris seconded the motion. The motion passed unopposed. (**Attachment 2 - MDWG Minutes 20121113.doc, Attachment 3 - MDWG Minutes 20121130.doc, Attachment 4 - MDWG Minutes 20130222.doc, Attachment 5 - MDWG Minutes 20130301.doc, Attachment 6 - MDWG Minutes 20130315.doc**)

Review of Action Items

Anthony Cook reviewed the action items. Most updates can be found in the notes column of the spreadsheet. (**Attachment 7 - SPP MDWG Action Items 20130516.xls**)

#57) Scott Jordan stated that Staff is leaning heavily on the work done by WECC load modeling as well as discussions in the MMWG. Joe Fultz suggested Scott and Anthony to continue staying engaged in the MMWG discussions and keep the MDWG updated. Joe also urged the group to get involved and gain a better understanding to help provide input.

Action Item: Scott to send out WECC presentation to the MDWG.

#83) Nathan McNeil informed the group that a task force was created to handle inquiries for the AQ process. He stated that there is background material for the May TWG meeting that didn't get discussed but will be at a future meeting.

Action Item: Anthony to send out the TWG background material regarding the AQ process to the MDWG.

#85) Anthony stated that he is currently compiling a list of LSEs. Reené Miranda asked if the list will only include registered entities. Anthony stated that once the list is compiled, Staff will work with the members to compile a list of non-registered entities. John Mills stated that Staff can also get a list of entities registered with the Market and compare with the list registered with the RE.

#89) The TWG asked the MDWG to provide possible solutions to address the issue and resubmit to the TWG. Nathan McNeil expressed his concern of not modeling the removal of generation in the models until after a unit has been retired. He stated that this could mask problems that might show up once that unit is no longer available. Anthony stated that in the current process, a member can remove a unit from the MDWG model set, but if an undesignation letter hasn't been submitted, the unit will get modeled in the ITP model set. John Mills stated that he will look through the Tariff and see what the language is on generation retirement. The group agreed that suggestions

should be sent to Anthony Cook. Nathan urges the group to agree on one suggestion to send back to the TWG.

Action Item: John Mills to gather Tariff language and provide to the MDWG regarding generation retirement.

Action Item: MDWG members provide Anthony with ideas of how to model generation retirements for MDWG and ITP models.

Agenda Item 2 – Stakeholder Survey:

Anthony Cook went over the results of the 2012 Organizational Group Survey including the additional comments. (**Attachment 8 - 2012 org survey_analysis.xlsx**)

Agenda Item 3 – 2013 Series:

Powerflow

Anthony Cook gave a brief overview of the 2013 Series MDWG powerflow model building effort. He stated that the build was scheduled to end January 30, 2013 utilizing five passes, but instead ended March 1, 2013 with eight passes. He pointed out that many of the same docucheck issues remained in the report from the initial pass. John Mills asked the group to really focus on the docucheck report of each pass so that it is used to its full potential. He stated that doing this will help improve each pass of models as well as help keep the initiative on schedule.

Dynamic

Scott Jordan gave an update on the 2013 Series MDWG dynamic model building effort. He stated that there were issues with getting the contract finalized between SPP and PLI. He asked the group to review a revised schedule. He gave a comparison of the current schedule versus a proposed. He noted that the overall difference is the final posting date being delayed until August 23, 2013, but that efforts will be made to expedite the process if possible. John Boshears asked about updating the TPL Dynamic Contingency list. This is a question that needs to be directed to the R&D Special Studies Department. SPP Modeling Staff will pass along the request.

Reené Miranda motioned to approve the revised schedule. John Boshears seconded the motion. The motion passed unopposed. (**Attachment 9 - 2013 MDWG Modeling Schedule Dynamics Proposed Revision 05082013.pdf**)

Action Item: Anthony to email the new approved Dynamic schedule to the MDWG.

Action Item: Anthony will follow-up with R&D Special Studies Department about updating the TPL Dynamic Contingency list.

Agenda Item 4 – 2014 Series:

MMWG Spring Meeting Updates

Anthony gave a brief update on the spring MMWG meeting. He stated that the MMWG is working on creating an exceptions file in excel format. Once the format is established,

SPP Staff will add similar functionality to the MDWG model building process. The group also decided to reinstate the FLAT start requirement for the MMWG model set. There was some discussion to move to another version of PSS/e; however, there are still several questions that need answered prior to making a decision.

Model Selection

The group reviewed the proposed model selection for the 2014 Series MDWG powerflow, dynamics, and short circuit sets. Anthony Cook stated that the powerflow and dynamic models are based on the MMWG 2014 Series model set and the short circuit models are based on anticipated SERC short circuit models.

Scott Rainbolt asked if the group would be interested in building a 2025 spring model in order to schedule maintenance outages for a ten year spring case. Members asked if maintenance outages were really scheduled 10 years out and if everyone wanted another model to review and perform contingency analysis on. Some said they may consider it if a formal request was made from the ESWG or if another model was removed. There was not a consensus for the extra model.

Nathan McNeil wanted to note that a separate “ASPEN users” short circuit model may not need to be built due to software enhancements. He also stated that he would volunteer to help perform more testing to solidify an answer.

Nate Morris asked the group if there are concerns with only having a current year and a six year short circuit model. His reason was that if a safety issue is found when studying the current year model, there is no time to correct the problem. He asked if a 2 year out model should be built so that members could study it and have time to plan corrections if anything is found. Nathan McNeil pointed out that the sequence data is provided in each powerflow case and that the external data would be the same. John Boshears stated that short circuit studies are concerned with today and not the future. He stated that unless the changes are significant, the fault current should not change that much. The group decided not to add another model to the short circuit set. John Mayhan added that the new TPL-002-04 standard will require “single line to ground” fault studies on a 10 year model. Staff will need to look at the TPL standards further.

Nate Morris motioned to approve the proposed model selection. Nathan McNeil seconded the motion. The motion passed unopposed. (**Attachment 10 - 2014 Series Model Selection.xlsx**)

Action Item – Check with Doug Bowman to make sure that SPP has identified the correct short circuit cases to address TPL studies.

Action Item – Get with Doug Bowman to make sure we have all of the sequence data needed for TPL.

Schedule

The group reviewed the proposed schedule for the 2014 Series model build. Some of the members expressed concerns with some of the dates and time frames in the proposed schedule. Due to complexity of making changes to the schedule, Anthony asked for individuals to email any concerns to him. The schedule will be tabled and

discussed at a future conference call. (**Attachment 11 - MDWG 2014 Series Schedule_DRAFT.pdf**)

Action Item – Members to email Anthony with concerns of the draft schedule.

Agenda Item 5 – Modeling Practices:

Aux Load, Gross vs. Net, Pmax, Pgen, Pmin

Anthony Cook began the discussion with a background of the topic. He stated that this topic has been discussed for a few years in the Model Improvement Task Force (MITF) and that the group's decision was to allow the practice of modeling either net or gross generation output as long as certain steps were followed. This can be found in the posted MITF whitepaper. Anthony stated that NERC is working to condense the MOD standards into three standards and that one of the standards, MOD B, deals with this issue. Reené Miranda is on the drafting team of MOD B and stated that the standard is currently leaning toward the modeling of gross output as Pmax and explicitly modeling station load. Reené also added that Pmax should also consider the transmission service associated with that generator.

Chris Haley stated that in previous years, generation and load data was collected directly from the resource planning members for the EIA-411 effort and was use to report capacity and demand to NERC. Starting with 2013, this data was taken from the 2013 MDWG model build to populate the EIA-411. SPP expects to use this same methodology going forward in hopes to obtain consistency between NERC assessments and modeling numbers. This methodology change has brought to light a number of discrepancies with reported generation data between the models and the member supplied resource planning data. Also, data reported by the generation owners in the EIA-860 report doesn't coincide with the other two previously mentioned mediums.

Anthony and Chris gave a presentation that showed the discrepancies between the pmax value on units in the models and pmax value reported in the EIA-860. Reené asked for SPP to create a list showing Pmax discrepancies for each company. Scott Rainbolt asked for a link to the EIA-860 data.

Anthony stated that there is less confusion when Pmax represents the gross seasonal capability of a unit and the station load is explicitly modeled. Mo asked for a worksheet to be added to the data submittal workbook to map station load to generators. SPP proposed creating a standard to model gross seasonal capability as Pmax and explicitly model station load. This topic will be discussed further at a future meeting. (**Attachment 12 - Generation Reporting Differences.pptx**)

Action Item – Anthony and Chris to compile a list of pmax discrepancies for each company and send to members.

Action Item – SPP Staff to add station load mapping worksheet to the data submittal workbook.

Modeling of Mothballed vs. Retired/Decommissioned Units

This item is in conjunction with action item # 89. In some cases, a unit is to stay in the model but it will be “mothballed” meaning it isn’t planned to be used. One issue is that there is not a modeling standard for these units. The unit could be turned on and dispatched in a study which could give incorrect results. Another issue that Chris Haley stated is that these units are still being included in the seasonal capability reported in the EIA-411. One possible improvement is to give the unit a specific identifier and make the Pmax/Pmin value zero. This will be discussed more in depth at a future meeting.

Modeling granularity for units

Anthony stated that in some instances, some smaller units are aggregated into one. An example is three 1.5 MW diesel units being modeled as one 4.5 MW unit. He asked the group how it would be modeled if one of the units was taken out for an outage. He stated that improvement is needed for more granularity. This will be discussed more in depth at a future meeting.

Not modeling known projects

Anthony asked the group if there is any reason not to model a planned project. The group didn’t have any reasons not to. Joe Fultz stated that if the in-service date isn’t firm, be conservative and model it later than it might actually be complete.

Tie Line Rating Methodology: Planning vs. Real-time

Anthony brought this question from the MMWG to the group. The concern is that planning models have different emergency ratings than what Operations would use. Mo Awad stated that each company has to develop a rating methodology. He stated that Ops has 30 minutes to accommodate the emergency rating. Anthony questioned if Rate B in the planning models has a time limit associated with it. The answer was that in some instances it might and some might not. The consensus of the group is that the most limiting element’s rating is used in the planning models regardless of time constraint.

Agenda Item 6 – Model Validation/Verification Efforts:

Governor Response Survey/Governor and Exciter Testing

Scott Jordan gave a presentation on Governor Response Survey and Governor and Exciter Testing being performed by SPP. SPP has been participating in an ERAG-MMWG project working on a dynamic case that can be used for a frequency response study. The situation the group has found is that the governor models are applied to the case per MOD Standards correctly, but there are plant controls that may be overriding the governor response. Currently the ERAG-MMWG is trying to devise a way to reproduce the response seen in the field by applying either a GGOV1 or LDFRQ.

Scott Jordan and Zach Bearden are in the process of testing/verifying governor and exciter models using DSA tools. These results will be coupled with the output of a Python Dyre file checker in order to identify suspect data. This will be an on-going process and either Scott or Zach may request assistance with dyre file data verification. **(Attachment 13 - SPP_GOV_SUR_Model_Imrpv.pptx)**

EMS State Estimator Comparison

This item was tabled until the next meeting.

Agenda Item 7 – MDWG Charter Updates:

Members are to provide updates to Anthony for discussion at the next meeting.
(Attachment 14 - MDWG_Charter_12-15-2008_approved.pdf)

Action Item – Members to supply updates to the MDWG Charter to Anthony Cook.

Agenda Item 8 – Other:

Data Submittal Workbook Updates

Anthony asked the group to help clean up the generator and expanded bus names tabs of the data submittal workbook. He also asked the members to try and keep fuel types standard. Dona Parks suggested creating a drop down selection. The members asked Staff to add a worksheet that tells the members what they need to help keep updated.

Action Item – Staff to create a member’s responsibility worksheet within the data submittal workbook.

Breaker Modeling/Automated Contingency file

Anthony stated that a few of the members are now utilizing the capability with PSS/e to model breakers. The issue with this is that it creates zero impedance lines and adds several new bus numbers to the models. Brandon Hentschel asked the group if it would be more beneficial to add a special character to the breaker bus name. This would identify where a breaker is without adding zero impedance lines and new buses. It would also allow for a python script to be created that can automate a breaker-to-breaker contingency file. There was concern from some of the members that changing the bus names would impact several processes that use the current bus names. He asked the group to put some thought into it and let him know of any other concerns.

New BES Definition

Scott Jordan gave a brief presentation on the new definition of the Bulk Electric System (BES). The covered in the presentation were the Phase 1 Definition and Inclusions, Exception Process, and Future Changes. Right now the effective date for the new BES Definition is July 1, 2013. The SPP Modeling Contacts asked if the presentation could be posted. **(Attachment 15 - MDWG_Charter_12-15-2008_approved.pdf)**

Action Item – Anthony to distribute the presentation on the new BES definition.

MOD Training

Anthony discussed putting together MOD training prior to the start of the 2014 Series MDWG model build. He is going to set up a Doodle poll to get something scheduled.

Action Item – Anthony to set-up a Doodle poll to get MOD training scheduled.

Transformer Zero Sequence Data

This item was tabled until the next meeting.

CBA Dispatch in MDWG Models

John Boshears asked if a CBA dispatch will be incorporated into the MDWG model build in the future. Anthony stated that he doesn't know if there will be any changes to the way the MDWG model are built.

Agenda Item 9 - Closing Administrative Duties:

Review of Action Items:

1. *Scott Jordan to send out the WECC presentation to the MDWG.*
2. *Anthony to send out TWG background material, regarding the AQ process, to the MDWG.*
3. *John Mills to gather Tariff language regarding generation retirement and provide to the MDWG.*
4. *MDWG members provide Anthony with ideas of how to model generation retirements for MDWG and ITP models.*
5. *Anthony to email the new approved Dynamic schedule to the MDWG.*
6. *Anthony will follow-up with R&D Special Studies Department about updating the TPL Dynamic Contingency list.*
7. *Check with Doug Bowman to make sure that SPP has identified the correct short circuit cases to address TPL studies.*
8. *Get with Doug Bowman to make sure we have all of the sequence data needed for TPL.*
9. *Members to email Anthony with concerns of the draft schedule.*
10. *Anthony and Chris to compile a list of pmax discrepancies for each company and send to members.*
11. *SPP Staff to add station load mapping worksheet to the data submittal workbook.*
12. *Members to supply updates to the MDWG Charter to Anthony Cook.*
13. *Staff to create a member's responsibility worksheet within the data submittal workbook.*
14. *Anthony to distribute the presentation on the new BES definition.*
15. *Anthony to set-up a Doodle poll to get MOD training scheduled.*

Next Meetings Place and Date:

Conference Call June 2013, Date TBD

Face-to-Face November 2013, Date TBD

Next Meeting Topics:

1. 2014 Series MDWG Schedule
2. Pmax Standardization/Modeling
3. Modeling Practice for Retired Generation
4. Modeling Practice for *Mothballed Units*
5. *Modeling Practice for Unit Granularity*
6. *EMS State Estimator Comparison*
7. *MDWG Charter Updates*
8. *Transformer Zero Sequence Data*



Adjourn Meeting

Nate Morris motioned to adjourn the meeting, Nathan McNeil seconded the motion. With no further business to discuss, the MDWG adjourned.

Respectfully submitted,
Anthony Cook
SPP Staff Secretary

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP
May 16, 2013
Sheraton Arlington, Arlington, Texas
9:00 A.M. – 5:00 P.M.**

• D R A F T A G E N D A •

1. Administrative Joe Fultz (30 min)
 - a. Call to order
 - b. Proxies
 - c. Introductions
 - d. Approve agenda
 - e. Approve minutes of previous meetings
 - i. November 13, 2012
 - ii. November 30, 2012
 - iii. February 22, 2013
 - iv. March 1, 2013
 - v. March 15, 2013
 - f. Review of Past Action Items (Anthony Cook)
2. Stakeholder Survey Anthony Cook (15 min)
3. 2013 Series (30 min)
 - a. Powerflow (Anthony Cook)
 - b. Dynamic (Scott Jordan)
4. 2014 Series Anthony Cook (45 min)
 - a. MMWG Spring Meeting Updates
 - b. Model Selection
 - c. Schedule
5. Modeling Practices(2 hr)
 - a. Aux Load, Gross vs. Net, Pmax, Pgen, Pmin (Anthony Cook, Chris Haley)
 - b. Modeling of Mothballed vs. Retired/Decommissioned Units (Anthony Cook, Chris Haley)
 - c. Modeling granularity for units (Anthony Cook)
 - d. Not modeling known projects (Anthony Cook)
 - e. Tie Line Rating Methodology (Anthony Cook)
 - i. Planning vs. Real-time
6. Model Validation/Verification Efforts.....(1 hr)
 - a. Governor Response Survey (Scott Jordan)
 - b. Governor and Exciter Testing (Scott Jordan)
 - c. EMS State Estimator Comparison (Derek Brown)
7. MDWG Charter Updates All (30 min)
8. Other(1 hr)
 - a. Data Submittal Workbook Updates (Anthony Cook)
 - b. Breaker Modeling/Automated Contingency file (Brandon Hentschel)
 - c. New BES Definition
 - d. MOD Training (Anthony Cook)
 - e. Transformer Zero Sequence Data (Derek Brown)

f. CBA Dispatch in MDWG models

9. Closing Administrative Duties..... Joe Fultz (15 min)
- a. Review Action Items
 - b. Next meeting place and date
 - c. Next meeting topics
 - d. Adjourn meeting

DRAFT

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP
November 13, 2012
Southwest Power Pool Corporate Office
Little Rock, Arkansas
1:00 P.M. – 5:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 1:18 p.m. The following Model Development Working Group (MDWG) members were in attendance:

Joe Fultz, Chair – Grand River Dam Authority (GRDA)
Nate Morris, Vice Chair – Empire District Electric (EDE)
Scott Rainbolt – American Electric Power (AEP)
Jason Shook – GDS Associates (GDS)
Nathan McNeil – Midwest Energy (MIDW)
Reené Miranda – Southwestern Public Service (SPS)
Brian Wilson – Kansas City Power & Light (KCPL)
John Boshears – City Utilities of Springfield (CUS)
Mike Clifton – Oklahoma Gas & Electric (OGE)
Mo Awad – Westar Energy (WR)
Dustin Betz - Public Power District (NPPD)

SPP Staff in attendance included Anthony Cook (Secretary), Kelsey Allen, Mitch Jackson, Brandon Hentschel, Zack Bearden, and Scott Jordan.

The following guests were also in attendance:

Derek Brown – Westar Energy (WR)
John Payne – Kansas Electric Power Cooperative (KEPCo)
Jason Bentz – American Electric Power (AEP)
Corey Falgout – American Electric Power (AEP)
Tim Smith – Western Farmers Electric Cooperative (WFEC)
Peter Howard - Kansas City Power & Light (KCPL)
Alex Mucha – Oklahoma Municipal Power Authority (OMPA)
Mark Reinart – Golden Spread Electric Cooperative (GSEC)
Aravind Chellappa – Southwestern Public Service (SPS)
Jeremy Pearman – Oklahoma Gas & Electric (OGE)
Ryan Einer – Oklahoma Gas & Electric (OGE)

Meeting Agenda

The agenda was reviewed by the group. Additions were made to Item 10. Nate Morris motioned to approve the agenda with the edit; Jason Shook seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20121113.doc)

Meeting Minutes

The July 26, 2012, August 25, 2012, August 29, 2012, and October 1, 2012 minutes were open for review. Nathan McNeil motioned to approve the previous meeting minutes; Nate Morris seconded the motion. The motion passed unopposed.

(Attachment 2 - Finalization of Powerflow Cases Email Vote 20120726.doc, Attachment 3 – Finalization of Dynamic Cases Email Vote 20120825.doc, Attachment 4 – MDWG Minutes 20120829.doc, Attachment 5 – Finalization of Dynamic Cases Email Vote 20121001.doc)

Review of Action Items

Anthony Cook reviewed some of the recently completed and in progress action items. Item #50: Staff has worked to edit the document. Hyperlinks have been made to reference various documents. Anthony is currently working to reorganize the manual.

Item #56: Entergy has agreed to coordinate loads to remove ZILs. Anthony has sent an email to those members with regional ties.

Item #85: This will be discussed in the meeting.

(Attachment 6 - SPP MDWG Action Items 20121113.xls)

Agenda Item 2 – Review of MDWG Charter:

The group reviewed the MDWG Charter for possible updates. There were some suggestions to change STEP to align more with ITP model building and emphasize these are not economic models. Members are to send proposal updates to Anthony for review at a future meeting.

Agenda Item 3 – MMWG Update:

Anthony Cook stated that the MMWG will build the 2013 Series Cases using PSS/E version 32. They will discuss a possible move to a newer version at the 2013 Spring meeting.

Agenda Item 4 – Data Reporting Requirements and Enforceability:

Anthony Cook stated that the Balance Authority (BA) is responsible for collecting data within their footprint according to the SPP Tariff. He also stated that that data is to be updated during the model building schedule. Reené Miranda stated that the Load Serving Entity (LSE) is required to submit data to SPP not the BA. Kelsey Allen stated the Regional Entity (RE) data request requires LSEs to submit data through the BA if they are a registered member. Reené stated that he disagrees that the BA be responsible for getting the LSE data. Anthony added that if an LSE doesn't supply the data upon the request of the BA and they are a member, SPP can assist in requesting the data. Reené and Mo Awad agree that data should be sent to SPP, but coordinated with the BA. Nathan McNeil added that this extends for generation and asked who is responsible for getting generation data for the models.

Kelsey stated that there needs to be a process improvement take place. Reene asked how many LSEs don't supply data as a percentage base. Mo asked for SPP to compile a list of LSEs to get an idea of how many companies this might involve.

Action Item – SPP staff to compile a list of LSEs

Action Item – Scott Jordan and Anthony cook will develop a process to use the data from GI and convert them to MOD Projects via the SPP Modeling Contacts.

Agenda Item 5 – Area Summary Report Evolution:

Anthony stated that SPP staff can create area summary reports based on the data within the models; however, if this needs to be LSE summaries, SPP can't create the reports. Mo Awad asked if the reports are needed. The group asked for SPP to find out if this is a requirement to create. If it isn't, the group is in favor of removing it from the data submittal workbook, otherwise SPP will create a LSE summary sheet template and distribute it to be filled out.

Action Item – SPP staff to find out if area summary reports are required.

Agenda Item 6 – Generation Retirement Process:

Nate Morris questioned the appropriate process for removing generation from the model. He cited the changes due to EPA regulations as well as retirements of generation in general. Anthony Cook stated that the unit should go through the undesignated resource process. Kelsey Allen added that the MDWG doesn't have an official process and that there is nothing preventing someone from removing a unit from the MDWG models. However, if the unit hasn't gone through the undesignated resource process, it will be added back into the ITP models. Nate asked how the discrepancy will be handled for planning if comparisons are made between the models.

Action Item – Anthony to ask TWG to discuss process for generation retirement and confidentiality.

Agenda Item 7 – Detail Modeling:

Anthony Cook began the discussion by asking the group how much detail is too much. He cited an example of two generators that have not been modeled and now want to be registered in the Market. Some Municipal's system are not modeled in detail, but are modeled as a load on a High Voltage (69, 115,138, or 161kV) bus. Should the generation units be modeled on the 138 kV bus or should the system be modeled in more detail to more accurately represent the system?

Mo Awad stated that it is a common practice to model the generation on the same voltage level as the load. Kelsey Allen added that the MITF Whitepaper states for generation registered to the market. Reené added that if it affects the dynamics of the system, detail should be included.

Anthony stated that this discussion is for information purpose only for now and no action is required.

Agenda Item 8 – EMS vs. MOD Modeling:

Scott Rainbolt described the internal process of updating ratings to MOD. He stated that SPP Operation staff continually contacts members asking why MOD ratings don't match EMS submissions. Kelsey explained that Ops staff uses MOD to validate seasonal ratings, but he encourages them to wait until the base case is updated. He added that the models need to be as accurate as possible so that if an event happens, the model can be used to replicate the event. The models are also needed for TCR to build models. Scott added that AEPW doesn't add updates until the next planning cycle.

Nathan McNeil stated that EMS operations sends out monthly emails for updates. Joe Fultz and Mo Awad stated that an email from the TO should supersede MOD.

Action Item – SPP modeling staff to educate operation staff on MOD.

Agenda Item 9 – CBA Model Update/Discussion:

Kelsey Allen reminded everyone to review the posted data and submit any comments.

Agenda Item 10 – Other:

a. 2013 Dynamic Model Build Schedule:

Scott Jordan discussed the proposed updates to the 2013 Series MDWG Dynamics schedule. He proposed taking 5 days from _____ and 5 days from _____ and adding the 10 days to the end for _____. Scott proposed the group review the changes and vote on them at a future meeting.

(Attachment 7 - 2013 MDWG Dynamics Model Build Schedule.pdf)

b. Dynamic Load Modeling:

Joe Fultz mentioned that dynamic load modeling is an item that was discussed in the TSTF and that for all who weren't aware, it is addressed in multiple standards that are out for comment. He asked if anyone was modeling dynamic load and if so to let their stability staff know that it will be a topic going forward due to the effects on stability studies.

Nathan McNeil stated that if there is going to be a significant change to how dynamic loads are modeled, it will take time to gather the necessary data.

c. Attachment AQ Updates:

Mo Awad gave an update on the TWG Attachment AQ process discussion from the November 7-8, 2012 meeting.

Agenda Item 11 - Closing Administrative Duties:

Next Meetings:

Face-to-Face: TBD, 2013

Next Meeting Topics: TBD

Summary of New Action Items

1. **SPP staff to compile a list of LSEs.**
2. **Scott Jordan and Anthony cook will develop a process to use the data from GI and convert them to MOD Projects via the SPP Modeling Contacts.**
3. **SPP staff to find out if area summary reports are required.**
4. **Anthony to ask TWG to discuss process for generation retirement and confidentiality.**
5. **SPP modeling staff to educate operation staff on MOD.**

Adjourn Meeting

Reené Miranda motioned to adjourn the meeting, Scott Schichtl seconded the motion. With no further business to discuss, the MDWG adjourned at 2:00 p.m.

Respectfully submitted,
Anthony Cook
SPP Staff Secretary

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP
November 30, 2012
Conference Call
1:00 P.M. – 2:00 P.M.**

• MINUTES •

The meeting was called to order at 1:04 p.m. The following Model Development Working Group (MDWG) members were in attendance:

Joe Fultz, Chair – Grand River Dam Authority (GRDA)
Nate Morris, Vice Chair – Empire District Electric (EDE)
John Boshears – City Utilities of Springfield (CUS)
Nathan McNeil – Midwest Energy (MIDW)
Reené Miranda – Southwestern Public Service (SPS)
Scott Rainbolt – American Electric Power (AEP)
Scott Schichtl – Arkansas Electric Cooperative (AECC)
Dustin Betz - Public Power District (NPPD)
Brian Wilson – Kansas City Power & Light (KCPL)

SPP Staff in attendance included Anthony Cook (Secretary), Scott Jordan, and Mitch Jackson.

The following guests were also in attendance:

Ryan Einer (Proxy for Mike Clifton) – Oklahoma Gas & Electric (OGE)
Jeremy Pearman – Oklahoma Gas & Electric (OGE)
Derek Brown – Westar Energy (WR)
Tim Smith – Western Farmers Electric Cooperative (WFEC)
Liam Stringham – Sunflower Electric Power Corporation (SEPC)
Ryan Yokley – Sunflower Electric Power Corporation (SEPC)
Jeremy Harris - Westar Energy (WR)
Kyle Drees- Westar Energy (WR)
Daniel Benedict – City of Independence, Missouri (INDN)
John Payne – Kansas Electric Power Cooperative (KEPCo)
Donnavan Leavitt – (EPIS)

Meeting Agenda

There was not an agenda prepared for this meeting.

Item 1 – 2013 Series Powerflow Schedule Update:

Anthony Cook stated to the group that the schedule needed updated due to the late posting of the MDWG 2013 Series Pass 3 models. He proposed extending the member submission date by one week and leaving the rest of the schedule the same. Nate Morris stated his concern of not giving enough time for the members to review the models. Anthony countered that a subset of the models was posted for review, thus

giving the members time to perform a preliminary overview during the original time frame. After some discussion by the group Nathan McNeil motioned to update the schedule with the proposed change. Dusting Betz seconded the motion. The motion passed with one member abstaining. Nate Morris with Empire District Electric abstained for the following reason:

EDE has concerns about compressing the available member review time in Pass 3 without any subsequent additional review time allotted to the members, especially due to the fact the majority of Pass 4 consists of the holiday season. The proposed schedule change appears to be in conflict with base reasoning as to why the members supported a single build vs. multiple builds. In not allowing for members to have more time to review/amend the models, there could be rippling effects in the forthcoming ITP review/study as well as any subsequent studies which are dependent on the 2013 Series Models.

Item 2 – 2013 Series Dynamics Schedule Update:

Scott Jordan reviewed the proposed changes to the Dynamics portion of the MDWG Schedule that he presented at the November 13, 2012 MDWG meeting. A request was made to have a “Post Preliminary Models” item and then a “Post Final Models...” item. Reené Miranda requested changing “DC” to “Dynamic Coordinator” to reduce confusion. Reené motioned to accept Scott’s proposal along with the new changes. Brian Wilson seconded the motion. The motion passed unopposed.

(Attachment 1 - 2013 MDWG Modeling Schedule_REV1.pdf)

Item 3 – PSSE V.32.2 Dynamics Correction:

Scott Jordan informed the group that one of the SPP Member had informed him of a case problem using the 2012 MDWG 2013S Reduced Dynamic Case. The Member sent the PSA file used to run the simulation causing PSSE Version 32.1 to stall. SPP Staff tested the PSA on the posted case and turned on the convergence monitoring. There were no messages during the simulation sent to the PDEV file that would cause the case to stall. SPP Staff also conferred with the Dynamics Coordinator concerning the situation and he agreed that there was nothing indicating a problem. SPP Staff then sent an e-mail to Siemens-PTI support. Siemens-PTI support sent a response that it had experienced some problems with some of the dynamic dyre file models in PSSE Version 32.1 and to download and test the simulation using PSSE Version 32.2. SPP Staff tested the simulation using PSSE Version 32.2 and the simulation ran using the snapshot, converted case, and DLL made using the previous version.

SPP Staff will work on a formal communication to the SPP Members and will more than likely ask the MDWG to change the version of PSSE to Version 32.2 sometime after the first of the year. This verbal communication of this situation is informal and intended at this time as a preliminary finding to a situation using PSSE Version 32.1. SPP Staff wants to make sure that they understand the full impact of the move to the new version. SPP Staff will have more communications with Siemens-PTI Support.

Item 4 - Closing Administrative Duties:



Adjourn Meeting

With no further business to discuss, the MDWG adjourned at 2:16 p.m.

Respectfully submitted,

Anthony Cook
SPP Staff Secretary

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP
February 22, 2013
Conference Call
10:00 A.M. – 11:00 A.M.**

• MINUTES •

The meeting was called to order at 10:37 a.m. The following Model Development Working Group (MDWG) members were in attendance:

Joe Fultz, Chair – Grand River Dam Authority
Nate Morris, Vice Chair – Empire District Electric
Nathan McNeil – Midwest Energy
Reené Miranda – Southwestern Public Service
Scott Rainbolt – American Electric Power
Scott Schichtl – Arkansas Electric Cooperative
Dustin Betz – Nebraska Public Power District
Derek Brown – Westar Energy
Mike Clifton – Oklahoma Gas & Electric
Brian Wilson – Kansas City Power & Light
Jason Shook – GDS Associates

SPP Staff in attendance included Anthony Cook (Secretary), Scott Jordan, Brandon Hentschel, Mitch Jackson, James Bailey, and Greg Sorenson (RE).

The following guests were also in attendance:

Jerry Bradshaw – (Proxy for John Boshears) City Utilities of Springfield
Ryan Einer – Oklahoma Gas & Electric
Darryl Bogges – Western Farmers Electric Cooperative
Liam Stringham – Sunflower Electric Power Corporation
Mo Awad - Westar Energy (WR)
John Payne – Kansas Electric Power Cooperative
Jason Bentz – American Electric Power
Matthew Bordelon – Central Louisiana Electric Company
Alan Burbach – Lincoln Electric System
Alex Dobson – Oklahoma Municipal Power Authority
Tom Miller – ITC Great Plains
Gimod Olapurayil – ITC Great Plains
David Sargent – Southwestern Power Administration
Jon Mayhan – Omaha Public Power District
John Shipman – Omaha Public Power District
Jeff Stewart – Lafayette Utilities System
James Simms – Southwestern Public Service
Donna Parks – Grand River Dam Authority
Martin Green – Grand River Dam Authority
Todd Wheeler – EPIS

Meeting Agenda

The agenda was reviewed by the group. Reené Miranda motioned to approve the agenda as presented; Scott Schichtl seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20130222.doc)

Agenda Item 2 – 2013 Series Model Status:

Anthony Cook updated the group on the current status of the Powerflow models. He stated that some members submitted idevs after the cut-off date which were not ran on the posted models. Nate Morris explained that extra unscheduled passes is the reason the TWG requested a report card on the model build. Joe Fultz followed up with three options for the group to consider:

- Option 1: Finalize the powerflow models as is and members submit post processing idev files.
- 2: Apply the submitted idev files and repost the models for finalization. Those members would go on the TWG report card.
- 3: Extend the build with another pass. Members submitting changes would go on the TWG report card.

Conversation about the options revealed that the group wasn't comfortable with option 1 because the models would be finalized with known issues remaining. The group also had issues with option 2 because they felt that this unfair to let a few make additional edits and not everyone. The group decided to allow another pass for updates. Nathan McNeil motioned to post the models today, allow SPP members to submit idev files until Monday, February 25th, repost the corrected models on Wednesday, February 27th, and then the MDWG vote to finalize on Friday, March 1 by conference call. Nate Morris requested that SPP post a list of changes submitted as an addendum with the reposted models. Scott Rainbolt seconded the motion. The motion passed unopposed.

Item 3 – PSS/e V.32.2:

Scott Jordan went over the posted "PSSe version 32.2 notes.docx" document with the group. He let the group know that there aren't any known conversion issues with the point revision. SPP will post the finalized powerflow models in version 32.2.

(Attachment 2 - Attachment 2 - PSSe version 32.2 notes.docx)

Item 4 - Closing Administrative Duties:

Next Meeting

- a. Conference call March 1, 2013
- b. Face-to-face May 16, 2013

Next Meeting Topics

- a. Finalize 2013 MDWG Powerflow models
- b. TBD



Adjourn Meeting

With no further business to discuss, Reené Miranda motioned to adjourn the meeting. Scott Schichtl seconded the motion. The MDWG adjourned at 11:21 a.m.

Respectfully submitted,

Anthony Cook
SPP Staff Secretary

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP**

March 1, 2013

Conference Call

2:00 P.M. – 3:00 P.M.

• MINUTES •

The meeting was called to order at 2:02 p.m. The following Model Development Working Group (MDWG) members were in attendance:

Joe Fultz, Chair – Grand River Dam Authority
Nate Morris, Vice Chair – Empire District Electric
Nathan McNeil – Midwest Energy
Scott Rainbolt – American Electric Power
Scott Schichtl – Arkansas Electric Cooperative
Dustin Betz – Nebraska Public Power District
Derek Brown – Westar Energy
Mike Clifton – Oklahoma Gas & Electric
Brian Wilson – Kansas City Power & Light
John Boshears – City Utilities of Springfield
Jason Shook – GDS Associates

SPP Staff in attendance included Anthony Cook (Secretary), Brandon Hentschel, Mitch Jackson, James Bailey, and John Mills.

The following guests were also in attendance:

Jerry Bradshaw – City Utilities of Springfield
Aravind Chellappa – (Proxy for Reené Miranda) Southwestern Public Service
Tim Smith – Western Farmers Electric Cooperative
Liam Stringham – Sunflower Electric Power Corporation
John Payne – Kansas Electric Power Cooperative
Jason Bentz – American Electric Power
Daniel Benedict – City of Independence
Dave Macey – City of Independence
Alex Mucha – Oklahoma Municipal Power Authority
Noumvi Ghomsi – Public Service Commission of Missouri
Gimod Olapurayil – ITC Great Plains
Donna Parks – Grand River Dam Authority
Martin Green – Grand River Dam Authority

Meeting Agenda

There was not an agenda prepared for the meeting.

Item 1 – 2013 Series Model Status:

Anthony Cook stated the powerflow models were reposted on Wednesday February 27 and the corrections were sent to the MDWG. Also the short circuit models were posted on Thursday, February 28. Since Anthony asked the group to finalize both the powerflow and short circuit models in the meeting posting, Nate Morris asked if anyone would need time to review the short circuit models before voting on them. Joe Fultz asked if there would be a time issue with having a chance to review the short circuit models. Anthony stated that the time issue is with the powerflow and not the short circuit models. Nate made a recommendation to table finalizing the short circuit models to discuss later. The group agreed.

Jason Shook motioned to approve the powerflow models for 2013. Derek Brown seconded the motion. The motion passed unopposed.

Brandon Hentschel stated that he will send out an update of remaining transformer code 4 issues in the short circuit models this afternoon. Nate Morris made a motion to allow members to submit corrections by Friday, March 8, 2013, SPP incorporate changes and repost by Tuesday, March 12, and the MDWG vote to finalize on Friday, March 15 by conference call. Mike Clifton seconded the motion. The motion passed unopposed.

Adjourn Meeting

With no further business to discuss, Nate Morris motioned to adjourn the meeting. Derek Brown seconded the motion. The MDWG adjourned.

Respectfully submitted,

Anthony Cook
SPP Staff Secretary

**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP**

March 15, 2013

Conference Call

9:00 A.M. – 10:00 A.M.

• MINUTES •

The meeting was called to order at 9:11 a.m. The following Model Development Working Group (MDWG) members were in attendance:

Joe Fultz, Chair – Grand River Dam Authority
Nate Morris, Vice Chair – Empire District Electric
Nathan McNeil – Midwest Energy
Scott Rainbolt – American Electric Power
Scott Schichtl – Arkansas Electric Cooperative
Dustin Betz – Nebraska Public Power District
Derek Brown – Westar Energy
Mike Clifton – Oklahoma Gas & Electric
Brian Wilson – Kansas City Power & Light
Jason Shook – GDS Associates

SPP Staff in attendance included Anthony Cook (Secretary), Brandon Hentschel, Mitch Jackson, John Mills, and Mike Hughes (RE).

The following guests were also in attendance:

Aravind Chellappa – (Proxy for Reené Miranda) Southwestern Public Service
Jerry Bradshaw – (Proxy for John Boshears) City Utilities of Springfield
Tim Smith – Western Farmers Electric Cooperative
John Mayhan – Omaha Public Power District
Chad Reed – Arkansas Electric Cooperative
Alex Mucha – Oklahoma Municipal Power Authority
Gimod Olapurayil – ITC Great Plains
Donna Parks – Grand River Dam Authority
Martin Green – Grand River Dam Authority

Meeting Agenda

There was not an agenda prepared for the meeting.

Item 1 – 2013 Series Short Circuit Model Status:

Brandon Hentschel informed the group of the updates received and issues still remaining. John Mayhan asked about additional checks such as transformers with the

windings wrong. Anthony Cook stated that additional screenings could be added to the docucheck program for short circuit purposes.

Nathan McNeil asked if there is a need for developing PSSE and ASPEN models. He stated that he ran a few fault analyses in ASPEN on the two sets and obtained the same results. Anthony stated that this needs to be looked into further before discontinuing the ASPEN User models. Nathan volunteered to help with the additional research.

Scott Schichtl requested adding the Short Circuit Task Force (SCTF) recommendations to the MDWG Procedure Manual.

Brian Wilson motioned to finalize the 2013 Series Short Circuit models as is. Nathan McNeil seconded the motion. The motion passed unopposed.

Adjourn Meeting

With no further business to discuss, Scott Schichtl motioned to adjourn the meeting. Jason Shook seconded the motion. The MDWG adjourned at 9:42 am.

Respectfully submitted,

Anthony Cook
SPP Staff Secretary

	Action Item	Responsible Parties	Date Originated	Date Updated	Progress	Notes
42	Review the new MOD standards approved by FERC and how they will apply to the MDWG and SPP planning modeling	SPP Staff	3/1/2010	5/16/2013	In Progress	Further review with the new NERC MOD standards being developed.
50	Reformat the MDWG procedure manual and add hyperlinks for referenced documents	Anthony Cook	8/6/2010	5/16/2013	In Progress	Currently working on updates from the MMWG manual.
56	Discuss with Entergy about SPP members modeling load with zero impedance lines	SPP Staff	8/6/2010	5/16/2013	Complete	Entergy prefer this method to reduce the amount of coordination and errors when creating the MMWG models. (5/8)Push to get rid of the ZILs. (5/24)Entergy is onboard to coordinate loads to remove ZILs. (10/31) Sent emails to members with regional ties as first step.
57	Determine the standards for stability load data	Scott Jordan	8/6/2010	5/16/2013	In Progress	Scott to give update of TSTF discussion at May 8, 2012 meeting. Being discussed at the MMWG.
71	Staff to review previous meeting minutes for resolution of any language discrepancies in the SPP Tariff about Uniform Generation Modeling	Kelsey Allen	11/8/2011		In Progress	
72	Staff to provide background information on reasons for choosing 20 MVA for machines and aggregate plant capacity for Uniform Generation Modeling when modeling auxiliary load	Staff	11/8/2011	5/8/2012	In Progress	This has been pushed back to the MITF for justification per the 12/6 meeting.
76	Look for ways to shorten the Dynamic Build.	Scott Jordan	2/8/2012	5/16/2013	In Progress	Internal Build? When could that take effect? Scott Jordan is attending training.
83	Ask TWG to review Attachment AQ for special circumstances.	SPP Staff	5/8/2012	5/16/2013	In Progress	Adding load to new substation due to load growth because existing substation is at capacity. An AQ task force was created.
84	RTO/RE staff and MDWG to address data reporting requirements and enforceability for independently owned generation and transmission assets.	MDWG/Staff	8/29/2012	11/13/2012	In Progress	TWG action item: Who is responsible, When data exchange is required, How to enforce data exchange.
85	SPP Staff to compile a list of LSEs	SPP Staff	11/13/2012	5/16/2013	In Progress	Compile a list to determine how many LSEs don't supply data as a percentage base.

Model Development Working Group	2012	2011	2010
Number of members	13	13	13
Number of responses	10	13	12
Response rate	77%	100%	92%
Overall effectiveness score	4.0	3.9	3.9
Lowest score			
Highest score			

Question	Average score		
	2012	2011	2010
The agenda reflects the actions to be taken during the meeting.	4.2	4.5	4.5
Meeting materials are provided in a timely manner.	3.7	3.8	3.6
The information provided prior to the meeting is utilized during the meeting.	4.1	4.2	4.2
The information presented in meetings is clear.	4.1	n/a	n/a
Meeting minutes are an accurate reflection of the meeting.	4.0	4.4	4.1
Additional comments:			
Materials should be provided at least 1 week before the meeting. Due to the lateness of the minutes, it is difficult to remember when they are provided several weeeeks later. The raw minutes should be shown during the end meeting or as every topic of discussion ends and emailed prior to the end of the meeting.			
Membership represents the diversity of the SPP organization.	4.0	4.1	4.3
Membership has the necessary expertise and/or skills to accomplish its goals.	3.8	4.3	4.3
Members come prepared to meetings.	3.9	4.2	3.6
Members are committed to participate and accomplish the group's goals.	3.8	4.2	4.1
Members are supportive and respectful of the individual needs and differences of group members.	4.5	4.3	4.5
Additional comments:			
Members with small transmission systems do not understand the problems of those having a larger system, with imbedded LSEs that are not members of SPP.			
Members are focused during discussion.	3.7	4.3	4.1
Decisions are identified and action is recommended.	3.9	4.2	3.8
Facilitation is sufficient to guide discussion.	3.9	4.2	4.0
Dissenting voices are heard.	3.8	4.2	4.1
I depart with a feeling that we have accomplished something.	3.9	4.1	3.8
Additional comments:			
SPP seems to have certain agendas that they want to push thru due to their internal processes without regard to the processes of other companies.			
The chair seeks input, and organizational group members are able to influence key decisions and plans.	4.2	4.2	4.3
The chair is supportive and respectful of the individual needs and differences of group members.	4.3	4.3	4.3
The chair keeps the group on task to achieve appropriate outcomes.	3.8	4.5	4.2
The chair ensures follow-through on questions and commitments.	3.7	4.3	3.9
Additional comments:			
Please provide three or more recommendations for improvement of this particular group and/or SPP's overall organizational group structure			
1. I don't believe SPP clearly understands the importance of having accurate models. SPP as a whole seems that it much rather meet a deadline than correct the models with the latest Build			
More questions need to be brought to the group as talking points in the meetings so that anyone else dealing with those same issues might benefit from other discussions. I would like to have more emphasis on NERC compliance issues and maybe a more unified/group approach for NERC compliance. This would allow for the members to reference how others approach their respective compliance efforts.			
Other comments			
The SPP model building department needs more individuals doing the work that pay attention to detail, the importance of accurate models. SPP as the Planning Authority needs to demand data from non-SPP members within the SPP footprint, so the entire transmission system 60kV and greater is included. The LSEs should include TOs, Municipals, Cooperatives, IPP. Additionally, data that is provided by the SPP Generation Interconnection Studies department is inaccurate and incomplete and does not comply with the MDWG Manual.			
I wish Mo was the Vice Chair.			

ID	WBS	Task Name	Duration	Start	Finish	Resource Names
1	1	11/30/2013 Revised Approved	108 days	Thu 1/31/13	Wed 7/3/13	
2	4	MDWG DYNAMICS MODELS	108 days	Thu 1/31/13	Wed 7/3/13	
3	4.10	2013 Model Updates	108 days	Thu 1/31/13	Wed 7/3/13	
4	4.10.57	Initial Data Update	29 days	Thu 1/31/13	Wed 3/13/13	
5	4.10.57.33	Build and Post DYRE Files, Wind Farm Data, and Docureport	10 days	Thu 1/31/13	Wed 2/13/13	SPP
6	4.10.57.34	Members Submit Data Updates	14 days	Thu 2/14/13	Wed 3/6/13	Members
7	4.10.57.35	Member Data Due	0 days	Wed 3/6/13	Wed 3/6/13	Members
8	4.10.57.36	Deliver Model Corrections to Dynamic Coordinator	5 days	Thu 3/7/13	Wed 3/13/13	SPP
9	4.10.58	Dynamic Coordinator builds initial models and submits issues	20 days	Thu 3/14/13	Wed 4/10/13	Powertech
10	4.10.59	Final Data Update	18 days	Thu 4/11/13	Mon 5/6/13	
11	4.10.59.41	Prepare and Post Dynamic Coordinator Issues	2 days	Thu 4/11/13	Fri 4/12/13	SPP
12	4.10.59.42	Members Submit Data Updates	10 days	Mon 4/15/13	Fri 4/26/13	Members
13	4.10.59.43	Member Data Due	0 days	Fri 4/26/13	Fri 4/26/13	Members
14	4.10.59.44	Model Corrections	5 days	Mon 4/29/13	Fri 5/3/13	SPP
15	4.10.59.45	Deliver Model Corrections to Dynamic Coordinator	1 day	Mon 5/6/13	Mon 5/6/13	SPP
16	4.10.60	Dynamic Coordinator builds and posts final models	10 days	Tue 5/7/13	Mon 5/20/13	Powertech
17	4.10.61	Build Preliminary Models	9 days	Tue 5/21/13	Mon 6/3/13	SPP
18	4.10.62	Post Preliminary Models	0 days	Tue 6/4/13	Tue 6/4/13	SPP
19	4.10.63	Member Review	10 days	Wed 6/5/13	Tue 6/18/13	Members
20	4.10.64	Apply Corrections Due to Member Feedback	10 days	Wed 6/19/13	Tue 7/2/13	SPP
21	4.10.65	Post Final Models based on Member Feedback	1 day	Wed 7/3/13	Wed 7/3/13	SPP
22						
23						
24	2	05/08/2013 Proposed Revision to 2013 Dynamics	144 days	Thu 1/31/13	Fri 8/23/13	
25	4	MDWG DYNAMICS MODELS	144 days	Thu 1/31/13	Fri 8/23/13	
26	4.10	2013 Model Updates	144 days	Thu 1/31/13	Fri 8/23/13	
27	4.10.57	Initial Data Update	29 days	Thu 1/31/13	Wed 3/13/13	
28	4.10.57.33	Build and Post DYRE Files, Wind Farm Data, and Docureport	10 days	Thu 1/31/13	Wed 2/13/13	SPP
29	4.10.57.34	Members Submit Data Updates	14 days	Thu 2/14/13	Wed 3/6/13	Members
30	4.10.57.35	Member Data Due	0 days	Wed 3/6/13	Wed 3/6/13	Members
31	4.10.57.36	Deliver Model Corrections to Dynamic Coordinator	5 days	Thu 3/7/13	Wed 3/13/13	SPP
32	4.10.58	Dynamic Coordinator builds initial models and submits issues	19 days	Mon 5/6/13	Fri 5/31/13	Powertech
33	4.10.59	Final Data Update	18 days	Mon 6/3/13	Wed 6/26/13	
34	4.10.59.41	Prepare and Post Dynamic Coordinator Issues	2 days	Mon 6/3/13	Tue 6/4/13	SPP
35	4.10.59.42	Members Submit Data Updates	10 days	Wed 6/5/13	Tue 6/18/13	Members
36	4.10.59.43	Member Data Due	0 days	Tue 6/18/13	Tue 6/18/13	Members
37	4.10.59.44	Model Corrections	5 days	Wed 6/19/13	Tue 6/25/13	SPP
38	4.10.59.45	Deliver Model Corrections to Dynamic Coordinator	1 day	Wed 6/26/13	Wed 6/26/13	SPP
39	4.10.60	Dynamic Coordinator builds and posts final models	9 days	Thu 6/27/13	Wed 7/10/13	Powertech
40	4.10.61	Build Preliminary Models	10 days	Thu 7/11/13	Wed 7/24/13	SPP
41	4.10.62	Post Preliminary Models	0 days	Thu 7/25/13	Thu 7/25/13	SPP
42	4.10.63	Member Review	10 days	Fri 7/26/13	Thu 8/8/13	Members
43	4.10.64	Apply Corrections Due to Member Feedback	10 days	Fri 8/9/13	Thu 8/22/13	SPP
44	4.10.65	Post Final Models based on Member Feedback	1 day	Fri 8/23/13	Fri 8/23/13	SPP

2014 Series Model Selection

Multiregional Modeling Working Group

Year	Season	Power Flow Model	Dynamic Model	
2015	Light Load	X	X	
2015	Spring	X		
2015	Summer	X	X	
2015	Summer Shoulder	X	X	
2015	Fall	X		
2015	Winter	X	X	
2016	Spring	X		
2016	Summer	X	X	
2016	Winter	X		
2020	Light Load	X	X	
2020	Summer	X	X	
2020	Winter	X	X	
2025	Summer	X		

Model Develop

Year	Season
2014	Spring
2014	Summer
2014	Summer Shoulder
2014	Fall
2014	Winter
2015	Light Load
2015	Spring
2015	Summer
2015	Summer Shoulder
2015	Fall
2015	Winter
2016	Spring
2016	Summer
2016	Winter
2020	Light Load
2020	Summer
2020	Winter
2025	Summer
2025	Winter

* All models rolled up 1 year

ment Working Group*

Power Flow Model	Dynamic Model	Short Circuit Model
X		
X		X
X		
X		
X		
X	X	
X		
X	X	
X	X	
X		
X	X	
X		
X	X	
X	X	
X	X	X
X	X	
X	X	
X		

r from 2013 Series.

ID	WBS	Task Name	Duration	Start	Finish	Resource Names
0		2014 MDWG Powerflow and Dynamics Models_DRAFT	220 days	Mon 7/15/13	Wed 5/28/14	
1	1	2014 MDWG Powerflow and Dynamics Models	220 days	Mon 7/15/13	Wed 5/28/14	
2	1.1	Kick-off	18 days	Mon 7/15/13	Wed 8/7/13	
3	1.1.1	Kick-off - Review MOD Projects	8 days	Mon 7/15/13	Wed 7/24/13	
4	1.1.1.1	Kick-off - Review MOD Projects	8 days	Mon 7/15/13	Wed 7/24/13	SPP
5	1.1.2	Kick-off - Lock Down MOD	18 days	Mon 7/15/13	Wed 8/7/13	SPP
6	1.1.3	Kick-off - MOD Model Extraction	1 day	Thu 7/25/13	Thu 7/25/13	SPP
7	1.2	Kick-off - Build Pass 1 Powerflow	9 days	Fri 7/26/13	Wed 8/7/13	
8	1.2.1	Kick-off - Build Pass 1 Powerflow	9 days	Fri 7/26/13	Wed 8/7/13	SPP
9	1.3	Kick-off - Post Pass 1 Powerflow	0 days	Wed 8/7/13	Wed 8/7/13	SPP
10	1.4	Kick-off - Initial Data Request (Contingency List Updates, Transactions, MTL)	0 days	Wed 8/7/13	Wed 8/7/13	SPP
11	1.5	Pass 1	37 days	Thu 8/8/13	Mon 9/30/13	
12	1.5.1	Pass 1 - Members Review/Submit Changes to Pass 1 Models	17 days	Thu 8/8/13	Fri 8/30/13	Members
13	1.5.2	Pass 1 - Member Review/Changes Due (Projects, Transactions, MTL, Contingency List)	0 days	Fri 8/30/13	Fri 8/30/13	Members
14	1.5.3	Pass 1 - Review MOD Projects	29 days	Thu 8/8/13	Wed 9/18/13	
15	1.5.3.1	Pass 1 - Review MOD Projects	29 days	Thu 8/8/13	Wed 9/18/13	SPP
16	1.5.4	Pass 1 - Lock Down MOD	20 days	Tue 9/3/13	Mon 9/30/13	SPP
17	1.5.5	Pass 1 - MOD Model Extraction	0 days	Wed 9/18/13	Wed 9/18/13	SPP
18	1.5.6	Pass 1 - Build Pass 2 Powerflow Models	8 days	Thu 9/19/13	Mon 9/30/13	
19	1.5.6.1	Pass 1 - Build Pass 2 Powerflow Models	8 days	Thu 9/19/13	Mon 9/30/13	SPP
20	1.5.7	Pass 1 - Post Pass 2 Powerflow Models	0 days	Mon 9/30/13	Mon 9/30/13	SPP
21	1.5.8	Pass 1 - Pass 2 ACCC Analysis	1 day	Mon 9/30/13	Mon 9/30/13	SPP
22	1.6	Pass 2 - Including MMWG Model Update	20 days	Tue 10/1/13	Mon 10/28/13	
23	1.6.1	Pass 2 - Members Review/Submit Changes to Pass 2 Powerflow Models	9 days	Tue 10/1/13	Fri 10/11/13	Members
24	1.6.2	Pass 2 - Member Review/Changes Due	0 days	Fri 10/11/13	Fri 10/11/13	Members
25	1.6.3	<i>Request First Tier external Short Circuit sequence data</i>	0 days	Mon 10/14/13	Mon 10/14/13	SPP
26	1.6.4	Pass 2 - Review MOD Projects	19 days	Tue 10/1/13	Fri 10/25/13	
27	1.6.4.1	Pass 2 - Review MOD Projects	14 days	Tue 10/1/13	Fri 10/18/13	SPP
28	1.6.4.2	Pass 2 - Lock Down MOD	11 days	Fri 10/11/13	Fri 10/25/13	SPP
29	1.6.5	Pass 2 - MOD Model Extraction	1 day	Mon 10/21/13	Mon 10/21/13	SPP
30	1.6.6	Pass 2 - Build Pass 3 Powerflow Models	5 days	Mon 10/21/13	Fri 10/25/13	
31	1.6.6.1	Pass 2 - Build Pass 3 Powerflow Models - Merge with 2013 MMWG Series	5 days	Mon 10/21/13	Fri 10/25/13	SPP
32	1.6.7	Pass 2 - Post Pass 3 Powerflow Models	0 days	Fri 10/25/13	Fri 10/25/13	SPP
33	1.6.8	Pass 2 - Pass 3 ACCC Analysis	1 day	Mon 10/28/13	Mon 10/28/13	SPP
34	1.7	Pass 3	14 days	Mon 10/28/13	Thu 11/14/13	
35	1.7.1	Pass 3 - Members Review/Submit Changes to Pass 3 Powerflow Models	13 days	Mon 10/28/13	Wed 11/13/13	Members
36	1.7.2	Pass 3 - Member Review/Changes Due	0 days	Wed 11/13/13	Wed 11/13/13	Members
37	1.7.3	Pass 3 - Review MOD Projects	13 days	Mon 10/28/13	Wed 11/13/13	
38	1.7.3.1	Pass 3 - Review MOD Projects	13 days	Mon 10/28/13	Wed 11/13/13	SPP
39	1.7.4	Pass 3 - Lock Down MOD	0 days	Wed 11/13/13	Wed 11/13/13	SPP
40	1.7.5	Pass 3 - MOD Model Extraction	0 days	Wed 11/13/13	Wed 11/13/13	SPP
41	1.7.6	Pass 3 - Model Update Meeting	3 days	Tue 11/12/13	Thu 11/14/13	
42	1.7.7	Pass 3 - Build Pass 4 Powerflow Models	0 days	Wed 11/13/13	Wed 11/13/13	
43	1.7.7.1	Pass 3 - Build Pass 4 Powerflow Models	0 days	Wed 11/13/13	Wed 11/13/13	SPP
44	1.7.8	Pass 3 - Post Pass 4 Powerflow Models	0 days	Wed 11/13/13	Wed 11/13/13	SPP
45	1.7.9	Pass 3 - Pass 4 ACCC Analysis	0 days	Wed 11/13/13	Wed 11/13/13	SPP
46	1.8	Pass 4	25 days	Thu 11/14/13	Fri 12/20/13	
47	1.8.1	Pass 4 - Members Review/Submit Changes to Pass 4 Powerflow Models	15 days	Thu 11/14/13	Fri 12/6/13	Members
48	1.8.2	Pass 4 - Member Review/Changes Due	0 days	Fri 12/6/13	Fri 12/6/13	Members
49	1.8.3	<i>Pass 4 - Request Review of 2014 ITP IDEVS</i>	0 days	Fri 11/15/13	Fri 11/15/13	SPP
50	1.8.4	Pass 4 - Review MOD Projects	17 days	Thu 11/14/13	Tue 12/10/13	
51	1.8.4.1	Pass 4 - Review MOD Projects	17 days	Thu 11/14/13	Tue 12/10/13	SPP
52	1.8.5	Pass 4 - Lock Down MOD	11 days	Fri 12/6/13	Fri 12/20/13	SPP
53	1.8.6	Pass 4 - MOD Model Extraction	1 day	Wed 12/11/13	Wed 12/11/13	SPP
54	1.8.7	Pass 4 - Build Pass 5 Powerflow Models	8 days	Wed 12/11/13	Fri 12/20/13	
55	1.8.7.1	Pass 4 - Build Pass 5 Powerflow Models	8 days	Wed 12/11/13	Fri 12/20/13	SPP
56	1.8.8	Pass 4 - Post Pass 5 Powerflow Models	0 days	Fri 12/20/13	Fri 12/20/13	SPP
57	1.8.9	Pass 4 - Pass 5 ACCC Analysis	1 day	Fri 12/20/13	Fri 12/20/13	SPP
58	1.9	Pass 5	23 days	Mon 12/23/13	Mon 1/27/14	
59	1.9.1	Pass 5 - Members Review/Submit Changes to Pass 5 Powerflow Models	12 days	Mon 12/23/13	Fri 1/10/14	Members
60	1.9.2	Pass 5 - Member Review/Changes Due	0 days	Fri 1/10/14	Fri 1/10/14	Members
61	1.9.3	Pass 5 - Review MOD Projects	17 days	Mon 12/23/13	Fri 1/17/14	
62	1.9.3.1	Pass 5 - Review MOD Projects	17 days	Mon 12/23/13	Fri 1/17/14	SPP
63	1.9.4	Pass 5 - Lock Down MOD	11 days	Fri 1/10/14	Fri 1/24/14	SPP
64	1.9.5	Pass 5 - MOD Model Extraction	1 day	Mon 1/20/14	Mon 1/20/14	SPP
65	1.9.6	Pass 5 - Build Final Powerflow Models	5 days	Mon 1/20/14	Fri 1/24/14	
66	1.9.6.1	Pass 5 - Build Final Powerflow Models - with ITP NTC IDEVS	5 days	Mon 1/20/14	Fri 1/24/14	SPP
67	1.9.7	Pass 5 - Post MDWG 2014 Series Build Final Powerflow Models	0 days	Fri 1/24/14	Fri 1/24/14	SPP
68	1.9.8	Pass 5 - Final ACCC Analysis	1 day	Mon 1/27/14	Mon 1/27/14	SPP
69	1.10	Final	10 days	Mon 1/27/14	Fri 2/7/14	
70	1.10.1	Final - Member Review for Finalization of Powerflow Models	10 days	Mon 1/27/14	Fri 2/7/14	Members
71	1.11	MDWG Short Circuit Models - Build Pass 1 Short Circuit Models	21 days	Mon 2/10/14	Tue 3/11/14	
72	1.11.1	Pass 1 - Build Pass 1 Short Circuit Models	2 days	Mon 2/10/14	Tue 2/11/14	SPP
73	1.11.2	Pass 1 - Post Pass 1 Short Circuit Models	0 days	Tue 2/11/14	Tue 2/11/14	SPP
74	1.11.3	Pass 1 - Members Review/Submit Changes to Pass 1 Short Circuit Models	7 days	Wed 2/12/14	Fri 2/21/14	Members
75	1.11.4	Pass 1 - Member Review/Changes Due	0 days	Fri 2/21/14	Fri 2/21/14	Members
76	1.11.5	Final - Implement Member Changes/Updates to Pass 1 Short Circuit Models	2 days	Mon 2/24/14	Tue 2/25/14	SPP
77	1.11.6	Final - Post MDWG 2014 Series Final Short Circuit Models	0 days	Tue 2/25/14	Tue 2/25/14	SPP
78	1.11.7	Final - Member Review for Finalization of Powerflow Models	10 days	Wed 2/26/14	Tue 3/11/14	Members
79	1.12	MDWG DYNAMICS MODELS	123 days	Mon 12/2/13	Wed 5/28/14	
80	1.12.1	2014 Model Updates	123 days	Mon 12/2/13	Wed 5/28/14	
81	1.12.1.1	Dynamic Coordinator Contract	63 days	Mon 12/2/13	Tue 3/4/14	
82	1.12.1.1.1	Create RFP for Dynamic Coordinator	18 days	Mon 12/2/13	Fri 12/27/13	SPP
83	1.12.1.1.2	SPP Delivers RFP to Dynamics Coordinator	5 days	Mon 12/30/13	Mon 1/6/14	SPP
84	1.12.1.1.3	Dynamic Coordinator Reviews RFP	10 days	Tue 1/7/14	Mon 1/20/14	
85	1.12.1.1.4	SPP and Dynamic Coordinator Finalize Contract	30 days	Tue 1/21/14	Tue 3/4/14	SPP
86	1.12.1.2	Initial Data Update	35 days	Mon 12/23/13	Wed 2/12/14	
87	1.12.1.2.1	Initial Data Update - Build and Post DYRE Files, Wind Farm Data, and Docureport	10 days	Mon 12/23/13	Wed 1/8/14	
88	1.12.1.2.1.1	Initial Data Update - Build and Post DYRE Files, Wind Farm Data, and Docureport	10 days	Mon 12/23/13	Wed 1/8/14	SPP
89	1.12.1.2.2	Initial Data Update - Members Submit Data Updates	20 days	Thu 1/9/14	Wed 2/5/14	Members
90	1.12.1.2.3	Initial Data Update - Member Data Due	0 days	Wed 2/5/14	Wed 2/5/14	Members
91	1.12.1.2.4	Initial Data Update - Deliver Model Corrections to DC	5 days	Thu 2/6/14	Wed 2/12/14	
92	1.12.1.2.4.1	Initial Data Update - Deliver Model Corrections to DC	5 days	Thu 2/6/14	Wed 2/12/14	SPP
93	1.12.1.3	Initial Data Update - DC builds initial models and submits issues	20 days	Thu 2/13/14	Thu 3/13/14	
94	1.12.1.4	Final Data Update	23 days	Fri 3/14/14	Tue 4/15/14	
95	1.12.1.4.1	Prepare and Post DC Issues	2 days	Fri 3/14/14	Mon 3/17/14	
96	1.12.1.4.1.1	Prepare and Post DC Issues	2 days	Fri 3/14/14	Mon 3/17/14	SPP
97	1.12.1.4.2	Members Submit Data Updates	15 days	Tue 3/18/14	Mon 4/7/14	Members
98	1.12.1.4.3	Member Data Due	0 days	Mon 4/7/14	Mon 4/7/14	Members
99	1.12.1.4.4	Model Corrections	5 days	Tue 4/8/14	Mon 4/14/14	
100	1.12.1.4.4.1	Model Corrections	5 days	Tue 4/8/14	Mon 4/14/14	SPP
101	1.12.1.4.5	Deliver Model Corrections to DC	1 day	Tue 4/15/14	Tue 4/15/14	SPP
102	1.12.1.5	Final Data Update - DC builds and posts final models	10 days	Wed 4/16/14	Tue 4/29/14	
103	1.12.1.6	Build Final Models	10 days	Wed 4/30/14	Tue 5/13/14	
104	1.12.1.6.1	Final Data Update - Build Final Models	10 days	Wed 4/30/14	Tue 5/13/14	SPP
105	1.12.1.7	Post Final Models	0 days	Tue 5/13/14	Tue 5/13/14	SPP
106	1.12.1.8	Member Review	10 days	Wed 5/14/14	Wed 5/28/14	Members

Generation Reporting Differences

May 16, 2013

Anthony Cook

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Generation Reporting Differences

Method 1:

- Pmax is Gross Maximum Seasonal Capability
- Station (Aux) Load is modeled explicitly
- $P_{\max} - \text{Aux Load} = \text{Net Capability}$

Method 2:

- Pmax is Net Maximum Seasonal Capability
- Station (Aux) Load is not modeled
- $P_{\max} = \text{Net Capability}$

Generation Reporting Differences

2013 Series MDWG: 2013 Summer

Pmax (Coal)	364 MW
Pgen	333 MW
Aux Load	N/A

Model Assumption 1: Pmax is Net

2011 EIA 860

Name Plate	419 MW
Summer Capability	364 MW

Note: Pmax = Summer Capability

New Assumption 1: Pmax is Net

Generation Reporting Differences

2013 Series MDWG: 2013 Summer

Pmax (Coal)	108.4 MW
Pgen	108.1 MW
Aux Load	8.4 MW

Model Assumption 1: Pmax is Gross

Model Assumption 2: $P_{\max} - \text{Aux Load} = 100 \text{ MW}$

2011 EIA 860

Name Plate	109.8 MW
Summer Capability	100 MW

Note: $P_{\max} - \text{Aux Load} = \text{Summer Capability}$

Generation Reporting Differences

2013 Series MDWG: 2013 Summer

Pmax (Gas – CT1)	165 MW
Pgen	125 MW
Aux Load	N/A

Model Assumption 1: Pmax is Net

GADS: Pmax = 209, Dependable = 202

Pmax (Gas – CT2)	165 MW
Pgen	125 MW
Aux Load	N/A

Model Assumption 1: Pmax is Net

GADS: Pmax = 197, Dependable = 168

2011 EIA 860

Name Plate	206 MW
Summer Capability	191.8 MW

Warning: Pmax < Summer Capability

Issue: What is Pmax ?

Name Plate	206 MW
Summer Capability	174.4 MW

Warning: Pmax < Summer Capability

Issue: What is Pmax ?

Generation Reporting Differences

2013 Series MDWG: 2013 Summer

Pmax (Gas-Steam)	265 MW
Pgen	175 MW
Aux Load	N/A

Model Assumption 1: Pmax is Net

GADS: Pmax = 251

2011 EIA 860

Name Plate	265 MW
Summer Capability	248 MW

Issue 1: Pmax \neq Summer Capability

New Assumption 1: Pmax is Gross

New Assumption 2: Aux Load = 17 MW

Generation Reporting Differences

2013 Series MDWG: 2013 Summer

Pmax (Coal)	719 MW
Pgen	706 MW
Aux Load	41 MW

Model Assumption 1: Pmax is Gross

Model Assumption 2: Pmax – Aux Load = 678 MW

Pmax (Coal)	732 MW
Pgen	717 MW
Aux Load	32 MW

Model Assumption 1: Pmax is Gross

Model Assumption 2: Pmax – Aux Load = 700 MW

2011 EIA 860

Name Plate	681.3 MW
Summer Capability	665 MW

Issue 1: Pgen – Aux Load = Summer Capability

Issue 2: What is Pmax ?

Name Plate	681.3 MW
Summer Capability	700 MW

Pmax – Aux Load = Summer Capability

Generation Reporting Differences

2013 Series MDWG: 2013 Summer

Pmax (Coal)	540 MW
Pgen	515 MW
Aux Load	N/A

Model Assumption 1: Pmax is Net

Pmax (Coal)	540 MW
Pgen	500 MW
Aux Load	N/A

Assumption 1: Pmax is Net

2011 EIA 860

Name Plate	569 MW
Summer Capability	515 MW

Issue 1: Pmax \neq Summer Capability

New Assumption 1: Pmax is Gross

New Assumption 2: Aux Load = 25 MW

Name Plate	569 MW
Summer Capability	523 MW

New Assumption 1: Pmax is Gross

New Assumption 2: Aux Load = 17 MW

Governor Survey & SPP Model Improvements

MDWG Spring Meeting

Dallas, Texas

May 16, 2013

Scott Jordan

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Table of Contents

Frequency Response

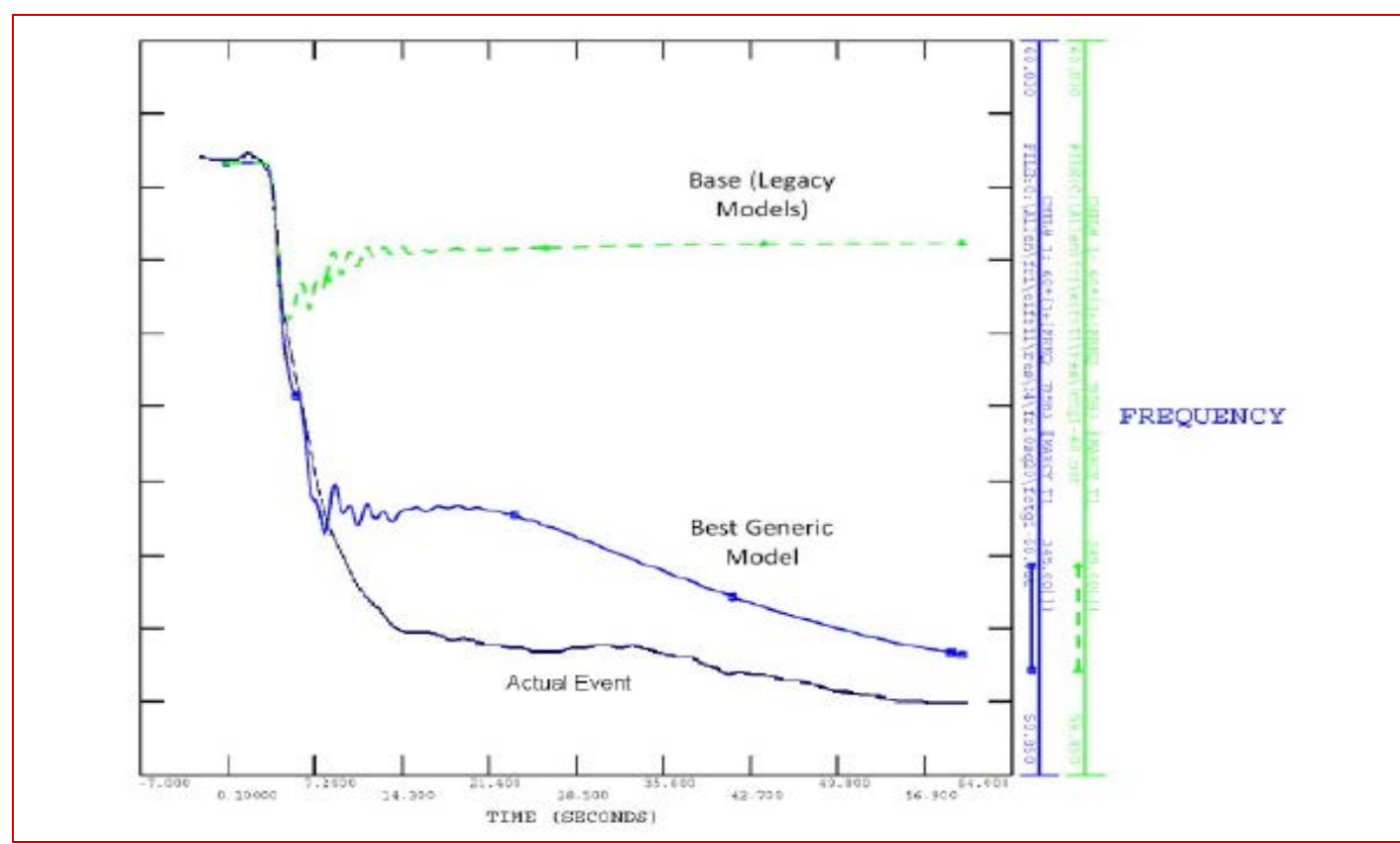
- FERC/NERC GO Machine Governor Survey
- Frequency Response Examples

Aspects of Model Improvement

- Dynamic Case Verification
 - Dyre File data Checking
- Step Response Simulations
 - Exciter
 - Governor

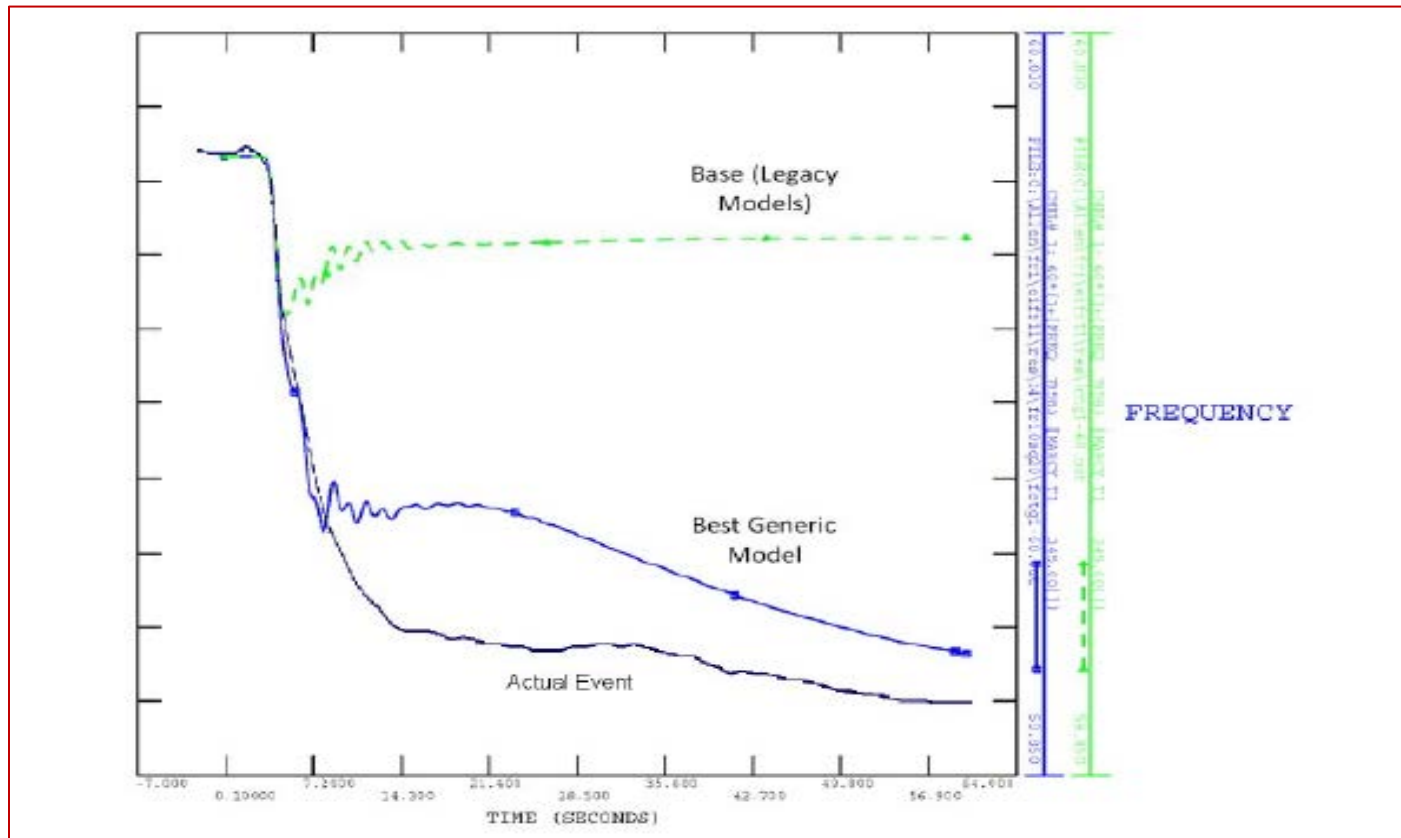
Frequency Response

A Joint FERC/NERC Frequency response study for the WECC, ERCOT and the Eastern Interconnect was commissioned in The Independent Party conducting the study found that the Eastern Interconnect Dynamic Cases were not capable of emulating the actual system response.



Frequency Response

The Eastern Interconnect worked with NERC on modifying the Base Models to get to the “Best Generic Model” response below. This was done by making 70% of the units non-responsive to the event, 20% partially responsive to the event, and the final 10% fully responsive to the event.



Frequency Response

FERC and NERC sent out a Governor Survey to the Generator Owners to try and gain more knowledge of how the generation unit plant controls were affecting the governors

The Survey and Plant visits revealed:

- **Combined Cycle units had no response or a squelched response**
- **Conventional Steam Units**
 - **Sliding or Variable Boiler Pressure Control had no response**
 - **All other units, classified as responsive or a squelched response**
- **Hydro Units were responsive**

Frequency Response

Once these guidelines were applied to the generation units of two RTOs, it was found that 62% of the generation was non-responsive and 38% would be responsive. This did not match the ERAG/NERC Study results. Then the units that were within 5% of their Pmax reviewed. This yielded an additional 23% of units that do to a 5% droop setting would not respond. This made the Percent spreads more in line of even less responsive as an area.

- 77 % non-responsive
- 23 % responsive or squelched

Additional Studies are being performed based on the GO Survey results.

Dynamic Case Verification

Python DOCU Check

- SPP Staff created a Python to perform similar checks to the dyre file model data as the PSSE Code
- Python constructs Excel Spreadsheets with data by Dynamic Model type and then by machine
 - Worksheet with the List of Models and the number of Suspect data points
 - Worksheet for each Model with the suspect data points and the actual suspect data
 - Suspect data is based upon the typical values found in the PSSE Program Documentation under Section 25.5 of Volume II of the Program Application Guide

Dynamic Case Verification

Python DOCU Model List

Model	Constants Checked	SPP Models	SPP Model Errors	ERAG Models		
AC8B	21	9	0	45		
CDSMS1	38	3	3	9		
CIMTR1	12	9	0	17		
CIMTR3	13	19	15	213		
CSTATT	14	2	2	14		
CSVGN1	10	4	2	17		
DEGOV1	13	6	6	23		
ESAC1A	19	1	0	84		
ESAC2A	22	5	5	58		
ESAC5A	15	21	18	70		
ESAC6A	23	1	1	32		
ESAC8B	15	13	12	231		
ESST1A	20	11	11	372		
ESST2A	13	1	1	31		
ESST4B	17	46	0	777		
EX2000	47	3	3	55		
EXAC1	17	35	8	179		
EXAC2	23	25	25	231		
EXAC3	22	4	4	31		

Dynamic Case Verification

Python DOCU GENROU DATA Checks

E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Model	T'do	T"do	T'qo	T"qo	H	D	Xd	Xq	X'd	X'q	X"d=X"q	Xl	S(1.0)	S(1.2)	
GENROU			3												
GENROU			3												
GENROU			3												
GENROU								1.6							
GENROU								1.6							
GENROU	12.5														
GENROU					0.808										
GENROU			2.5											0.194	
GENROU			2.9												
GENROU				0.267											
GENROU			2.9												
GENROU			2.9												
GENROU			2.9												
GENROU				0.46											
GENROU	13.4		4.1												
GENROU	10.296														
GENROU	10.296														
GENROU				0.22											
GENROU			2.7												
GENROU			2.8												
GENROU			2.8												
GENROU															

Step Response Simulations

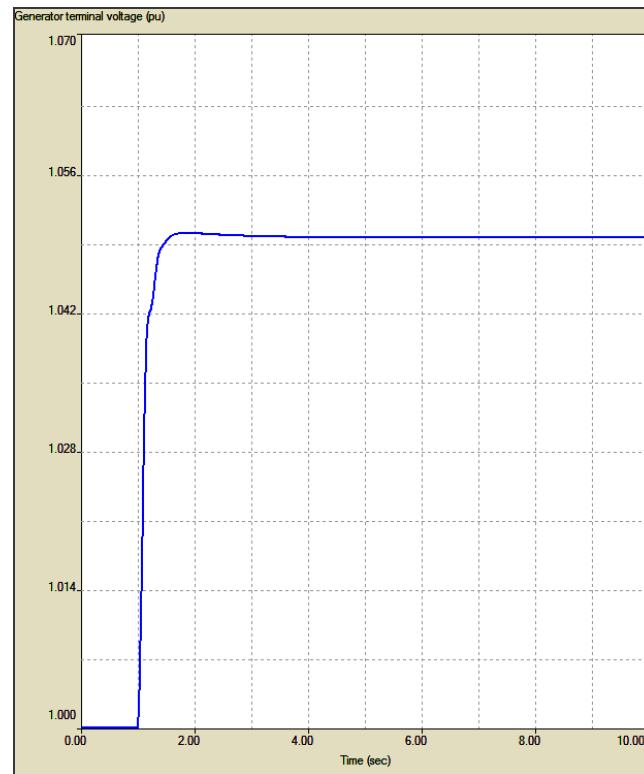
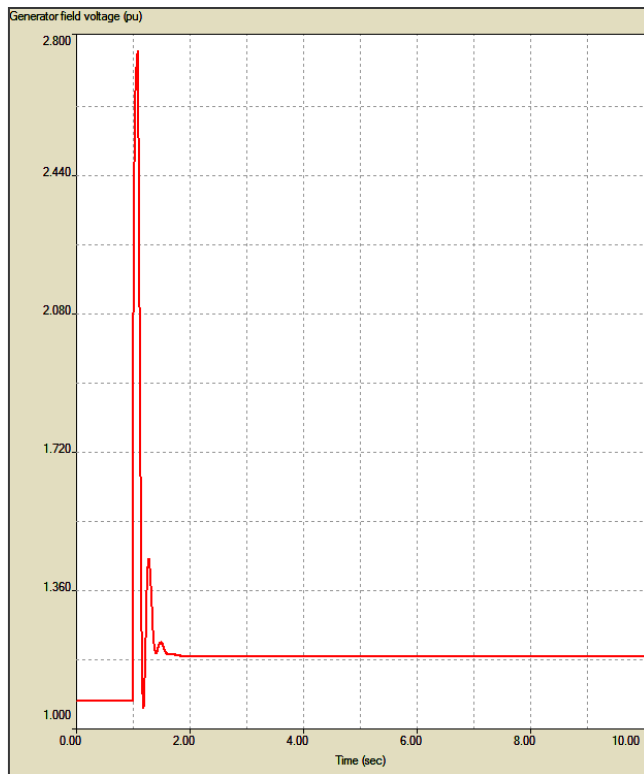
Exciter & Governor Testing

- SPP Staff is in the process of performing Exciter & Governor step response simulations
- DSA Tools TSAT is being used to perform the Step Response Simulations
- Segments of generation units based on Machine MVA using
- SPP Staff Reviewing Output

Step Response Simulations

Exciter & Governor Testing

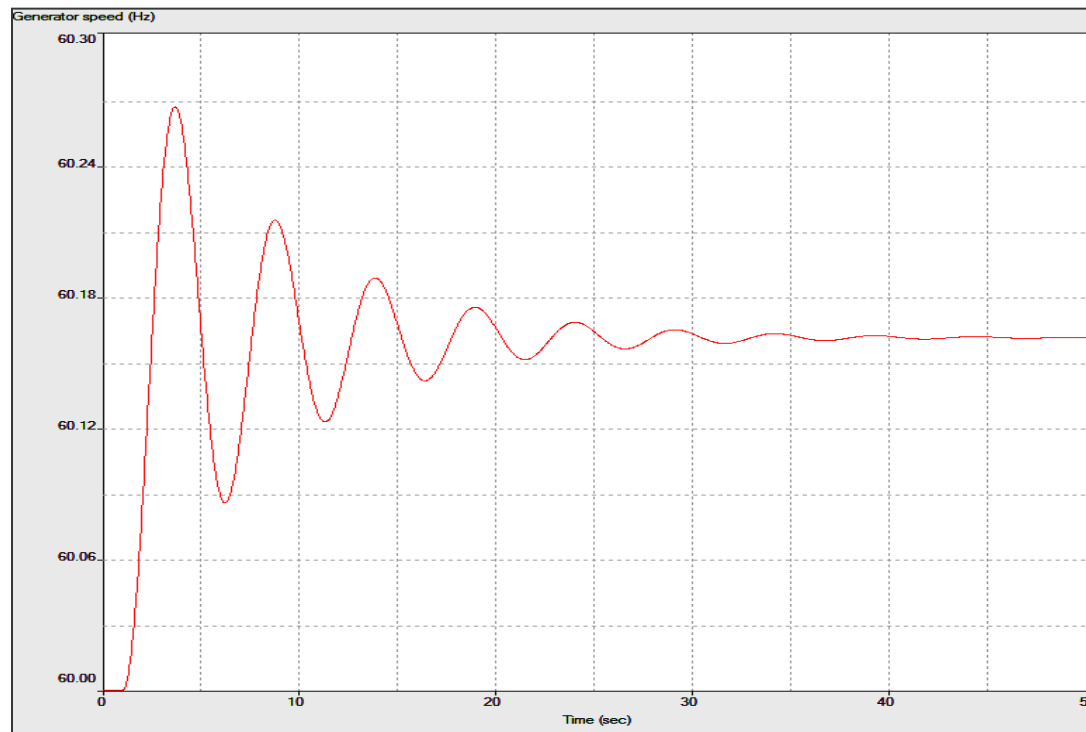
Exciter Step Response



Step Response Simulations

Exciter & Governor Testing

Governor Step Response



Next Steps:

Work with ERAG-MMWG on Frequency Response Study

- Continued Governor Response Testing
- Develop a Plan at the ERAG-MMWG to replace Governor Models with one that can be disabled, squelched, or fully responsive
- Still keep original data somehow
- SPP will work with SPP Modeling Contacts to Implement

SPP will work with Members through Model Verification Efforts

- SPP will continue to Test Exciters and Governors
- Will take everyone working together
 - Transmission Owners, Transmission Planners, & Generator Owners
 - Regional Transmission Organization

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**Southwest Power Pool
Model Development Working Group
Charter
December 15, 2008**

Purpose

The Model Development Working Group (MDWG) is responsible for the maintenance of transmission system models and applicable SPP Criteria related to (power flow, short circuit models, and associated stability database) which represents the current and planned transmission system of the Southwest Power Pool. It is also responsible to provide the Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group (MMWG) with data that supports the development of inter-regional transmission system models.

Scope of Activities

In carrying out its purposes, the MDWG will:

1. Review and develop applicable SPP Criteria related to the development, maintenance, and coordination of models in support of: the SPP Transmission Expansion Planning (STEP), Generation Interconnection, Transmission Service Study, North American Electric Reliability Corporation (NERC) Compliance, and any other planning activities within SPP.
2. Determine the models that should be used in the RTO, basis for the models and how they are modified for their purpose.
3. Review and periodically monitor the NERC Reliability Standards impacts on Transmission System planning models within SPP. Identify applicable NERC Standards, SPP Regional Standards, and SPP Criteria. Coordinate response on behalf of SPP.
4. Maintain Transmission System planning models that represent the current and planned electric network of SPP.
5. Provide ERAG MMWG with the SPP portion of the Eastern Interconnection current and planned Transmission System planning models and coordinate incorporating ERAG MMWG models into the SPP system models.
6. Ensure that the Transmission System planning models adequately support the needs of SPP organizational groups.



Representation

The MDWG membership consists of a minimum of 8 and up to 12 representatives from the SPP membership, including the chair and vice-chair.

Duration

Permanent.

Reporting

The MDWG reports to the Transmission Working Group (TWG). As necessary the MDWG may appoint a member of the MDWG as a liaison to other working groups for specific issues or action items being coordinated.

Bulk Electric System Definition & Exception Process

May 16, 2013

Scott Jordan

sjordan@spp.org · 501.614.3985



Overview

- **Phase 1 Definition of Bulk Electric System**
- **Requesting exception**
- **Exception process**
- **Future changes/Unknowns**

Phase 1 Definition of Bulk Electric System

- **Effective Date July 1st 2013**
- **Base definition**
 - Unless modified by the lists shown below, all Transmission Elements operated at 100kV or higher and Real Power and Reactive Power Resources connected at 100kV or higher. This does not include facilities used in the local distribution of electric energy.
- **Inclusion List (5)**
- **Exclusion List (4)**

Inclusions

- **I1 – Transformers (Both windings greater than 100KV)**
- **I2 – Generating Resources (20MVA single unit 75 MVA Multiple unit)**
- **I3 – Blackstart Resources (identified in restoration plan)**
- **I4 – Dispersed Power Producing Resources (solar/wind/etc...)**
- **I5 – Static or Dynamic devices that supply reactive power (Connected at 100KV directly or through dedicated transformer)**

Exclusions

- **E1 – Radial Systems (3 criteria: load, generation not in I3 less than 75 MVA, load and generation)**
- **E2 – Behind The Meter Generation (Serves load and net capacity doesn't exceed 75 MVA to the BES)**
- **E3 – Local Area Networks (100KV-300KV with flow only into network, 75 MVA gross nameplate rating limit, not part of a flowgate or transfer path)**
- **E4 – Retail Customer Reactive Devices (solely for its own use)**

Guidance Document (Not Finalized)

- **Diagrams (Blue for BES, Green Non BES)**
- **Examples for all 5 Inclusions**
- **Examples for all 4 Exclusions**
- **How you use the definition to classify elements (hierarchy approach to using the definition)**
- **Not part of the Definition (reference only)**

Requesting Exception

- Identify elements based on phase 1 definition
- Must demonstrate that an Element is or is not necessary for reliable operation
- Use standardized form
- RE contacts (Greg Sorenson & Deborah Currie)
- Notification to applicable PC, RC, TOP, TP, and BA
- Note: Owners are not the only entities that can submit requests (Owners must be notified if element they own is being submitted by another entity)

Exception Process

- **Review Elements per Phase 1 Definition**
- **Exception request submitted to RE (Owner or Submitting entity (SE)) with supporting documentation**
- **RE reviews application for completeness**
- **RE conducts substantive review (technical review panel)**
- **RE sends request to NERC with recommendation**
- **SE can comment on recommendation**
- **NERC reviews request**
- **NERC issues a decision**
- **Appeal process is available**

Future Changes/Unknowns

- IT application in development for exception submittals
- Rehearing requests filed with FERC could delay effective date of July 1st 2013
- Phase two work in progress to further refine the definition
- Guidance Document

References

- **Process Document**
 - Search for Docket RM12-7 January 25th 2012 under FERC website
- **Appealing NERC determination document in Rules of Procedure**
 - [http://www.nerc.com/docs/standards/sar/ROP 100-1600 eff 2010-7-11 CLEAN 20filed with FERC – REVISED FOR BES EXCEPTION PROCEDURE - 1-9-2012 \(2\) \(2\).pdf](http://www.nerc.com/docs/standards/sar/ROP%20100-1600%20eff%202010-7-11%20CLEAN%20filed%20with%20FERC%20%E2%80%93%20REVISED%20FOR%20BES%20EXCEPTION%20PROCEDURE%20-%201-9-2012%20(2)%20(2).pdf)
- **Exception Request Form**
 - [http://www.nerc.com/docs/standards/sar/Draft BES Exception Request Form 9-9-11.pdf](http://www.nerc.com/docs/standards/sar/Draft%20BES%20Exception%20Request%20Form%209-9-11.pdf)
- **Exception Process Flow Chart**
 - [http://www.nerc.com/docs/standards/sar/Proposed BES Exception Request process flowchart timelines 9-9-11.pdf](http://www.nerc.com/docs/standards/sar/Proposed%20BES%20Exception%20Request%20process%20flowchart%20timelines%209-9-11.pdf)

References Cont'...

- **Bulk Electric System Guidance Document**
 - http://www.nerc.com/docs/standards/sar/bes_definition_guidance_document_20121003_final.pdf
- **Bulk Electric Definition Filed with FERC**
 - http://www.nerc.com/docs/standards/sar/bes_definition_third_posting_roadmap_20111107_clean.pdf
- **Order 773 (FERC Final rule on Bulk Electric System Definition)**
 - <http://www.ferc.gov/whats-new/comm-meet/2012/122012/E-5.pdf>
- **Order 888 (Seven Factor Test for identifying Local Distribution)**
 - <http://www.ferc.gov/legal/maj-ord-reg/land-docs/rm95-8-00w.txt>