Southwest Power Pool
TRANSMISSION WORKING GROUP MEETING
February 5, 2019
AEP Office – Dallas, TX

• Summary of Actions Taken •

1. Approved the previous meeting minutes
2. Approved the meeting agenda
3. Approved 2019 Flowgate Assessment Scope
Southwest Power Pool

TRANSMISSION WORKING GROUP MEETING

February 5, 2019

AEP Office – Dallas, TX

• M I N U T E S •

Agenda Item 1 – Administrative Items

Call to Order

Chair Travis Hyde, called the meeting of the Transmission Working Group (TWG) to order at 8:00 am. The following members attended or were represented by proxy (Attachment 01a, 01b – Attendance.pdf, WebEx Attendance.xls):

- Travis Hyde (Chair), Oklahoma Gas & Electric
- Nathan McNeil (Vice-Chair), Midwest Energy, Inc.
- Daniel Benedict, Independence Power and Light
- Scott Benson, Lincoln Electric System
- John Boshears, City Utilities of Springfield Missouri
- Derek Brown, KCP&L and Westar, Evergy Companies
- Jarred Cooley, Xcel Energy
- Cliff Franklin, Sunflower Electric Power Corporation
- Joe Fultz, Grand River Dam Authority
- James Ging, Kansas Power Pool
- Kalun Kelley, Western Farmers Electric Cooperative
- John Knofczynski, East River Electric Power Cooperative
- Dan Lenihan, Omaha Public Power District
- Randy Lindstrom, Nebraska Public Power District
- Jim McAvoy, Oklahoma Municipal Power Authority
- Matt McGee, American Electric Power
- Shane McMinn, Golden Spread Electric Cooperative
- Nate Morris, Empire District Electric
- Michael Mueller, Arkansas Electric Cooperative Corporation
- Gayle Nansel, Western Area Power Administration
- John Payne, Kansas Electric Power Cooperative
- Chris Pink, Tri-State G&T
- Jason Shook, GDS Associates, Inc.
- Matthew Stoltz, Basin Electric Power Cooperative
- Michael Wegner, ITC Holdings
- Noman Williams, GridLiance High Plains LLC

Proxies

The following proxies were provided for all or portions of the meeting:

Full Proxy

- Noman Williams (GridLiance High Plains LLC) named Rachel Ibuado (GridLiance High Plains LLC) as his proxy.
- Matt McGee (AEP) named Scott Rainbolt (AEP) as his proxy.
- Dan Lenihan (OPPD) named Josh Verzal (OPPD) as his proxy.
Partial Proxy
- Chris Pink (Tri-State) named Cody Sickler (Tri-State) as his partial proxy.

Aaron Stewart, TWG staff secretary, informed Travis that the group had a quorum.

Antitrust Guidelines
Aaron noted to the TWG that the agenda for the meeting included Antitrust Guidelines and reminded the group that certain topics were not allowed for discussion during the meeting.

Previous Meeting Minutes Approval (Action Item)
Travis asked the TWG for any changes to the minutes (Attachment 01c, 01d – TWG Minutes December 19, 2018.docx, TWG Minutes January 14, 2019). A correction to the spelling of John Olsen’s name was made to the December 19, 2018 Face-to-Face Minutes.

Motion: Nate Morris (EMDE) made a motion to approve the set of TWG meeting minutes as corrected. Cliff Franklin (SEPC) seconded the motion. The motion was approved unanimously.

Meeting Materials Review
The group reviewed the meeting materials that were posted. There was discussion regarding the meeting locations for the coming year. An action item was taken to look into possible locations that are more centrally located to host meetings and increase participation. There were also concerns about the number of changes made to the meeting materials after posting. An agenda item for an IBIS update was added to the agenda prior to the meeting. Travis Hyde presented the agenda to the group for review and asked for any additions or corrections (Attachment 01e – February 5, 2019 TWG Agenda.docx).

Motion: Scott Benson (LES) made a motion to approve the agenda as revised. Kalun Kelley (WFEC) seconded the motion. The motion was approved unanimously.

Agenda Item 2 – Current Action Items Review
Aaron reviewed the current action items list with the group (Attachment 02 – TWG Action Items_01-28-19.xlsx). Action items 162, 183 and 188 are still on going with no update to provide. Action items 184 and 186 were on the agenda for discussion during this meeting. Action items 189 and 190 were added since the last review of actions during the November meeting. Action item 189 is being discussed internally and is planned for future discussion at a yet to be determined AQ Improvement Task Force (AQITF) meeting. Action item 190 is also being discussed internally and a plan will be developed to provide results to the TWG and Regional Compliance Working Group (RCWG) at future meetings.

Agenda Item 3 – Regional and Local Planning Coordination
LPP/LPC Survey Results
Aaron Stewart, SPP staff, presented the results of the local planning criteria/local planning process (LPC/LPP) survey results to the group (Attachment 03 – LPP-LPC Survey Results.pptx). The presentation listed out the stats on overall response rate and summarized the responses to each question on the survey. Specifically the group focused discussion on the use of the Attachment AQ process for coordination of locally planned projects and the potential of moving towards one LPC per pricing zone. Aaron finished the presentation by outlining the changes in policy that are the goals of the regional and local planning coordination effort. An action item was taken to follow up with SPP internal compliance to perform a risk assessment regarding FAC-002 requirements associated with SPP’s Generator Interconnection process.
**Agenda Item 5 – RR 340: PMU for New Generator Interconnections**

Cody Parker, SPP staff, provided the group with an information presentation on RR 340 (Attachment 05 – RR 340 PMU Placement and Comment Review TWG.pptx). Cody started his presentation by going over the FERC determination on RR 162. He then went over an update on RR 340 and the changes that were made to take into account the comments received from the FERC determination on RR 162.

**Agenda Item 6 – Generator Retirement Process Update**

Kirk Hall, SPP staff, provided the group with an overview of the generator retirement process that is currently being developed (Attachment 06 – Generation_Retirement_TWG BP Review_v2.pptx). Kirk started the presentation by going over the Revision Request (RR) process and how the proposed language will work through the RR process. He then went through the flow of the proposed process, providing details on each portion. Kirk finished the presentation by going over the next steps with the goal of developing a business practice RR in the near future.

**Agenda Item 7 – TWG Reports**

**MDWG Report**

Nate Morris (EMDE), MDWG Chair, provided the TWG with an update on the activities of the MDWG (Attachment 07a – MDWG report to TWG.doc). Nate introduced two new voting members that were recently added to fill out the MDWG roster. He also went over the items of discussion at the last MDWG meeting. He went over the current effort by the MDWG to reduce the number of models that are being developed. The group also has an effort underway to identify MOD-032-1 data submitting responsibilities in SPP GIaA milestones rather than during the start of the MDWG model builds.

**DLTF Report**

Derek Brown, DLTF Chair, provided the TWG with an update on the activities of the DLTF (Attachment 07b – DLTF_Report_TWG.docx). The group is continuing to be involved with WECC, EPRI, MEPPI, and NERC LMTF to gain industry knowledge of the CMLD Load Model. Developed CMLD Industrial Composite load model representations and worked with SPP Staff, the MDWG Members and Modeling contacts to gather, compile, and verify the application of the Industrial CMLD load models. The DLTF has also begun to develop the remaining set of CMLD models to cover Residential and Commercial loads with EPRI. Lastly, the DLTF has submitted a response to the VIS TWG action item regarding the review of the damping criteria.

**TPLTF Report**

Chris Colson, TPLTF Chair, provided the TWG with an update on the activities of the TPLTF (Attachment 07c – TPLTF_Report_TWG.docx). Chris went over the past and upcoming milestones for TPL-007-1/2, the work that has been completed for the geomagnetically-induced currents (GIC) flow analysis, the activities that are going to be conducted as part of Requirement R6. In the coming months the TPLTF and SPP staff will continue efforts to refine the GMD System Models towards improved performance of GIC assessments and handle challenges that are presented by the new TPL-007-3 that is being drafted.

**Agenda Item 9 – Modeling Year-1 Definition Change**

Michael Odom provided the group with a presentation on aligning the year-one model definition for the MDWG and ITP models (Attachment 09 – SPP Planning Model Year One Alignment.pptx). Currently the MDWG/MMWG and ITP/TPL models have different Year-1 definitions. Aligning these definitions would lessen confusion for which models are needed and are being built. Michael went through some examples explaining in more detail what a change in Year-1 definitions would mean to the upcoming 2021 model builds. He then concluded the presentation by listing out the next steps needed to make the change to the Year-1 definition.
**Agenda Item 10 – Compliance and Advanced Studies**

**TPL-001-5 Update**
Jonathan Hayes, SPP staff, provided the group with an update on TPL-001-5 (Attachment 10a - TPL TWG presentation.pptx). Specifically he pointed out the status of Project 2015-10, went over FERC Orders 754 and 786 and the impacts they have on TPL-001-5. Jonathan then handed the presentation over to Scott Jordan, SPP staff, to discuss the implementation plan and next steps for TPL-001-5.

**2019 Flowgate Assessment Scope (Action Item)**
Melanie Hill, SPP staff, presented the 2019 Flowgate Assessment Scope for approval (Attachment 10b - 2019 Flowgate Assessment.zip).

**Motion:** Randy Lindstrom (NPPD) made a motion to approve the 2019 Flowgate Assessment Scope. Nathan McNeil (MIDW) seconded the motion. The motion was approved unanimously.

**Agenda Item 11 – 2019 ITP**

**2019 ITP Schedule Review**
Sherri Maxey, SPP staff, presented a review of the 2019 ITP schedule (Attachment 11a – 2019 ITP Schedule.pptx). Sherri covered the developments since the last 2019 ITP update, which included items like the BA and BR needs assessments being completed. There was no discussion on this item.

**2019 ITP DPP Window Statistics**
Ellen Cook, SPP staff, then presented an update on the recent DPP window (Attachment 11b – DPP_WINDOW_Statistics.pptx). Ellen provided the latest number of total submittals received and reminded the TWG that the window was scheduled to close on 2/6/2019. There was no discussion on this item.

**Agenda Item 12 – 2020 ITP**

**2020 ITP Schedule Review**
Sherri Maxey presented a review of the 2020 ITP schedule (Attachment 12a – 2020 ITP Schedule.pptx). Sherri covered the timeline and reported on the separate tasks required for the 2020 ITP, such as scope development and powerflow modeling. Sherri gave details such as start and end dates, as well as the projected SPP staff leaders for each milestone. There was no discussion on this item.

**2020 ITP Powerflow Models**
David Duhart, SPP staff, gave an update on the 2020 ITP Powerflow (Attachment 12b – 2020 ITP Powerflow Update.pptx). He alerted stakeholders that the final pass was approaching, and solicited them for their review and comments before the final posting. He also noted that Rayburn County would be represented in the 2020 ITP models and Lubbock would be removed starting in the 2021 summer models. There was no discussion on this item.

**Agenda Item 13 – MISO-SPP JCSP Update**
Adam Bell, SPP staff, gave a presentation on the SPP-MISO Coordinated System Plan process (Attachment 13. – MISO-SPP JCSP Update.zip). This presentation covered the details and projected timeline of the new joint-study process. It also gave specifics concerning the model build process, needs identification and coordination, as well as project evaluation and portfolio development. A question was asked about when would be the earliest a potential project could be seen out of the study, and was given the answer of April 2021.

**Agenda Item 14 – Use of Transmission Operating Guides**
Joshua Pilgrim, SPP staff, presented a brief update to the upcoming Transmission Operating Guide (TOG) process (Attachment 14. – Transmission Operating Guide Presentation.pptx). He covered the issues faced during the previous ITP concerning this topic, as well as discussion that was had during the
last TWG face-to-face meeting in November. The new TOG process was still under development, with special focus being placed on finding ways to quantify risks associated with TOGs to determine if they were still acceptable solutions or if they need to be phased out in favor of projects. The question was asked about who would be the responsible party for determining if a TOG was valid in planning processes. Joshua answered that the criteria was still under development. The point was raised that market-to-market flowgates should be specially considered when analyzing TOGs. Joshua also added that duration of use could be a potential criterion for withdrawal of a TOG. It was asked if the criteria would go through TWG for approval, to which Joshua answered yes. Discussion then followed about whether or not the TOGs being considered were also being communicated to the market side. The concern was that if a TOG lowers generation, it would be disadvantageous if the market did not know about it. An action item was taken that SPP provide a list of the TOGs that SPP currently would consider in the planning process.

Agenda Item 15 – NERC Activities Update
Shannon Mickens, SPP staff, gave an update to the recent NERC activities (Attachment 15 – NERC Activities Update.zip). He specifically touched on the System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG) as well as the Standards Efficiency Review (SER). Casey Cathey, SPP staff, then expounded on the work of the SPIDERWG and urged the TWG to stay in tune to the group and its findings.

Agenda Item 16 – 2019 TWG Goals
Casey Cathey discussed goals for the 2019 TWG concerning process creation and enhancement (Attachment 16 – 2019 TWG Goals.pptx). Casey mentioned approvals for the 2019 and 2020 ITP processes, as well as the development of processes to handle TOGs, Distributed Energy Resources (DERs), Energy Storage Resources (ESRs), and generation retirement. Randy Lindstrom (NPPD) answered that his focus for the year was making sure all involved parties (PC, TP, TO) meet compliance requirements. Travis mentioned a concern that the different planning processes are not looking at all needed aspects of planning the system. Randy also said that the HITT is working on upcoming issues that will influence the TWG and he requested that Staff provide regular updates of HITT progress during the TWG meetings.

Agenda Item 17 – IBIS Update
Doug Bowman, SPP staff, provided an update to the Inverter-Based Generation Integration Study (IBIS) (Attachment 17 – IBIS Update TWG 2.5.19.pptx). He discussed some of the preliminary results based on tests done on SPP PSS/E models. There was no further discussion of the topic.

Agenda Item 18 – Summary of Action Items
Aaron Stewart provided a summary of the captured action items during the meeting. There were two action items captured. The first was to discuss with SPP compliance concerns with FAC-002 requirements and SPP’s Generation Interconnection process. The second was to provide the TWG with a list of the TOGs that SPP currently would consider in the planning process.

Agenda Item 19 – Discussion of Future Meetings
The group discussed future meeting places. The only diversion from the proposed schedule was to look into meeting in Little Rock in November and moving the Detroit meeting.
Seeing there was no further business, the meeting adjourned at 3:25 PM.

After the meeting, the 2020 ITP Base Reliability Powerflow Models were approved through an email vote. The motion and second were received on 2/19/2019 and the vote concluded on 2/22/2019.

**Motion:** Nate Morris (EMDE) made a motion for the TWG to approve the 2020 ITP Base Reliability Powerflow Models as posted on February 8, 2019. John Boshears (CUS) seconded the motion. The motion was approved with 1 no vote by Dan Lenihan (OPPD).

The voting rationale behind the no vote was provided below:

Dan Lenihan (OPPD)

“OPPD votes No because the issues surrounding the ECDI-based dispatch that we identified in Pass 3 have not been adequately addressed, and changes made by SPP after Pass 4 to station service load input parameters for the ECDI-based automation scripts have led to additional deficiencies in the dispatches of OPPD’s units. This appears to be a continuation or a repeat of the same ECDI-based issues that OPPD identified in the 2019 ITP BR models.”

Respectfully Submitted,

Aaron Stewart
Secretary
Southwest Power Pool, Inc.
TRANSMISSION WORKING GROUP MEETING
February 5-6, 2019
AEP Office – Dallas, TX

**ATTENDANCE LIST**

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<td>Nathan McNeill</td>
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Steve Purdy (SPP) spurdy@spp.org
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Southwest Power Pool
TRANSMISSION WORKING GROUP MEETING
December 19, 2018
41st Floor AEP Office – Dallas, TX

• Summary of Actions Taken •

1. Approved the previous meeting minutes
2. Approved the meeting agenda
3. Approved MDWG Charter Revisions and RR 335 as part of the consent agenda
4. Approved the 2018 SPP Comprehensive TPL-001-4 Assessment
5. Approved the SPP TPL-007-1 Assessment Report
6. Approved RR 334: Criteria Update Use in Transmission Owner Designation Process
7. ESWG and TWG Approved the 2020 ITP Scope
Agenda Item 1 – Administrative Items

Call to Order
Travis Hyde, TWG Chair, called the meeting to order at 8:02 am. The following members attended or were represented by proxy (Attachment 1a, 1b – Attendance.pdf, WebEx Attendance.xls):

- Travis Hyde (Chair), Oklahoma Gas & Electric
- Nathan McNeil (Vice-Chair), Midwest Energy, Inc.
- Daniel Benedict, Independence Power and Light
- Scott Benson, Lincoln Electric System
- John Boshears, City Utilities of Springfield Missouri
- Derek Brown, KCP&L and Westar, Evergy Companies
- Jarred Cooley, Xcel Energy
- Cliff Franklin, Sunflower Electric Power Corporation
- Joe Fultz, Grand River Dam Authority
- James Ging, Kansas Power Pool
- Kalun Kelley, Western Farmers Electric Cooperative
- John Knofczynski, East River Electric Power Cooperative
- Dan Lenihan, Omaha Public Power District
- Randy Lindstrom, Nebraska Public Power District
- Jim McAvoy, Oklahoma Municipal Power Authority
- Matt McGee, American Electric Power
- Nate Morris, Empire District Electric
- Michael Mueller, Arkansas Electric Cooperative Corporation
- Alan Myers, ITC Holdings, Inc.
- Gayle Nansel, Western Area Power Administration
- John Payne, Kansas Electric Power Cooperative
- Chris Pink, Tri-State G&T
- Jason Shook, GDS Associates, Inc.
- Matthew Stoltz, Basin Electric Power Cooperative
- Noman Williams, GridLiance High Plains LLC

Proxies
The following proxies were provided for all or portions of the meeting:

Full Proxy
- Jody Holland (GridLiance High Plains LLC) proxy for Noman Williams (GridLiance High Plains LLC)

Partial Proxy
- John Olsen (KCPL & Wester, Evergy Companies) partial proxy for Derek Brown (KCPL & Wester, Evergy Companies)
- Josh Verzal (Omaha Public Power District) partial proxy for Dan Lenihan (Omaha Public Power District)
Kirk Hall, TWG staff secretary, informed Travis that the group had a quorum.

**Antitrust Guidelines**
Kirk noted to the TWG that the agenda for the meeting included Antitrust Guidelines and reminded the group that certain topics were not allowed for discussion during the meeting.

**Previous Meeting Minutes Approval (Action Item)**
Travis asked the TWG for any changes to the minutes (Attachment 1c, 1d – October 23, 2018 ESWG-TWG Minutes.docx, TWG Minutes November 13-14 2018.docx). A correction to the spelling of Kalun Kelley’s name was made to the November 13-14, 2019 Face-to-Face Minutes.

   **Motion:** Kalun Kelley (WFEC) made a motion to approve the set of TWG meeting minutes. Nate Morris (EMDE) seconded the motion. The motion was approved unanimously.

**Meeting Materials Review**
Kirk informed the group that the charter had been approved by the MOPC. The changes only affected the membership section, expanding the number of seats from 24 to 26. This change guarantees all Transmission Owning (TO) members would have a seat on the TWG. This change also created an additional seat to be filled by a Transmission Using (TU) member. Kirk announced that Jarred Cooley (SPS) would immediately be a full voting member to fill the TO seat and that the remaining vacancy would be filled after the New Year. A notification will be sent out requesting nominations to fill the remaining vacancies with a goal of filling the seat prior to the February face-to-face. Kirk also noted that the updated charter had been posted on SPP.org for review.

**Agenda Item 2 – Consent Agenda (Action Item)**
The consent agenda consisted of the MDWG Charter Revisions (Attachment 2a - MDWG Charter Revision 20181206.docx) and RR 335: GI Three Stage Study Process (Attachment 3b - RR335 GI Three-Stage Process.zip). There was no additional discussion amongst the group regarding the consent agenda.

   **Motion:** John Knofczynski (EREPC) made a motion to approve the consent agenda. Jason Shook (GDS Associates, Inc.) seconded the motion. The motion was approved unanimously.

**Agenda Item 3 – Regional and Local Planning Coordination**
Coordination
Micha Bailey, SPP staff, presented the group with an introduction to the regional and local planning coordination effort (Attachment 3a - Regional and Local Planning Coordination.pptx). Micha went over the guiding principles that are driving the need for increased coordination between regional and local planning. He also went over the goals and benefits that come from this coordination between SPP and Transmission Owners. There was no further discussion on this topic.

LPP/LPC Application
Aaron Stewart, SPP staff, presented an initial discussion on how local planning criteria (LPC) and local planning processes (LPP) (Attachment 3bi - LPC & LPP application.pptx). The objective of this presentation was to gather more information from the group on LPC and LPP, start the discussion about which criteria is appropriate for SPP to apply and discuss with the group how SPP will use LPC and LPPs in planning studies going forward. A list of the categories of criteria SPP has identified from the individual LPC documents submitted for the annual engineering data request was presented to the group. There was discussion among the group regarding specifics of the categories of criteria presented and whether or not these should be considered in SPP planning studies. The overall discussion of the group leaned towards if a company feels the criteria categories are needed at the local level then they are legitimate and should be considered. However, there was some concerns voiced about mandating criteria at local
lower voltage level. The main concern was that what one company deems appropriate for their system is not necessarily appropriate for another companies system. It was explained that what is being proposed is not a region wide criteria but rather at a zonal level and coming to consensus on LPC. Aaron next presented a flowchart staff had developed for applying LPC/LPPs in SPP planning studies (Attachment 3bii - LPC & LPP Flowchart.pdf). There was a lot of conversation among the group regarding the flowchart. In general, the comments related to how the LPC would be applied to either the region or a zone. There were concerns from the group about deciding on criteria contained in individual LPC that would then be applied to the entire region. During the discussion, it was explained that the goal of this effort was not to decide on criteria that would be applied to the region, but rather to decide at a zonal level what criteria should be applied. There was also concerns regarding the complexity of some of the analysis required by some LPC. The main issue was the resource impact to SPP if staff were required to perform these different analyses and how this might push additional costs onto the membership. It was mentioned that the Holistic Integrated Tariff Team (HITT) was providing feedback towards each zone developing an LPC and through this each TO would have a voice in what is included if this option is pursued. The discussion was ended due to time constraints but this discussion is going to be an ongoing topic at the TWG for some time and will be included on future agendas.

**Agenda Item 4 – SPP Planning Coordinator Update**

**2018 SPP Comprehensive TPL-001-4 Assessment (Action Item)**

Charles Hendrix, SPP staff, presented the 2018 SPP Comprehensive TPL-001-4 Assessment (Attachment 4a - PC_update_Dec19_TWG Motion.pptx) seeking approval by the TWG. Nathan McNeil (MIDW) verified with Charles that one issue that was seen during the analysis that was not shown in the presentation was cleared. Charles confirmed that the issue was fixed. Randy Lindstrom (NPPD) requested clarification regarding the extreme event checks in NPPD’s area; specifically if they were not listed in Table 2.6 did that mean rotor angle instability was not seen. Charles clarified that this was correct; if the events were not shown in Table 2.6 then there would not be a cascading look. There was no further discussion on this item.

**Motion:** Nathan McNeil (MIDW) made a motion to approve the 2018 SPP Comprehensive TPL-001-4 Assessment. Nate Morris (EMDE) seconded the motion. The motion was approved unanimously.

**SPP TPL-007-1 Assessment Report (Action Item)**

Chris Colson (WAPA) discussed the SPP TPL-007-1 Assessment of Geomagnetically-induced Currents (GIC) resulting from Geomagnetic Disturbance (GMD) that was posted to GlobalScape. Specifically, Chris presented to the group the data to facilitate the requirement R5 of the standard. The report listed seven transformers in the SPP footprint under worst-case conditions that were observed to exceed the maximum value of 75 Amps per phase. Randy Lindstrom (NPPD) asked if the TPLTF had reviewed and approved the report and GIC data. Chris explained that they had not due to the guidance document stating this was an SPP PC requirement under R5 of the standard. There was no further discussion.

**Motion:** Alan Myers (ITC Holdings, Inc.) made a motion to approve the SPP TPL-007-1 R5 Assessment report as posted on GlobalScape with the suggested revisions submitted by SPP stakeholders. Jason Shook (GDS Associates, Inc.) seconded the motion. The motion was approved unanimously.

**CIP-002-5 Assessment Notice**

Charles Hendrix notified the group that the CIP-002-5 assessment had been posted and that if there were any questions they should follow up with Jason Terhune (SPP).
**Agenda Item 5 – RR 334: Criteria Update Used in Transmission Owner Designation Process (Action Item)**

Aaron Shipley, SPP staff, presented RR 334: Criteria Update Used in Transmission Owner Designation Process (Attachment 5 - RR 334 Recommendation Report.docx) for approval by the TWG. This RR will update the types of planning processes to include the 20-Year Assessment as a process that can potentially produce a project eligible to become a Competitive Upgrade (CU). This update will more accurately reflect and account for all SPP planning processes that can result in a CU. There were questions from the group about why this change was needed since there would very likely never be NTCs issued from the 20-Year Assessment. It was explained that this while the possibility of NTCs being issued was very slim; the RR was proposed to align with the original goals of the TPITF. When the original revisions were made to Attachment O the ITP20 was included in a separate section and this detail was missed, this was a cleanup of that oversight. There was also a question asked about what other groups this RR had been too. Aaron explained that the PCWG had reviewed and approved. The only other group would be the CTPTF; however, given their status they would not be reviewing this.

**Motion:** Alan Myers (ITC Holdings, Inc.) made a motion to approve RR 334: Criteria Update Used in Transmission Owner Designation Process. Jason Shook (GDS Associates, Inc.) seconded the motion. The motion was approved with 2 no votes by Randy Lindstrom (NPPD) and Travis Hyde (OKGE) and 1 abstention by Nate Morris (EMDE).

After the meeting, those individuals who voted no or abstained were provided the opportunity to submit their voting rationale. The submitted responses are provided below.

Travis Hyde (OKGE)

“OG&E doesn’t agree that NTC’s should be issued out of any 20 year study. OG&E understand the tariff is written that way and that’s not really what the RR deals with. We also don’t believe that projects identified out of 20 year study should be competitive at that point.”

Randy Lindstrom (NPPD)

“NPPD voted No on RR 334 since we do not support the revised language which will now include the 20-Year Assessment as a valid study from which a NTC or Competitive Upgrade can be identified. The 20-Year Assessment is too speculative and limited in scope to allow for the designation of a transmission project to be for constructed and funded under the SPP tariff.”

Nate Morris (EMDE)

“Empire feels a 20 year study is too far reaching to be considered as producing valid results. This type study is purely conceptual due to the ever changing transmission system, generation types and locations across the region, load growth/profiles, etc. With the understanding the Tariff allows for NTC’s to be issued out of this study and that this particular RR encompasses the alignment of verbiage for compliance reasons (vs. justifying any NTC’s that could be issued), any NTC that could be issued out of a 20 year study should be considered invalid due to the study being conceptual in nature and therefore the results are purely conceptual.”

**Agenda Item 6 – SPP Powerflow vs. Operational Data Benchmark**

Michael Odom, SPP staff, presented the SPP Powerflow vs Operational Data Benchmark (Attachment 6 - SPP Powerflow vs Operational Data Benchmark.pptx) to the TWG. In accordance with SPP Criteria 5.3.3 SPP staff shall benchmark model data against actual SPP system conditions. Michael presented the comparison of SPP Summer (April – September) and peak load real-time values against the correlating SPP Planning model summer load values. There was no further discussion on this item.

**Agenda Item 7 – 2019 ITP Model Update (Action Item)**

Michael Odom presented a slide deck to the group that detailed updates that had been made to the BA Powerflow models (Attachment 7 - 2019 ITP Model Updates.pptx). He went over the updates made two-
winding transformers in the BA Light Load models and the Qload updates made in the BA Powerflow Lubbock 2029 Light Load Future 1 model. While this item was listed as an action item on the agenda, no action was taken at the meeting. The group decided that the updated models would be approved through an expedited email vote that would occur after the New Year.

**Agenda Item 8 – DPP Window Information**

Sherri Maxey, SPP staff, provided the group with an update and overview of the DPP Window (Attachment 08 - DPP Window.pptx) that was scheduled to open on January 8, 2019 at 12:00am. Sherri went over the DPP process flow, siting SPP BP 7650 and the DPP submittal form instructions on SPP.org for reference. She also went over the open and close dates of the DPP window, changes made to the submittal form and best practices when submitting DPPs. There was no further discussion on this topic.

**Agenda Item 9 – Viola NTC Re-Evaluation Notification**

Kirk presented to the group the notification for re-evaluation of the Viola NTC (Attachment 09 - NTC 200228 Modification.pptx). Kirk explained the reason for the re-evaluation being driven by a change in the rating of the new 345/138 kV transformer that would be installed at Viola changing from 492 MVA to 440 MVA. This change was due to Westar initially intending to use an existing transformer but since the study’s conclusion, a determination was made to purchase a new transformer with a lower rating. Kirk explained that the decrease in the rating caused no adverse impacts to reliability or transmission service. A question was asked about whether or not the cost changed because of the modification. Kirk explained that the cost stayed within the allowable bandwidth so this was not considered in the re-evaluation. Another question was asked about whether or not this transformer would show up in the near future as needing to be higher than the 440 MVA due to planning for a higher rating. Derek Brown (WERE) explained that they had been planning for 440 MVA emergency rating since 2016. They do not anticipate any issues with future upgrades being needed. There was also a question asked about how the original 492 MVA rating was decided for the original NTC. Kirk explained that this NTC came from the 2014 Near-Term study that was prior to the Order 1000 process. The process during this time was to work with the TO on what their normal transformer sizes are. It was communicated they were going to use an existing transformer with a 492 MVA rating but it was decided to get a new transformer with a lower rating. There was no further discussion on this item.

**Agenda Item 10 – TWG Charter Update**

This agenda item was discussed earlier in the meeting under Meeting Materials Review.

**Agenda Item 11 – Future Meetings**

Kirk reminded the group of scheduled upcoming meetings. There was no further discussion.

**Joint Meeting with ESWG for remainder of agenda**

**Agenda Item 12 – Administrative Items**

Call to Order
The ESWG/TWG joint portion of the meeting was called to order at 1:00pm.

The following members attended or were represented by proxy:

- Alan Myers (Chair), ITC Great Plains
- Tim Owens (Vice-Chair), Nebraska Public Power District
- Randy Collier, City Utilities of Springfield
- Natasha Henderson, Golden Spread Electric Cooperative
- Jody Holland, Gridliance High Plains
Agenda Item 13 – 2019/2020 ITP Report Card

Juliano Freitas, SPP staff, went over the 2019 and 2020 ITP Report Card for the groups (Attachment 13a, 13b - 2019 ITP Quarterly Report Card_Updated.pptx, 2020 ITP Quarterly Report Card.pptx). Juliano provided an overview of the status of current and upcoming milestones for both the 2019 and 2020 ITP studies. There was no further discussion.

Agenda Item 14 – 2020 ITP Scope (Action Item)

Kirk presented the 2020 ITP Scope (Attachment 14 - 2020 ITP scope_Final Draft_TWG_ESWG Approved.docx) to the groups for approval. Esat Guney, SPP Market Monitor, asked how staff plans to incorporate member-specific public announcements related to carbon reduction into the ITP process. Kirk informed him that the ITP could account for those things in different ways such as future assumptions and ensuring SPP members are meeting state mandates and goals, however, the ITP is a regional process does not evaluate the system based upon member-specific initiatives unless agreed upon through the stakeholder process.

ESWG: Tim Owens (NPPD) made a motion to approve the 2020 ITP Scope as presented, with minor edits so that the name of the document is consistent with the ITP Manual and the tariff. Kurt Stradley (LES) seconded the motion. The motion was approved unanimously.

TWG: Alan Myers (ITCGP) made a motion to approve the 2020 ITP Scope as presented, with minor edits so that the name of the document is consistent with the ITP Manual and the tariff. Jason Shook (GDS Associates, Inc.) seconded the motion. The motion was approved unanimously.

Agenda Item 15 – 2019 ITP Needs Assessment and Solution Development Discussion

Kirk provided the groups with an update on the 2019 ITP needs assessment and solution development (Attachment 15 - 2019 ITP Discussion_v2.pptx). As part of the update, Kirk discussed the concept of using additional metrics in the development of the ITP Portfolio, specifically the Benefit of Avoided Reliability Projects. The presentation included a previous example of these considerations that occurred during the 2015 ITPNT and ITP10 studies, and identified the new ITP process provides an automatic opportunity to evaluate how projects initially identified for reliability or economic purposes are evaluated against both reliability and economic needs. Kirk discussed how using this additional metric would
provide staff and members with additional projected benefit during the portfolio development process. Use of this metric in the portfolio development milestones would allow staff and members to consider the additional benefits of economic solution’s ability to address known reliability needs, instead of calculating the benefit after the portfolio is finalized. In general, the group supported the addition of this metric but would like to see more details before utilizing this metric in the 2019 ITP study. Stakeholders also identified a potential risk of longer lead-times for economic projects (generally considered to be larger solutions overall). The longer lead times may not allow some economic projects to be placed in-service before the reliability need occurs. Staff agreed that lead-time should be considered when making project recommendations. Kirk finished the discussion by stating that staff is still investigating the use of the avoided reliability benefit metric and would bring more information back to the stakeholder groups as internal staff discussion continues. Nikki Roberts, SPP staff, also highlighted a few items for stakeholder related to the needs assessment and existing ITP Manual language. This information included the additional analysis for the approved Target Area, Need type relationships and correlations, seams considerations, and the invalidation/reclassification concepts described in the ITP Manual.

Seeing there was no further business, the meeting adjourned at 3:00pm.

Respectfully Submitted,

Kirk Hall
Secretary
Southwest Power Pool
TRANSMISSION WORKING GROUP MEETING
January 14, 2019
SPP Corporate Campus – Little Rock

• Summary of Actions Taken •

1. Approved previous meeting minutes.
Southwest Power Pool
TRANSMISSION WORKING GROUP MEETING
January 14, 2019
SPP Corporate Campus – Little Rock, AR

• MINUTES •

Agenda Item 1 – Administrative Items

Call to Order
TWG Chair Travis Hyde called the meeting to order at 8:33 am. The following members were in attendance or represented by proxy (Attachment 01a – Attendance.xls):

- Travis Hyde (Chair), Oklahoma Gas and Electric
- Nathan McNeil (Vice-Chair), Midwest Energy, Inc.
- Scott Benson, Lincoln Electric System
- John Boshears, City Utilities of Springfield
- Derek Brown, KCP&L and Westar, Evergy Companies
- Jarred Cooley, Xcel Energy
- Cliff Franklin, Sunflower Electric Power Corporation
- Joe Fultz, Grand River Dam Authority
- James Ging, Kansas Power Pool
- Kalun Kelley, Western Farmers' Electric Cooperative
- John Knofczynski, East River Electric Power Cooperative
- Dan Lenihan, Omaha Public Power District
- Randy Lindstrom, Nebraska Public Power District
- Matt McGee, American Electric Power
- Nate Morris, Empire District Electric Company
- Michael Mueller, Arkansas Electric Cooperative Corporation
- Gayle Nansel, Western Area Power Administration
- Alan Meyers, ITC Holdings, Inc.
- John Payne, Kansas Electric Power Cooperative
- Chris Pink, Tri-State Generation and Transmission Association, Inc.
- Matthew Stoltz, Basin Electric Power Cooperative
- Noman Williams, GridLiance High Plains LLC

Proxies
The following proxies were provided for all or a portion of the meeting:

Full Proxy:
- Jody Holland (GHP) proxy for Noman Williams (GHP)
- Reene’ Miranda (SPS) proxy for Jarred Cooley (SPS)

Aaron Stewart, TWG Staff Secretary, informed Travis that the group had achieved a quorum.
TWG Meeting Minutes (Action Item)
Travis asked the group if anyone had any changes that needed to be made to the September 25th, 2018 meeting minutes (Attachment 01b – September 25, 2018 ESWG-TWG Minutes_redline.docx). Matt McGee (AEP) pointed out one typo that was corrected in the meeting. Travis requested a motion to approve the revised meeting minutes.

**Motion:** Alan Myers (ITC) made a motion to approve the revised meeting minutes. Matt McGee (AEP) seconded the motion. Motion passed unanimously.

**Agenda Item 2 – 2018 Organizational Effectiveness Survey**
Aaron provided the group with a presentation to go over the 2018 Organizational Effectiveness Survey results (Attachment 02, 2018 Organizational Group Effectiveness Survey.pptx). He went over the response rate of all the organizational working groups compared to the TWG, noting that the response rate was slightly lower than average across all org groups. He also listed the areas of the survey where the group received high scores and areas that the group received lower scores. There was no additional discussion.

**Agenda Item 3 – RR 162: PMU for New Generator Interconnections**
Cody Parker, SPP staff, went over RR 162 to educate the group on the new RR 334 that would be coming to the TWG for approval in the coming meetings (Attachment 03, RR 162 Update and Next Steps.pptx). He gave the group an overview of the original RR 162 that included a brief history, and final Tariff and operating criteria language. Cody also went over the FERC determination on RR 162 and then provided the group with the details for the new RR 334. There was a question asked about what kind of data PMUs would be gathering and how this data would be used. Cody explained that the data collected would be from the generator and transmission system and not the generator only. There was a comment made that since the PMU will collect data used by the Transmission Owner (TO) and not just the Generator Owner (GO) that these would be a network upgrade. Cody stated that he would be sure to include this question and feedback when the new RR 334 is discussed at the Regional Tariff Working Group (RTWG).

**Agenda Item 4 – Regional and Local Planning Coordination**
Modeling Coordination
Eddie Watson, SPP staff, provided the group with a presentation regarding the coordination of TO planned projects for inclusion in SPP models (Attachment 04a, TO Planned Project Coordination.pptx). He went over background information that included the goals and benefits of improving coordination between SPP and TOs when it comes to building accurate models. Eddie gave the group an overview of the current process and then the future proposed process. The new process requests that all TO planned projects be submitted through RMS to notify SPP. Once SPP receives the RMS ticket, staff will provide guidance on how this planned project will need to be studied for inclusion in the planning models. The group had questions about what process would be used to study these once they are submitted through RMS. Staff explained that the study process would follow existing processes and have the same visibility. The group also voiced concerns around the definition of material modification and how this would apply to what is and is not required to go through the process being proposed. There was also discussion about how this process would handle generation retirements. Staff explained that there is an effort already being worked on outside of this one that would handle generation retirements. Due to the sensitive nature of publicly releasing plans to retire generation, staff is working on a business practice that would allow the study of these retirements while still allowing for confidentiality.

**Agenda Item 5 – 2019 ITP Items**
Schedule Update
Sherri Maxey, SPP staff, provided the group with an update on the schedule for the 2019 ITP (Attachment 05a, 2019 ITP Schedule.pptx). There was no further discussion.
Agenda Item 6 – 2020 ITP Items

Schedule Update
Sherri Maxey provided the group with an update on the schedule for the 2020 ITP (Attachment 06a, 2020 ITP Schedule.pptx). There was no further discussion.

Generation and Load
Clayton Mayfield, SPP staff, went through a presentation to discuss planned retirement inconsistencies for the 2020 ITP Base Reliability (BR) Powerflow models and the 2020 ITP Generation Review workbook and reviewed the next steps for the 2020 ITP generation and load review (Attachment 06b, 2020 ITP Generation and Load Review Update.pptx). There was no additional discussion.

Powerflow Model
David Duhart, SPP staff, provided the group with an update on the 2020 ITP Powerflow model (Attachment 06c, 2020 ITP Powerflow Presentation.pptx). He discussed the pass 4 posting of the models and also noted that the final scheduled pass, pass 5, would be posted on January 14th and feedback accepted until February 1st. David requested that the group review the models and to be sure to notify modeling staff before the February 8th posting date. There was no additional discussion.

Agenda Item 7 – GE’s WindRESERVE
Steve Bravo, General Electric, provided the group with an overview of GE’s WindRESERVE Technology (Attachment 07, GE WindRESERVE Overview for SPP 011419 Trans WG.PDF). There was no additional discussion.

Agenda Item 8 – Closing Items
Aaron reminded the group that the nomination period to fill the open seat would be closing on January 18. He also went over the upcoming scheduled meetings.

Seeing that there was no further business, the meeting adjourned at 10:01 am.

Respectfully Submitted,

Aaron Stewart
Secretary
Southwest Power Pool, Inc.
TRANSMISSION WORKING GROUP MEETING
February 5, 2019
AEP Building – Dallas, TX

• A G E N D A •

Tuesday, 8:00am – 5:00pm

1. Administrative Items.................................................................................................................. Travis Hyde (5 mins)
   a. Call to Order
   b. Proxies
   c. Antitrust Guidelines
   d. Previous Meeting Minutes Approval (Action Item)
      i. December 19th, 2018 Minutes
      ii. January 14th, 2019 Minutes
   e. Agenda Approval (Action Item)
   f. Meeting Materials Review

2. Current Action Items Review ................................................................................................. Aaron Stewart (5 mins)

3. Regional and Local Planning Coordination ........................................................................... Staff (120 mins)
   a. LPP/LPC Survey Results – Aaron Stewart

4. Break ..................................................................................................................................... (10 mins)

5. RR 340: PMU for New Generator Interconnections......................................................... Cody Parker (20 mins)

6. Generator Retirement Process Update .................................................................................. Kirk Hall (30 mins)

7. TWG Reports .......................................................................................................................... All (40 mins)
   a. MDWG Report – Nate Morris
   b. DLTF Report – Derek Brown
   c. TPLTF Report – Chris Colson

8. Lunch.................................................................................................................................... (60 mins)

9. Modeling Year-1 Definition Change ...................................................................................... Michael Odom (30 mins)

10. Compliance and Advanced Studies .................................................................................... Staff (45 mins)
   a. TPL-001-5 Update – Scott Jordan/Jonathon Hayes
   b. 2019 Flowgate Assessment Scope (Action Item) – Melanie Hill

Antitrust: SPP strictly prohibits use of participation in SPP activities as a forum for engaging in practices or communications that violate the antitrust laws. Please avoid discussion of topics or behavior that would result in anti-competitive behavior, including but not limited to, agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition.
Antitrust: SPP strictly prohibits use of participation in SPP activities as a forum for engaging in practices or communications that violate the antitrust laws. Please avoid discussion of topics or behavior that would result in anti-competitive behavior, including but not limited to, agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition.

11. 2019 ITP ................................................................................................................................. Staff (20 mins)
   a. Schedule Review – Sherri Maxey
   b. DPP Window Statistics – Ellen Cook

12. 2020 ITP ................................................................................................................................. Staff (30 mins)
   a. Schedule Review – Sherri Maxey
   b. Powerflow Model – David Duhart

13. MISO-SPP JCSP Update ........................................................................................................ Clint Savoy/Adam Bell (20 mins)

14. Use of Transmission Operating Guides ............................................................................... Josh Pilgrim (90 mins)

15. NERC Activities Update ....................................................................................................... Shannon Mickens (15 mins)

16. 2019 TWG Goals ............................................................................................................... Casey Cathey (30 mins)

17. IBIS Update ......................................................................................................................... Doug Bowman (30 mins)

18. Summary of Action Items .................................................................................................... Aaron Stewart (5 mins)

19. Discussion of Future Meetings (Central Time) ......................................................................... Aaron Stewart (5 mins)
   a. March 14th, 2019 – WebEx 8:30am-12:00pm
   b. April 9th, 2019 – WebEx 8:30am-12:00pm
   c. May 14th-15th, 2019 – Kansas City, Missouri – KCPL/Evergy Offices
<table>
<thead>
<tr>
<th>Item</th>
<th>Date Originated</th>
<th>Action Item</th>
<th>Updates</th>
<th>Status (Not Started, In Progress, Closure Pending, On Hold, Closed)</th>
<th>Owner</th>
<th>Notes/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>162</td>
<td>March 16, 2016</td>
<td>Staff to set up a specific time for TWG to review section 7 of the SPP Planning Criteria</td>
<td>February 14, 2018: A portion of SPP Criteria Section 7.2 has been added to RR 237 for the TWG to consider. October 30, 2017: Section 5 is currently under review with RR 237. Once RR 237 is completed, focus will turn to all or portions of Section 7. November 8, 2016: Because of the new TPITF process, the Planning Criteria will be updated along with a large portion of other governing documents such as the OATT and Business Practices. Section 5 of the Criteria will need to updated as well. Once this section is corrected, a section by section approach will be taken to modify, update, or delete sections of the SPP Planning Criteria, including Section 7.</td>
<td>In Progress</td>
<td>Kirk Hall</td>
<td></td>
</tr>
<tr>
<td>183</td>
<td>August 7-8, 2017</td>
<td>Staff to begin to compile information and develop initial criteria for Remedial Action Scheme policy for TWG/ORWG review</td>
<td>February 14, 2018: Staff has consolidated the survey responses and developed a draft proposal for the TWG and ORWG to consider moving forward. October 30, 2017: Staff has put together a list of potential applications for a RAS for discussion and review with the TWG.</td>
<td>In Progress</td>
<td>Kirk Hall/Jason Tanner</td>
<td></td>
</tr>
<tr>
<td>184</td>
<td>May 15-16, 2018</td>
<td>Staff to review the Op Guide Policy in Attachment B of the ITP Manual and bring a proposal to stakeholder on how to handle op guides in the future</td>
<td>November 14, 2018: Staff presented to the TWG requesting feedback on a potential approach. Staff going to take feedback into consideration with plan to bring topic back to TWG at a future meeting.</td>
<td>In Meeting</td>
<td>Josh Pilgrim</td>
<td>Agenda Item 14</td>
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<tr>
<td>186</td>
<td>May 15-16, 2018</td>
<td>TWG, MDWG, and ESWG Chairs to work with the managers of Reliability Planning, Modeling, and Economic Planning to develop an action plan to improve the model build process</td>
<td>January 28, 2019: Staff has discussed defining Year 1 of the ITP process to align with the MDWG model build with the MDWG. This could reduce the number of forecasts needed as well as provide additional benefits. October 30, 2018: TWG, ESWG, and MDWG Chairs and Secretaries held a call prior to the August Face-to Face meeting with the management team from Reliability Planning, Economic Planning, and Modeling. More to come on the progress.</td>
<td>In Meeting</td>
<td>SPP Staff/Chairs</td>
<td>Agenda Item 9</td>
</tr>
<tr>
<td>188</td>
<td>June 28, 2018</td>
<td>Staff to come back to the TWG to discuss the process for evaluating Sponsored Upgrades for Z2 credits.</td>
<td>In Progress</td>
<td>Transmission Service Staff</td>
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<tr>
<td>189</td>
<td>November 14, 2018</td>
<td>The AQITF took an action item to identify potential efficiencies in the AQ process potentially resulting in a new RR.</td>
<td>Discussing minimal potential efficiencies with the AQ process. This will be discussed at future AQITF meetings.</td>
<td>In Progress</td>
<td>AQITF</td>
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<tr>
<td>190</td>
<td>November 14, 2018</td>
<td>SPP staff took an action item to evaluate the impact of screening using normal ratings as mentioned in RR 237.</td>
<td>Staff is going to run analysis utilizing rate A as thermal limit under contingency and compare results to present at a future meeting.</td>
<td>In Progress</td>
<td>SPP Staff</td>
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<tr>
<td>1</td>
<td>February 3-4, 2010</td>
<td>Staff to create a work plan for the new TPL-001-4 Standard implementation.</td>
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<td>5</td>
<td>May 11-12, 2011</td>
<td>Staff to develop a strawman framework for enhancing the ITP planning process which will phase in coordinated levels of reactive compensation and short circuit analysis for better project cost estimation.</td>
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<td>18</td>
<td>February 21-22, 2012</td>
<td>Staff to perform gap analysis for Criteria 3 and 12.2-12.4 as well as additional comparison of Criteria 4 against NERC Standards.</td>
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<td></td>
<td>August 21-22, 2012</td>
<td>RTO and RE staff to work with the MDWG to address data reporting requirements and enforceability for merchant/independently-owned generation and transmission assets. Define 1) who is responsible for the data exchange, 2) when data exchange is required, 3) how to enforce the exchange of data.</td>
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<td>58</td>
<td>May 14, 2013</td>
<td>Staff to research options 4 and 5 (All Constrained Elements and Constrained with Threshold) on how to define CBA reliability needs in future ITPNTs.</td>
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<td>63</td>
<td>May 14, 2013</td>
<td>MDWG to investigate adding unit availability as option in MOD database.</td>
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<td>64</td>
<td>May 14, 2013</td>
<td>Staff to research generation retirements process in ITPNT.</td>
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<td>73</td>
<td>August 14-15, 2013</td>
<td>Staff to investigate if rating changes on existing flowgates could cause a flowgate to be removed from SPP’s permanent flowgate list.</td>
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<td>74</td>
<td>August 14-15, 2013</td>
<td>Staff to develop proposal for procedures to determine generation and transmission regarding CIP-002-5 using the MISO’s methodology as a building block. Bring procedures to September meeting.</td>
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<td>79</td>
<td>October 23, 2013</td>
<td>Staff agreed to call Randy to discuss the Ft Randal – Spencer line. (WAPA integration study)</td>
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<td>80</td>
<td>November 18-19, 2013</td>
<td>Staff to coordinate SPS load submitted in AQ process that was not included in the HPILS loads that may accelerate the need of some HPILS projects</td>
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<td>81</td>
<td>November 18-19, 2013</td>
<td>Staff to develop proposal for investigation of series compensation for the December 18 conference call</td>
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<td>82</td>
<td>November 18-19, 2013</td>
<td>Staff to investigate which areas did not receive email request for 5 contingencies to be assessed using the Fast Fault Screening Tool</td>
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<td>83</td>
<td>November 18-19, 2013</td>
<td>Staff to generate list of affected generation facilities so TWG will know what units will be affected</td>
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<td>84</td>
<td>November 18-19, 2013</td>
<td>TWG to create TPL Standards task force to work with staff on impacts of the new TPL-001-4 standard</td>
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<td>85</td>
<td>November 18-19, 2013</td>
<td>Staff to give the TWG trending data for the Near Term violations that would have generated an NTC and double check the contingencies to confirm they are valid</td>
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<td>87</td>
<td>November 18-19, 2013</td>
<td>Staff to summarize the discussion on ITP Improvements and provide comments back to the TWG for review</td>
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<tr>
<td>88</td>
<td>November 18-19, 2013</td>
<td>CRTF to bring a sample of the protocol document to the TWG to review the formatting as well as continue investigation of Criteria 12.2 and the impacts of its removal</td>
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<td>89</td>
<td>November 18-19, 2013</td>
<td>Staff to share AQ Improvement Task Force revised tariff language as well as the business practice before taking it to the MOPC</td>
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<td>90</td>
<td>December 9, 2013</td>
<td>Staff to check with the SPP Legal Dept. to determine who qualifies as an authorized officer for an applicant company</td>
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<td>91</td>
<td>December 9, 2013</td>
<td>Staff to research what was intended by ‘configurations’ in the business practice language</td>
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<td>92</td>
<td>December 18, 2013</td>
<td>Staff to update Appendix I with all supplied in-service dates in time for the January MOPC meeting</td>
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<td>93</td>
<td>December 18, 2013</td>
<td>Staff to add language to 2015 ITPNT Scope regarding CBA analysis and provide to TWG for email vote as soon as possible</td>
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<td>94</td>
<td>December 18, 2013</td>
<td>Staff to work on completion of the TPL assessments earlier and hold a separate call to review and approve the TPL reports</td>
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<td>95</td>
<td>December 18, 2013</td>
<td>Staff to update the 2013 TPL Comprehensive Report with changes made to the Steady State and Dynamic Reports</td>
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<td>96</td>
<td>December 19, 2013</td>
<td>Staff to remove GSUs and matching POR/PODS from the FAC-013-2 report before distribution</td>
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<td>97</td>
<td>January 22, 2014</td>
<td>Staff to firm up dates on the 2015 ITP10 schedule and provide a full two weeks for review of the constraint assessment</td>
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<td>98</td>
<td>January 22, 2014</td>
<td>Staff to bring a 2015 ITPNT schedule to the members</td>
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<td>99</td>
<td>January 22, 2014</td>
<td>Staff to develop a list of past projects issued due to the connection of generation to be presented at the next TWG meeting</td>
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<td>100</td>
<td>January 22, 2014</td>
<td>Staff to post the translation of the generator names</td>
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<td>101</td>
<td>January 22, 2014</td>
<td>Staff to determine how possible NTCs identified in the IS will be handled</td>
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<td>102</td>
<td>February 11-12, 2014</td>
<td>Staff to close Action Item 3 and create new action item combining benchmarking for DSA Tools and the Fast Fault Screening Tool</td>
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<tr>
<td>103</td>
<td>February 11-12, 2014</td>
<td>Staff to poll the TWG to see how many members have more stringent facility ratings methodology and how many TOs have their own ratings methodology</td>
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<tr>
<td>104</td>
<td>February 11-12, 2014</td>
<td>SPP Staff to include an example in the methodology of what should be included or excluded on the list and combine multiple CIP-002-5 lists into one</td>
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<td>105</td>
<td>February 11-12, 2014</td>
<td>Staff to continue investigation of trending data to include voltage analysis, model comparisons, and determine if any other methods may provide additional insight into the need for NTCs in the first 3 years</td>
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<td>107</td>
<td>February 11-12, 2014</td>
<td>SPP Staff to develop a draft set of guidelines for double circuit capable transmission by May to present to the TWG.</td>
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<td>108</td>
<td>February 11-12, 2014</td>
<td>SPP Staff to report numbers based on the DFAX analysis at the March conference call</td>
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<td>109</td>
<td>February 11-12, 2014</td>
<td>MDWG to determine how to capture the MISO North-South and South-North flows in the model</td>
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<tr>
<td>110</td>
<td>February 11-12, 2014</td>
<td>MDWG to discuss the need for year 5 and year 10 models related to the new TPL-001-4 standard at next MDWG meeting</td>
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<td>113</td>
<td>March 12, 2014</td>
<td>SPP Staff to discuss the possibility of firming up the language around study estimates and the timeline in which an NTC is issued</td>
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<tr>
<td>114</td>
<td>March 12, 2014</td>
<td>Staff to develop full list of flowgates that were removed and provide reason for removal and post to true share by Friday, March 21st</td>
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<td>115</td>
<td>March 28, 2014</td>
<td>Staff to note that TWG will discuss HPILS impacts on ITP10 and ITPNT scopes at a later date</td>
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<td>116</td>
<td>April 3, 2014</td>
<td>Staff to email the new DFAX numbers to TWG members on April 04, 2014</td>
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<tr>
<td>117</td>
<td>April 23, 2014</td>
<td>Staff to create criteria for RMR identification and present analysis results to members</td>
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<tr>
<td>118</td>
<td>May 20-21, 2014</td>
<td>SPP Staff to determine study requirements to install Series Compensation on a chosen line and determine costs and workload associated with the studies.</td>
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<tr>
<td>120</td>
<td>June 13, 2014</td>
<td>Include flowgate process discussion as agenda topic in future TWG meeting</td>
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<tr>
<td>121</td>
<td>June 13, 2014</td>
<td>SPP Staff to confirm if anyone has reached out to WAPA/Heartland/Basin for the new model build</td>
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<tr>
<td>122</td>
<td>August 12-13, 2014</td>
<td>Staff to work with legal to understand at what point collaboration can be done in the ITP process</td>
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<td>123</td>
<td>August 12-13, 2014</td>
<td>Staff to overlay the proposed ITPNT schedules with the TWG work schedule</td>
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<td>124</td>
<td>August 12-13, 2014</td>
<td>Staff to present the ITPNT cycle change proposal to the RTWG, ESWG, and ORWG for feedback</td>
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<td>125</td>
<td>August 12-13, 2014</td>
<td>Staff to clean up the Planning Improvement Task Force Scope and present to the TWG in October for November meeting approval</td>
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<td>126</td>
<td>August 12-13, 2014</td>
<td>SPP Staff to send data request to TOs requesting the number of user-submitted contingencies and incorporate TWG review of clearing time</td>
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<td>127</td>
<td>August 12-13, 2014</td>
<td>Staff to look into cost for 3rd party review</td>
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<td>128</td>
<td>August 12-13, 2014</td>
<td>Staff to send out the list of assumed retirements and send out a document of assumptions for the models</td>
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<tr>
<td>129</td>
<td>November 18, 2014</td>
<td>Staff to work on development of a tool with PTI for TOs to accurately measure Successive Positive Peak Ratio as defined in the Disturbance Performance Requirements document approved by the TWG with a target completion date of the end of 1st quarter in 2015</td>
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<td>130</td>
<td>December 18, 2014</td>
<td>Staff to review Criteria 4 and add specificity as it relates the TWG's ability to approve flowgates and also coordinating JOA language updates if necessary to be presented at the April MOPC</td>
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<td>131</td>
<td>December 18, 2014</td>
<td>Staff to present on the Fast Fault Screening Tool and provide a comparative analysis of the tool at the February TWG meeting</td>
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<td>132</td>
<td>February 17-18, 2014</td>
<td>Staff to determine the costs for members to submit 5 contingencies per planning event and bring back to the March TWG conference call</td>
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<td>133</td>
<td>February 17-18, 2014</td>
<td>Staff/TPL TF to request documentation of each member's spare equipment strategy</td>
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<td>134</td>
<td>February 17-18, 2015</td>
<td>Doug Bowman to work with NPPD on Gerald Gentleman Station stability issues not seen during the 2014 TPL Analysis</td>
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<td>135</td>
<td>February 17-18, 2015</td>
<td>Staff to review previous ITPNT Assessments to determine how many projects were approved based upon being needed in either Scenario 0 or 5</td>
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<td>136</td>
<td>March 18, 2015</td>
<td>Staff to explore TARA for other options to perform the constraint assessment</td>
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<td>137</td>
<td>March 18, 2015</td>
<td>Staff to review the use of TPL-001-4 contingencies where Non-Consequential Load Loss is not allowed for the 2016 ITPNT assessment</td>
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<td>138</td>
<td>March 18, 2015</td>
<td>Staff to work with Gayle Nansel on the Short Circuit model review</td>
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<td>139</td>
<td>March 18, 2015</td>
<td>Staff to address questions discussed during the meeting related to BPR-059 for discussion and approval during the March 25 Net Conference</td>
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<td>140</td>
<td>March 18, 2015</td>
<td>Staff to send out an email for the SPP/MISO CSP needs posted on TrueShare</td>
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<td>141</td>
<td>March 25, 2015</td>
<td>Staff to follow up on determining if SPP Criteria 3.5 conflicts with BPR-059</td>
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<td>142</td>
<td>March 25, 2015</td>
<td>Staff to investigate whether local planning criteria is considered CEII</td>
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<td>143</td>
<td>May 18-19, 2015</td>
<td>Staff to examine how FACTS devices, HVDC lines, and other exotic projects could be evaluated fairly in the competitive Order 1000 process and develop a process for evaluation</td>
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<td>144</td>
<td>May 18-19, 2015</td>
<td>TPLTF to modify its charter to account for TPL-007-1 and present to the TWG at the June TWG Net Conference</td>
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<td>145</td>
<td>May 18-19, 2015</td>
<td>Staff to identify IROLs for Planning and Operations separately</td>
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<tr>
<td>146</td>
<td>May 18-19, 2015</td>
<td>Staff to update the Flowgate change candidates and TRM value spreadsheets and redistribute to the members for a special net conference to be set up for a vote, which would occur no less than 1 week after the files have been distributed</td>
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<td>147</td>
<td>May 18-19, 2015</td>
<td>Staff to provide the TWG with an educational session on how the Flowgate Assessment is performed</td>
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<tr>
<td>148</td>
<td>May 18-19, 2015</td>
<td>Staff to compile comments from the members and draft a response to the request for Limited Operation of a Generator for presentation to the TWG at a later meeting</td>
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<tr>
<td>149</td>
<td>June 19, 2015</td>
<td>Staff to investigate the ability for the Series Reactor project to be variable instead of fixed with MISO</td>
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<tr>
<td>150</td>
<td>June 19, 2015</td>
<td>Staff to coordinate the sharing of the Transmission Operating Guide for the Mingo 345/115 kV transformer with Jerry Brinkman at Midwest Energy</td>
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<tr>
<td>151</td>
<td>June 19, 2015</td>
<td>Staff to investigate with regulatory on the cost recovery for the cap banks and transformer</td>
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<tr>
<td>152</td>
<td>August 18-19, 2015</td>
<td>MDWG to engage with owners of DC Ties (or data submitters) to propose an action from this issue by the end of the year</td>
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<tr>
<td>153</td>
<td>August 18-19, 2015</td>
<td>Staff to explain the displacement process for selecting projects and provide a real world example on how this process would work.</td>
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<tr>
<td>154</td>
<td>September 16, 2015</td>
<td>Investigate PSS/E's Optimal Power Flow functionality and research the ABB analysis that derated constraints in the event file and report back to the TWG with the findings.</td>
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<tr>
<td>155</td>
<td>November 17-18, 2015</td>
<td>Jim McAvoy to work with Charles Hendrix and Jonathan Hayes to develop a whitepaper outlining how SPP and its members comply with FAC-002-2, including the identification of the roles and responsibilities of staff and stakeholders.</td>
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<tr>
<td>156</td>
<td>November 17-18, 2015</td>
<td>Staff to provide the SPPR tool to the members.</td>
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<tr>
<td>157</td>
<td>February 23-24, 2016</td>
<td>Staff will review the document submitted by the TSTF and the TWG meeting minutes in order to properly represent the discussion on the December 9th, 2016 TWG minutes.</td>
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<tr>
<td>158</td>
<td>February 23-24, 2016</td>
<td>Staff to review the schedule to allow more time for members to be able develop idevs for the CAPs, mitigations, or model corrections</td>
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<tr>
<td>159</td>
<td>February 23-24, 2016</td>
<td>Staff to verify if breaker locations are incorporated into the PCM module</td>
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<tr>
<td>160</td>
<td>February 23-24, 2016</td>
<td>Verify how switchable reactors are considered in the TPL analysis</td>
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<tr>
<td>February 23-24, 2016</td>
<td>Send out TPL scope in redline format</td>
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<tr>
<td>May 17-18, 2016</td>
<td>Staff to bring back the 2016 TPL Dynamic Assessment Scope after damping requirements have been added</td>
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<tr>
<td>May 17-18, 2016</td>
<td>Staff to send out email vote request for Scenario 5 methodology in the 2017 ITPNT on May 26th</td>
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<tr>
<td>May 17-18, 2016</td>
<td>Staff to develop a hybrid option for evaluating additional contingencies and bring back to the TWG for consideration</td>
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<tr>
<td>May 17-18, 2016</td>
<td>Staff to post final flowgate list to TrueShare</td>
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<tr>
<td>May 17-18, 2016</td>
<td>Staff to begin facilitation to address the concerns around new flowgate candidates that may appear based upon upgrades made to the transmission system near Kansas-Nebraska border</td>
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<tr>
<td>July 28, 2016</td>
<td>Staff to update the SPPR tool based upon the new Disturbance Performance Requirements document and update the 2016 SPP TPL-001-4 Dynamic Assessment Scope to allow for engineerin judgement for waveforms that do not fit the Disturbance Performance Requirements document</td>
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<tr>
<td>August 24, 2016</td>
<td>Staff will review the last set of Criteria 5.3.3 data for incorrect data spikes and report back on the changes</td>
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<tr>
<td>August 24, 2016</td>
<td>Staff to bring back recommendations on the use of non-transmission solutions and use of load shed as a way to mitigate needs to the TWG for approval</td>
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<tr>
<td>November 15-16, 2016</td>
<td>Staff to calculate the renewable dispatch values for the alternative methods discussed during the meeting</td>
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<tr>
<td>December 7, 2016</td>
<td>Staff to provide information on the 2017 ITP10 recommended projects affecting the High Majestic RAS to NextEra as soon as possible</td>
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<tr>
<td>December 7, 2016</td>
<td>SPS to provide information to NextEra on breaker-to-breaker contingencies and line distance protection, if any exists</td>
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<tr>
<td>December 14, 2016</td>
<td>Staff to post compliance statements for the 2016 TPL-001-4 assessment for the members</td>
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<tr>
<td>176</td>
<td>February 15, 2017</td>
<td>Staff to check SOL methodology as it relates to non BES facilities before sending as an email vote</td>
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<tr>
<td>177</td>
<td>February 15, 2017</td>
<td>Staff to perform data check to show what the dispatch of wind might be using approaches previously discussed at TWG. Members asked that load also be considered in the examples</td>
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<td>178</td>
<td>February 15, 2017</td>
<td>Staff will post the updated 2017 ITPNT model set for stakeholder review</td>
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<tr>
<td>179</td>
<td>February 15, 2017</td>
<td>Staff to post PSS/e models for stakeholders to validate results of the VIS recommendations</td>
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<tr>
<td>180</td>
<td>February 15, 2017</td>
<td>Staff to set up specific time with John Fulton (SPS) and Nathan McNeil (Westar) to discuss issues related to the analysis, results, and recommendations prior to scheduling this item to be reviewed at a later TWG meeting</td>
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<td>181</td>
<td>May 16, 2017</td>
<td>Staff to review the sensitivity case contingency analysis requirements in the 2017 TPL-001-4 Assessment Scope and revisit standardized scope reliability needs assessment, if necessary</td>
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<td>182</td>
<td>May 16, 2017</td>
<td>Staff to determine if Recommendation #6 is truly necessary. If so, staff will present a high level study scope, cost estimate and more detailed information related to the analysis to the TWG for approval</td>
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<tr>
<td>183</td>
<td>May 17, 2017</td>
<td>Staff to provide generation dispatch and ACCC result comparisons for the previous block dispatch method and the ECDI function for members to review prior to making a decision</td>
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<tr>
<td>184</td>
<td>August 7-8, 2017</td>
<td>Staff to provide more detail, language, and examples of solution evaluation for the operational project evaluation methodology</td>
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<tr>
<td>185</td>
<td>November 7-8, 2017</td>
<td>Staff to check internally if login information for GlobalScape has been provided to stakeholders</td>
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<tr>
<td>185</td>
<td>May 15-16, 2018</td>
<td>Staff to report back to the TWG members how the Transmission Service Process will model new service requests for renewable in the new Base Reliability models</td>
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<tr>
<td>187</td>
<td>May 15-16, 2018</td>
<td>Provide an update to the TWG on the progress of the IBIS model build</td>
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<tr>
<td>Updates</td>
<td>Status (Not Started, In Progress, Closure Pending, On Hold, Closed)</td>
<td>Owner</td>
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<tr>
<td>February 11-12, 2014: TWG created the TPL Task Force to work together with staff to determine the effects of the new TPL Standard. The TPLTF Charter describes in detail the specific details the task force will be reviewing</td>
<td>Complete</td>
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<tr>
<td>February 11-12, 2014: TWG discussed the creation of this task force and decided to allow the TPL Task Force</td>
<td>Complete</td>
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<td></td>
<td>Kirk Hall</td>
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<tr>
<td>April 01, 2015: The new MOD-032-1 standard specifically requirements R1 (07/01/2015 effective date) and R2 (07/01/2016 effective date) will help answer this action item.</td>
<td>Complete</td>
<td>MDWG</td>
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<tr>
<td><strong>R1.</strong> Each Planning Coordinator and each of its Transmission Planners shall jointly develop steady-state, dynamics, and short circuit modeling data requirements and reporting procedures for the Planning Coordinator’s planning area that include: [Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]</td>
<td>Complete</td>
<td>MDWG</td>
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<tr>
<td>1.1. The data listed in Attachment 1.</td>
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<td>1.2. Specifications of the following items consistent with procedures for building the Interconnection-wide case(s):</td>
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<td>1.2.1. Data format;</td>
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<td>1.2.2. Level of detail to which equipment shall be modeled;</td>
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<td>1.2.3. Case types or scenarios to be modeled; and</td>
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<td>1.2.4. A schedule for submission of data at least once every 13 calendar months.</td>
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<td>1.3. Specifications for distribution or posting of the data requirements and reporting procedures so that they are available to those entities responsible for providing the data.</td>
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<tr>
<td>R2. Each Balancing Authority, Generator Owner, Load Serving Entity, Resource Planner, Transmission Owner, and Transmission Service Provider shall provide steady-state, dynamics, and short circuit modeling data to its Transmission</td>
<td>Complete</td>
<td>Kirk Hall</td>
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<tr>
<td>Scope approved by email vote and approved by MOPC during January meeting cycle</td>
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<tr>
<td>September 17, 2014</td>
<td>MDWG added language in the MDWG procedure manual to set the generation limits to 0.</td>
<td>Complete</td>
<td>MDWG</td>
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<tr>
<td>July 20, 2014</td>
<td>EPA 111D will help develop this methodology.</td>
<td>Complete</td>
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<tr>
<td>May 11, 2015</td>
<td>The MDWG created a process on how to model retired/mothballed generation, however, there is nothing to enforce the new process.</td>
<td>Complete</td>
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<tr>
<td>February 10, 2015</td>
<td>The annual flowgate process allows for flowgates to be removed from the NERC/SPP Book of Flowgates. In reference, to facilities identified through PRC-023-2 the facility must be removed from the NERC/SPP Book of Flowgates for facilities identified through Attachment B.1. For facilities identified through Attachment B.4, analysis will be required to ensure that the higher rating allows for the facility to be removed.</td>
<td>Complete</td>
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<tr>
<td>September 10, 2014</td>
<td>TWG approved the CIP-002-5 Methodology as modified. CIP-002-5 replaced CIP-002-4. Nevertheless, IROL analysis will still be performed in the new standard. Staff working on methodology before approval.</td>
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<td>Completed</td>
<td>Jay Caspary</td>
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<td>Included as part of</td>
<td>TWG November 18-19, 2013 minutes and sent out in a separate email.</td>
<td>Complete</td>
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<tr>
<td>May 20-21, 2014</td>
<td>TWG did not agree with what the RTWG approved and remanded additional work to the AQITF</td>
<td>Complete</td>
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<tr>
<td>May 18-19, 2015</td>
<td>AQITF was revived</td>
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<tr>
<td>November 17-24, 2015</td>
<td>Jim McAvoy and Jason Speer presented that the NERC FAC-002-2 became a stumbling block in the TF's discussions. Guidance from the SPP RE and MRO RE is needed before further discussions on attachment AQ revisions take place.</td>
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<tr>
<td>November 8, 2016</td>
<td>The SPP BOD approved RR 174 which updated Attachment AQ to improve the AQ process</td>
<td>Completed</td>
<td>Ben Bright</td>
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<td></td>
<td>The term ‘configuration’ is intended to mean substation configuration such as breaker and a half scheme or ring bus scheme</td>
<td>Completed</td>
<td>Brett Hooton</td>
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<td></td>
<td>All in-service dates corrected in Appendix I for the January MOPC and BOD meetings</td>
<td>Completed</td>
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<td></td>
<td>Scope approved at January MOPC meeting</td>
<td>Completed</td>
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<td></td>
<td>Staff has scheduled two separate conference calls in December in order to use one for TPL Report approval</td>
<td>Completed</td>
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<tr>
<td>August 5, 2014</td>
<td>This item is still being determined. The SPP BOD has approved all language modifications to the SPP Governing Documents. The modifications to the SPP Governing Documents still require FERC approval.</td>
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<td>Completed</td>
<td>Kirk Hall</td>
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<tr>
<td>May 20-21, 2014</td>
<td>TWG agreed with Michael's analysis and saw no trends in the data. Members also approved staff's recommendation to begin monitoring the system at different thresholds for the purpose of future trending.</td>
<td>Complete</td>
<td>Michael Odom</td>
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<tr>
<td>Date and Event</td>
<td>Complete Status</td>
<td>Responsible Party</td>
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<tr>
<td>May 20-21, 2014: Guidelines presented to the TWG but there was concern that</td>
<td>Complete</td>
<td>Michael Odom</td>
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<td>the guidelines are currently too vague.</td>
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<tr>
<td>August 5, 2014: Special study completed in April that determined loop flows</td>
<td>Complete</td>
<td>MDWG</td>
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<td>resulting from Gen to Gen transfers between MISO North and MISO South.</td>
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<tr>
<td>May 2014: MDWG voted to rebuild year 2020 and 2025 for the 2015 Series</td>
<td>Complete</td>
<td>MDWG</td>
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<tr>
<td>August 5, 2014: Other business practice revisions related to Order 1000 and</td>
<td>Complete</td>
<td>Cary Frizzell</td>
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<tr>
<td>MOPC action items have been prioritized. Modified language to Business</td>
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<tr>
<td>Practice 7060 related to this subject should originate from the TWG.</td>
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<tr>
<td>August 5, 2014: Topic expected to be on November agenda</td>
<td>Complete</td>
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<td>August 5, 2014: Staff has had numerous informal discussions with WAPA at</td>
<td>Complete</td>
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<td>different working groups. Modelling had its first phone call on August 5th</td>
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<td>with WAPA about the new model build.</td>
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<td>November 11, 2014: Staff has worked with the Legal department to allow more</td>
<td>Complete</td>
<td>Kirk Hall</td>
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<td>information to be posted such as Conceptual Cost estimates, public posting</td>
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<td>of RMS questions/responses, and other supplied information.</td>
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<td>February 10, 2015: Staff has worked through the 2016 ITPNT schedule and is</td>
<td>Complete</td>
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<td>in the process of reviewing other Planning Schedules to ensure members input</td>
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<td>periods have been taken into account and will not overlap.</td>
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<tr>
<td>November 11, 2014: The 2016 ITPNT schedule is currently under development.</td>
<td>Complete</td>
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<td>As soon as it is finalized this information will be made available for</td>
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<td>members.</td>
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<td>November 11, 2014: William Mauldin, Jody Holland, and Kirk Hall took this</td>
<td>Complete</td>
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<td>item to the listed working groups. No feedback was provided. The cycle</td>
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<td>change was present to both the MOPC and BOD and was approved by both groups.</td>
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<tr>
<td>November 11, 2014: Mo Awad updated the scope document for review with the</td>
<td>In Meeting</td>
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<td>TWG and ESWG during their respective November face-face meetings.</td>
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<tr>
<td>November 11, 2014</td>
<td>Staff has requested the user-submitted contingencies for the TPL Dynamic Assessment</td>
<td>Complete</td>
<td>Doug Bowman</td>
<td></td>
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</tr>
<tr>
<td>May 12, 2015</td>
<td>SPP has worked to create study template for study submission. TWG directed SPP to act as the 3rd party reviewer while not affecting the administration fee.</td>
<td>Complete</td>
<td>Aaron Stewart</td>
<td></td>
<td></td>
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<tr>
<td>May 12, 2015</td>
<td>Legal is reviewing TWG's request as it relates to this issue.</td>
<td>Complete</td>
<td>Will Tootle/Kirk Hall</td>
<td></td>
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<tr>
<td>August 11, 2015</td>
<td>SPP Legal - The Tariff requirements relate to TOs adding flowgates and would not be applicable to MISO flowgates</td>
<td>Complete</td>
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<tr>
<td>August 18-19, 2015</td>
<td>Doug presented the results of the FFS tool to the TWG. Members had no issues with the benchmarking results</td>
<td>Complete</td>
<td>Doug Bowman</td>
<td></td>
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<tr>
<td>May 12, 2015</td>
<td>Stability Scope allows for all contingencies requested by members to be submitted</td>
<td>Complete</td>
<td>Doug Bowman</td>
<td></td>
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<tr>
<td>August 11, 2015</td>
<td>Members' long lead time equipment has been accounted for to remain compliant with the TPL-001-4 standard</td>
<td>Complete</td>
<td></td>
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<tr>
<td>March 18, 2015</td>
<td>Results were posted in the background materials</td>
<td>Complete</td>
<td></td>
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<tr>
<td>March 25, 2015</td>
<td>Brandon Hentschel presented to the TWG other options of performing the constraint assessment using TARA</td>
<td>Complete</td>
<td>Brandon Hentschel</td>
<td></td>
<td></td>
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<tr>
<td>March 25, 2015</td>
<td>Jason Terhune presented some merits and demerits of using the TPL-001-4 contingencies where Non-Consequential Load Loss is not allowed, in the 2016 ITPNT</td>
<td>Complete</td>
<td>Jason Terhune</td>
<td></td>
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<tr>
<td>March 25, 2015</td>
<td>Staff addressed questions posed by TWG in the previous meeting</td>
<td>Complete</td>
<td>Ben Bright</td>
<td></td>
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<tr>
<td>March 8, 2015</td>
<td>Staff sent an email to TWG and Stakeholders later on in the evening</td>
<td>Complete</td>
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<tr>
<td>No issues were found. BPR059 was approved</td>
<td>Complete</td>
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<tr>
<td>Local Planning criteria can be found on SPP OASIS page which is public</td>
<td>Complete</td>
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<tr>
<td>May 2016 TWG Meeting: Staff developed a high level process to evaluate interfaces</td>
<td>Complete</td>
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<tr>
<td>Date</td>
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<tr>
<td>November 17-18, 2015</td>
<td>Michael presented the revised TPLTF charter</td>
<td>Complete</td>
<td>Michael Odom</td>
<td></td>
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<tr>
<td>August 11, 2015</td>
<td>Planning IROLs will be identified through FAC-014 analysis</td>
<td>Complete</td>
<td>Aaron Stewart</td>
<td></td>
<td></td>
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<tr>
<td>June 3, 2015</td>
<td>Updated flowgate change candidates and TRM values were approved by the TWG</td>
<td>Complete</td>
<td>Moses Rotich</td>
<td></td>
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<tr>
<td>August 11, 2015</td>
<td>Moses Rotich presented to the TWG the process staff uses to perform the Annual Flowgate Assessment</td>
<td>Complete</td>
<td>Moses Rotich</td>
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<td></td>
<td></td>
<td></td>
<td>Charles Hendrix</td>
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<tr>
<td>October 21, 2015</td>
<td>Michael presented the metrics again to the TWG voted to approve their use in the ITPNT assessment</td>
<td>Complete</td>
<td>MDWG</td>
<td></td>
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<tr>
<td>February 7, 2016</td>
<td>The TWG has approved a process that would invalidate AC overloads if the facilities is part of or related to an existing constraint. This process was approved in the 2017 ITP10 and has been approved to carry forward in the new ITP process.</td>
<td>Complete</td>
<td></td>
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<tr>
<td>November 9, 2015</td>
<td>SPP does not own the PSS/E Optimal Power Flow functionality, but staff is investigating using TARA for this functionality</td>
<td>Complete</td>
<td></td>
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<tr>
<td>May 5, 2016</td>
<td>Staff will provide the SPPR tool upon request. Please contact Tom Burns in the R&amp;D and Special Studies group if you want the tool.</td>
<td>Complete</td>
<td>Tom Burns</td>
<td></td>
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<tr>
<td>May 10, 2016</td>
<td>TWG approved the 2016 Steady State Scope at the April 20th TWG Net Conferenc</td>
<td>Complete</td>
<td>Jason Terhune/Aaron</td>
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<tr>
<td>May 5, 2016</td>
<td>Staff verified that breaker locations are not incorporated into the PCM module</td>
<td>Complete</td>
<td>Jason Terhune/Aaron</td>
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<tr>
<td>May 9, 2017</td>
<td>Switchable reactors are considered for contingency analysis consistent with the NERC Standard and are also available to provide relief as part of a CAP if a violation is observed.</td>
<td>Complete</td>
<td>Jason Terhune</td>
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<tr>
<td>May 9, 2017</td>
<td>This action item was completed on 2/22/2017 based upon notification from the Chair of the MINT Technical Committe Randy Lindstrom. A similar analysis was requested again this year. November 8, 2016: Staff has completed the requested work to date and provided results to the interested parties. Staff is currently waiting on feedback from the impacted stakeholders at this time.</td>
<td>Melanie Hill</td>
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<tr>
<td>February 7, 2016</td>
<td>Staff provided the tool to the members prior to the completion of the 2016 TPL-001-4 assessment</td>
<td>Charles Hendrix</td>
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<tr>
<td>October 30, 2017</td>
<td>Staff will report on errors at the next opportunity to review an updated set of benchmarking to meet the requirements of Section 5.3.3</td>
<td>Modeling</td>
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<tr>
<td>May 9, 2017</td>
<td>Staff incorporated the use of load shed as a mitigation methodo consistent with NERC TPL-001-4 in the 2017 ITPNT. November 8, 2016: The TWG has reviewed staff's recommendations for both items, however, only the process for the use of load shed as a way to mitigate needs has been completely addressed. Staff is continuing to develop a more transparent process for non-transmission solutions, especially Transmission Operating Guides</td>
<td>Charles Hendrix</td>
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<tr>
<td>February 7, 2017</td>
<td>Staff completed the calculations and reviewed with the TWG over multiple conference calls with the TWG in December 2016. The TPITF review the alternate proposals with the TWG input and made a recommendation to the MOPC and Board to change the method. The Board approved the new methodology on January 31, 2017.</td>
<td>Michael Odom</td>
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<tr>
<td>February 7, 2017</td>
<td>Staff provided that information to NextEra, who later withdrew the request for the RAS at the TWG</td>
<td>Kirk Hall</td>
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<tr>
<td>February 7, 2017</td>
<td>Staff provided that information to NextEra, who later withdrew the request for the RAS at the TWG</td>
<td>Charles Hendrix</td>
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<tr>
<td>May 9, 2017</td>
<td>Compliance statements were posted in advance of the study completion for members to review and include in their TPL assessments as necessary February 7, 2017: Compliance statements are nearly complete and should be posted to TrueShare prior to the start of the meeting.</td>
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<tr>
<td>Date</td>
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<tr>
<td>August 7, 2017:</td>
<td>RR 228 has been approved by the MOPC and Board and the SPP Planning Criteria has been updated accordingly.</td>
<td>Complete</td>
<td>Charles Hendrix</td>
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<tr>
<td>May 9, 2017:</td>
<td>RR 224 went through the Revision Request process and was affirmed. Since that time an additional RR, RR 228 has been developed to offer additional clarification on SOL methodology in the Operating Horizon.</td>
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<td>August 7, 2017:</td>
<td>Data presented at May TWG Meeting, Additional request noted in Action Item 185.</td>
<td>Complete</td>
<td>Modeling</td>
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<td>May 9, 2017:</td>
<td>Staff currently working gathering data to show the historical trends for the light load seasons.</td>
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<tr>
<td>May 9, 2017:</td>
<td>Models were posted for stakeholder review upon their completion</td>
<td>Complete</td>
<td>Reliability Planning</td>
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<tr>
<td>May 9, 2017:</td>
<td>Model were posted for stakeholder review after the April 19th TWG Net Conference.</td>
<td>Complete</td>
<td>Doug Bowman</td>
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<tr>
<td>May 9, 2017:</td>
<td>Final discussions to occur prior to May TWG Meeting</td>
<td>Complete</td>
<td>Kirk Hall/Doug Bowman</td>
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<tr>
<td>August 7, 2017:</td>
<td>Staff has discussed the concerns related to the TPL-001 sensitivity case contingency analysis. During the 2017 TPL-001 study, staff analyzed all contingencies but only required corrective action plans or other mitigations for mon/con pairs that showed up in the base case and the sensitivity case for the same year/season. This is line with staff’s interpretation of the TPL-001 standard as well as the approved SPP 2017 TPL-001 Assessment scope.</td>
<td>Complete</td>
<td>Charles Hendrix</td>
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<tr>
<td>May 1, 2018:</td>
<td>TWG and ORWG approved the study scope during the month of February. Since that time staff has worked to have the contracts signed for the consultant as well as EPRI. Work is currently ongoing and regular updates will be brought to the TWG.</td>
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<tr>
<td>February 14, 2018:</td>
<td>Included for TWG approval after approval from the ORWG</td>
<td>Complete</td>
<td>Jason Tanner</td>
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<tr>
<td>October 30, 2017:</td>
<td>Staff has prepared a draft study scope document for TWG review and feedback.</td>
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<tr>
<td>August 7, 2017:</td>
<td>Staff believes a study should be completed, however, not ready to produce a study scope and estimated cost for the work to be done at this time. TWG can expect to see something within the next quarter.</td>
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<td>August 7, 2017:</td>
<td>Staff provided the information to the TWG who approved this methodology change unanimously</td>
<td>Complete</td>
<td>Zack Bearden</td>
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<tr>
<td>October 30, 2017:</td>
<td>Will has provided multiple revisions to the Operational Project Evaluation Methodology for both the ESWG and TWG. The TWG approved a revised version of the language and the ESWG is expected to review and vote on the TWG approved language on November 8th.</td>
<td>Complete</td>
<td>Will Tootle</td>
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<tr>
<td>February 14, 2018:</td>
<td>GlobalScape has gone live. TrueShare has been inactivated. If access is required, submit a request for GlobalScape access in SPP's Request Management System (RMS)</td>
<td>Complete</td>
<td>Kirk Hall</td>
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<tr>
<td>Date: October 30, 2018</td>
<td>Models were posted a few days after the August meeting with feedback due to Doug Bowman by the end of August. Feedback has been incorporated and an update will appear on the November agenda.</td>
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<td>Complete</td>
<td>Jason Tanner/Doug Bowman</td>
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<tr>
<td>Complete</td>
<td>Charlton Hill</td>
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</table>
Marked complete based upon Reactive Comp check in the ITPNT and ITP10 study scopes for 345 kV line. Also Minimum Design Standards include reactive compensation guidelines

Agenda Item 5
Agenda Item 17

November 18, 2014: Agenda Item 6d

TPL Task Force formed after February TWG Meeting.

TWG directed staff to move forward with the Protocol template
Staff noted that the applicant company would determine the authorized officer.

TWG approved the constraint assessment for Pass 3 with Agenda Item 13c.

Staff reminded the TWG at the February Meeting that there were no NTCs issued for connecting generation to the system.

NTCs will be issued upon facilities coming under the tariff later this year.

Staff requested this information from the TWG, this information was discussed as part of the recent CRTF Meeting and a new CRR was created to modify the SPP Criteria 12.2, Agenda Item 18.
Information included in previous discussions related to Reliability Metrics Discussion on previous TWG Net Conferences

Study estimates and timelines are dependent upon the ITP schedule. Any Business Practice revision changes to firm up language should originate from the TWG

Staff posted this information for the TWG to review prior to the vote on Pass 3 of the constraint assessment

Agenda Item 5
Agenda Item 10a

In relation to CIP-014-2

In relation to Limited Operations of Generator Interconnections (MOPC AI 206)
<table>
<thead>
<tr>
<th>Item</th>
<th>Date Originated</th>
<th>Action Item</th>
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<tbody>
<tr>
<td>3</td>
<td>February 1, 2011</td>
<td>Scott Jordan will contact Randy Lindstrom and John Fulton to discuss DSA tools and benchmarking tests.</td>
</tr>
<tr>
<td>6</td>
<td>August 3-4, 2011</td>
<td>Staff to assess Powertech contract and impacts to members for building stability models and provide a report to TWG.</td>
</tr>
<tr>
<td>8</td>
<td>November 2-3, 2011</td>
<td>Staff to show financial data with regards to contracting future stability studies or hiring an FTE to SPP staff to complete the studies in house.</td>
</tr>
<tr>
<td>32</td>
<td>August 21-22, 2012</td>
<td>Staff to determine necessary data from transmission owners that SPP (Planning Coordinator) needs for its TPL-001-4 compliance.</td>
</tr>
<tr>
<td>36</td>
<td>August 21-22, 2012</td>
<td>Staff to develop a strawman proposal on when and how merchant transmission facilities should be included in SPP study processes.</td>
</tr>
<tr>
<td>37</td>
<td>August 21-22, 2012</td>
<td>Staff to work with volunteers to develop language to add to Appendix 11.</td>
</tr>
<tr>
<td>70</td>
<td>August 14-15, 2013</td>
<td>Staff to determine if the current Tariff allows for cost recovery in the ATSS process for cost estimates developed by TOs.</td>
</tr>
<tr>
<td>72</td>
<td>August 14-15, 2013</td>
<td>Staff to estimate additional staff resources/costs for staff to perform Criteria 3.5 interconnection studies.</td>
</tr>
<tr>
<td>86</td>
<td>November 18-19, 2013</td>
<td>Staff to work on scoping study to analyze the reactive requirements on the system.</td>
</tr>
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<td>Description</td>
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<tr>
<td>106</td>
<td>February 11-12, 2014</td>
<td>SPP Staff to develop a whitepaper for all 3 possibilities on how to deal with upgrades to de-rated facilities, including costs and consequences</td>
</tr>
<tr>
<td>111</td>
<td>February 11-12, 2014</td>
<td>Staff to poll modeling contacts to determine who submitted HPILS loads and how much was submitted for the MDWG models to ensure that the most current 50/50 load forecast HPILS loads be included in the MDWG model build</td>
</tr>
<tr>
<td>112</td>
<td>February 11-12, 2014</td>
<td>SPP Staff to develop a list of work with deadlines to be updated on a monthly basis to be sent to the TWG and ESWG to allow members to plan their resources.</td>
</tr>
<tr>
<td>119</td>
<td>May 20-21, 2014</td>
<td>SPP Staff to research effects of Criteria 12.2 removal on cost allocation</td>
</tr>
<tr>
<td>171</td>
<td>August 24, 2016</td>
<td>Involve the ESWG in unit retirement discussion to get feedback and perspective on how to handle unit retirements in the planning models</td>
</tr>
<tr>
<td>Updates</td>
<td>Status (Not Started, In Progress, Closure Pending, On Hold, Closed)</td>
<td>Owner</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>July 20, 2014: SPP Modeling Department is currently building the 2014 Series Dynamic Models in house. PLI only being used for consultation purposes</td>
<td>Closed</td>
<td>Closed Scott Jordan</td>
</tr>
<tr>
<td>August 5, 2014: Being handled by TPL TF</td>
<td>Closed</td>
<td>Closed Doug Bowman/Scott Jordan</td>
</tr>
<tr>
<td>MOPC provided guidance on merchant transmission facilities through the 2015 ITP10 decisions in July 2013: IA agreement in place on both sides of facilities if applicable.</td>
<td>Closed</td>
<td>Closed Kirk Hall</td>
</tr>
<tr>
<td>Staff has sought volunteers’ opinions on topic. Currently working on draft language.</td>
<td>Closed</td>
<td>Closed CRTF</td>
</tr>
<tr>
<td>May 20-21, 2014: CRTF was disbanded at May face-face TWG meeting</td>
<td>Closed</td>
<td>Closed CRTF</td>
</tr>
<tr>
<td>05/09/2014: Tessie Kentner provided feedback on this action item: Sections 19.4 and 32.4 could be interpreted to permit an affected Transmission Owner to seek reimbursement for performing the ATSS. However, if the intent is for the Transmission Owner to start billing for performing these studies, it would be best to modify the Tariff to explicitly permit this</td>
<td>closed Steve Purdy</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
<td>Status</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>August 7, 2017</td>
<td>CAWG discussing derates currently based on new staff initiative on handling de-rates/re-rates</td>
<td>Closed</td>
</tr>
<tr>
<td>February 7, 2017</td>
<td>Staff informed the TWG in November 2016 that a new initiative is underway on how to handle de-rates.</td>
<td></td>
</tr>
<tr>
<td>November 8, 2016</td>
<td>Staff has developed a new initiative to evaluate de-rates in the planning models. As the work progresses, the working groups will see updates.</td>
<td></td>
</tr>
<tr>
<td>May 20-21, 2014</td>
<td>Action Item updated to reflect TWG request to be provided with information to allow for members to complete resource planning within their utility</td>
<td>Closed</td>
</tr>
<tr>
<td>August 5, 2015</td>
<td>Research underway with legal and other key staff</td>
<td>Closed</td>
</tr>
<tr>
<td>February 14, 2018</td>
<td>SPP staff has a corporate-wide initiative to develop an all-encompassing Generator Retirement process. Staff will be discussing this with the TWG as we finalize our draft process</td>
<td>Closed</td>
</tr>
<tr>
<td>October 30, 2017</td>
<td>Planning staff currently in discussions on developing a process for evaluating planned generation retirements.</td>
<td></td>
</tr>
</tbody>
</table>
TWG requested this item close and an additional action item be created to benchmark DSA Tools and the Fast Fault Screening Tool

Addressed as part of Action Item 5.

This is an additional action item to AI 1 above.

Review old HVDC interconnection agreements for baseline language
HELPING OUR MEMBERS WORK TOGETHER TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
Local Planning Criteria and Processes Survey Results
Quick Stats

• Survey was sent to 34 entities
• Received responses from 23 entities for a 68% response rate
• Breakdown of responding entity types:
  • 10 Transmission Owners
  • 13 Transmission Users
Question 1

- Does your company have a local planning process?
  - Yes (14) – 61%
  - No (9) – 39%
Question 2

• Does your company have local planning criteria, whether filed with SPP or otherwise?
  • Yes (17) – 74%
  • No (6) – 26%
Question 3

• Is your local planning process and/or criteria publicly documented and accessible? If so, where is it located and how is it accessed?
  • Yes (16) – 70%
  • No (4) – 17%
  • No Response (3) – 13%

• Common Responses
  • FERC 715 filing
  • SPP OASIS
  • Companies own tariff
Question 4

- Does your company use a local planning process and/or criteria to approve construction of new or materially modified transmission facilities that have NOT been identified and approved for construction through any of SPP’s Attachment O planning processes?
  - Yes (12) – 52%
  - No (11) – 48%
Question 5

- Has FERC Approved your local planning process?
  - Yes (3) – 13%
  - No (19) – 83%
  - No Response (1) – 4%
Question 6

• How does your company coordinate with SPP projects that were approved using your local planning process or criteria?
  • SPP study results are considered when planning local projects.
  • Projects are not approved using local planning process or criteria.
  • Attachment AQ. Projects that are not applicable to Attachment AQ are also reflected in the latest model submittals, once approved internally.
  • Haven’t yet had a need for coordination of projects from LPC with SPP. Currently working with members in same zone to come to consensus LPC, since projects that are identified by local criteria are cost recovered from the local zone.
Question 6

- How does your company coordinate with SPP projects that were approved using your local planning process or criteria?
  - Notify SPP through the Planning and Modeling processes.
  - Have not had any BES projects come out of LPP that were not already identified in an SPP Attachment O or AQ planning process.
  - If project is identified using local planning process, then need will be submitted to SPP in accordance with Section III Attachment O.
  - Local plans are coordinated with SPP. Through the local planning process SPP will be notified of any projects with details beyond just updating the SPP models.
Question 7

• What should SPP’s role be in assessing transmission facility changes that are driven by the local planning process and/or criteria?

  • SPP should ensure projects do no harm. If no harm and meets requirements of Attachment AI then project should be eligible for cost recovery and included in the STEP.

  • SPP should monitor LPC/LPP and review/approve projects with NTCs if the processes/criteria are applied appropriately. If the members of a pricing zone implement local planning criteria that is consistent and accepted by the members of the zone, then projects identified by these local planning criterion/processes should be given NTCs and the facilities accepted under the tariff. The projects and how they were identified should be open and transparent to the members of the zone and SPP should be involved in verifying that the justification is appropriate.
Question 7

• What should SPP’s role be in assessing transmission facility changes that are driven by the local planning process and/or criteria?
  • SPP should provide oversight and make sure that local criteria is being applied correctly.
  • SPP should perform the studies necessary for determining system impact in accordance with NERC Reliability Standard FAC-002.
  • SPP should look for opportunities to replace smaller local projects with larger regional projects that provide benefits and a proportionately lower cost. SPP would need to verify that larger regional projects provides the benefits that the local projects were intended to provide.
Question 8

- Would your company support or oppose requiring all transmission owners within a transmission pricing zone to use consistent local planning processes and/or criteria? Why?
  - Support (17) – 74%
    - This would provide a fair approach to ensure all entities are able to provide equally reliable service
    - Cautiously Support, but see potential difficulties in reaching consensus amongst all TOs in a zone. Would need a process for LPC review and revision when a new TO enters a zone with an established LPC.
    - Yes, would be ideal if costs are shared in the zone, however, zonal load ratio shares can make this difficult.
    - Would support using an LPC that is consistent with the TO that makes up the majority of the zone.
Question 8

• Would your company support or oppose requiring all transmission owners within a transmission pricing zone to use consistent local planning processes and/or criteria? Why?
  • Oppose (6) – 26%
    • Concerns with the inherent differences in TO systems and how they were historically planned, differing design standards, amount of transmission, age of system, geographic region, etc..
    • Think there is merit in this approach but generally oppose due to difficulties in getting consensus because of how TOs have planned their system. Would be difficult to apply one LPC uniformly to all transmission in the zone since the amount of facilities TOs have under the tariff can vary within a zone.
    • Owning loads across multiple zones means our company would need a local planning criteria that applies to multiple.
Question 9

• How does your company meet coordination requirements (R4) associated with NERC Reliability Standard FAC-002?
  • Go through the SPP studies as part of the process
  • SPP regional planning processes
    • Attachment V, Attachment O, SPP Criteria 5.5 study processes, Attachment AQ, and SPP Planning Process for Section 5.5, Appendix PL-6
    • The SPP Integrated Transmission Plan (ITP) cycles and SPP Transmission Expansion Plan (STEP) processes as necessary.
    • SPP Models on Demand database (SPP MOD).
  • TO has the responsibility to study and confirm the impacts or absence of impacts to the transmission system
  • Bi-annual meetings with host transmission owner in which the projects are discussed
Question 9

• How does your company meet coordination requirements (R4) associated with NERC Reliability Standard FAC-002?
  • Studies are coordinated internally as well as with neighboring entities as needed for applicable facilities
  • In addition to the SPP PC studies for FAC-002 compliance, our company performs its own independent study
  • We provide all the required data to the RTO for their studies. We also run internal studies local to our system & compare with RTO studies for accuracy.
  • FAC-002 is performed by another entity on our behalf
  • One item that much of the requirements hinge upon is within the Application Guideline, specifically "engineering judgement".
  • We have an internal document that we use to meet our coordination requirements
Question 10

What does your company define as a material modification to a transmission facility?

- Changes to the transmission system that could significantly impact flows on that facility or interconnected facilities. Examples could include changes in operating status (normally open vs normally closed) and significant changes in line impedance.

- In general, we feel a material modification to a facility is a change that affects or modifies the function/capability of the facility.

- Increasing the capacity of a substation, adding additional breakers, reconfiguring the substation, etc. would be considered a material modification.

- The definition of Material Modification related to transmission facilities should include: 1. Change in rating/impedance due to re-conductoring all or a portion of a line 2. Re-insulation of a line for probable future voltage conversion 3. Adding automated or remote controlled line sectionalizing devices (switches, breakers) 4. Additions/Changes to line terminal equipment including breakers, switches, line traps, etc.
Question 10

• What does your company define as a material modification to a transmission facility?
  • Evaluated on a case-by-case basis with respect to transmission system topology changes that could affect the reliability or operation of the transmission system.
  • Material modifications do not include replacements that do not involve significant changes to ratings (i.e. replacing an decrepit transformer with a slightly larger one would not count).
  • A change in voltage class would be material. Replacing old facilities (aging) with new facilities that have more capacity but the same voltage is not material.
  • Material modification is not defined by our company.
  • The definition of material modification has many differing interpretations.
Question 10

• What does your company define as a material modification to a transmission facility?

  • Change(s) to the Bulk Electric System and/or SPP tariff facilities that have not been previously studied and approved by the Transmission Provider including new lines, new transformer branches, decreases to facility ratings, re-conductors, changes in line operating voltage, connection or connection of new or existing branches (whether lines or transformer branches) to stations or lines to which they have not been connected for greater than 12 months, or disconnection of branches (whether lines or transformer branches) from the stations or lines to which they have been connected for greater than 12 months.
Question 11

- Please share your ideas for improving coordination between local planning processes and the SPP regional planning process.
  - Local Planning Process improvements
    - Incorporating more LPPs into SPP’s Regional process
    - Better communication among the stakeholders
  - One Zonal LPC
  - Turn Sponsored Upgrade Process into an Attachment AQ process
  - Have a definition of Material Modification
  - Have a process to incorporate existing open looped facilities
  - I think it works pretty well now. Nothing is perfect
Policy Change Goals

- Develop SPP wide process for coordination of LPC/LPP in regional planning studies.
- Develop policy for single LPC per pricing zone consistent with HITT recommendation.
- Define material modification.
- Clarify or modify Sponsored Upgrade study process.
RR 340
PMU Placement and Comment Review

Requiring PMUs for new GIA

Cody Parker
TWG 2/5-6/19
FERC Determination
RR162
Docket No. ER18-1078-000
FERC Determination

• SPP has not shown that its proposal to give the transmission owner the option of funding the installation is just and reasonable and not unduly discriminatory or preferential.

• We are also not persuaded by SPP’s assertion that its proposal is consistent with other tariff provisions previously accepted by the Commission, such as Attachment V, Appendix 6, Article 8.2 of SPP’s Tariff, which governs the installation of remote terminal units.

• SPP’s proposed Tariff language does not include certain details that could affect the costs of PMUs and who bears those costs. Specifically, SPP’s proposed Tariff revisions fail to specify who will be responsible for ongoing PMU communication and operation and maintenance expenses.
FERC Determination

- Our rejection of SPP’s Tariff revisions is without prejudice to SPP refiling its PMU proposal without the proposed language permitting transmission owners to fund PMU installations at their discretion.

- Any subsequent proposal should be clear in explaining how transmission owners will treat PMU installation costs in order to avoid including them in transmission rates.

- Any subsequent proposal should include Tariff language regarding responsibility for ongoing PMU communication and operation and maintenance expenses.

- Any subsequent proposal should include Tariff language clarifying the extent to which the interconnection customer can utilize existing equipment, such as relays or digital fault recorders with phasor measurement capabilities, or provide data from PMUs already deployed by the interconnection customer and/or sited on the generator side of the point of interconnection.
Updated RR 340
8.5 Phasor Measurement Recording Equipment. Prior to the Initial Synchronization Date of a Generating Facility having a Generating Facility Capacity equal to or greater than 50 MW, phasor measurement recording and communications equipment shall be installed by the Transmission Owner at Interconnection Customer’s expense, or funded by the Transmission Owner at its discretion, that is capable of gathering phasor measurements as specified in the PMU Communications Handbook. To the extent similar quality equipment is being added or already exists, such as relays or digital fault recorders, that can collect data at least at the same rate as PMUs and which data is synchronized via a high-accuracy satellite clock, such equipment could satisfy this requirement if the equipment is located on the Transmission Owner’s side of the Point of Change of Ownership. The phasor measurement equipment shall be installed at the Transmission Owner’s side of the Point of Change of Ownership and becomes part of the Transmission Owner Interconnection Facilities. Phasor measurements shall be streamed in IEEE C37.118 or equivalent format and be provided to the Transmission Provider. This data shall at least be sufficient to determine (i) positive-sequence voltage magnitude and angle, (ii) positive-sequence current magnitude and angle, (iii) frequency, and (iv) rate of change of frequency. Such data shall be transmitted over the data circuit(s) as indicated in Article 8.1.

Each Party will promptly advise the other Party if it detects or otherwise learns of any metering, telemetry or communications equipment errors or malfunctions that require the attention and/or correction by the other Party. The Party owning such equipment shall correct such error or malfunction as soon as reasonably feasible.
Where do we place the PMU?

TOIF

PCO  POI

Generator  Transmission System

Equipment Ownership

IC Owns  TO Owns

O&M Costs

IC Responsibility  TO Responsibility

TOIF – Transmission Owner Interconnection Facilities
PCO – Point of Change of Ownership
POI – Point of Interconnection

IC – Interconnection Customer
TO – Transmission Owner
O&M – Operating and Maintenance Expense
Tariff Definitions

Attachment V, Section 1

Network Upgrade

• shall mean the additions, modifications, and upgrades to the Transmission System required at or beyond the point at which the Interconnection Facilities connect to the Transmission System to accommodate the interconnection of the Generating Facility to the Transmission System.

Transmission Owner's Interconnection Facilities

• shall mean all facilities and equipment owned, controlled, or operated by the Transmission Owner from the Point of Change of Ownership to the Point of Interconnection as identified in Appendix A to the Generator Interconnection Agreement or Interim Generator Interconnection Agreement, as applicable, including any modifications, additions or upgrades to such facilities and equipment. Transmission Owner’s Interconnection Facilities are sole use facilities and shall not include Distribution Upgrades, Stand Alone Network Upgrades or Network Upgrades.
Operating and Maintenance Expenses.

• Subject to the provisions herein addressing the use of facilities by others, and except for operations and maintenance expenses associated with modifications made for providing interconnection or transmission service to a third party and such third party pays for such expenses, Interconnection Customer shall be responsible for all reasonable expenses including overheads, associated with: (1) owning, operating, maintaining, repairing, and replacing Interconnection Customer's Interconnection Facilities; and (2) operation, maintenance, repair and replacement of Transmission Owner’s Interconnection Facilities.
RR Comments

  - Comments filed
    - ITC Great Plains
    - Kansas City Board of Public Utilities
    - Missouri Public Service Commission
RR 340 Work Plan

- 2/28 RTWG action
- 3/6 ORWG action
- 3/14 TWG action
- 3/18 RCWG action
- 4/16 MOPC action
HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
Generator Retirement Process & Business Practice

Kirk Hall
February 5-6, 2019
Overview

• Today’s Objective
  • Outline the Revision Request process for implementation of the generator retirement process
  • Generator retirement process overview
  • Initial review and feedback on the process and business practice*

*included in background materials
Revision Request Process

• Generator Retirement Business Practice will be included in a larger Revision Request that will include Tariff revisions and likely ITP Manual revisions

• RR will be owned by the Regional Tariff Working Group
  • RTWG will likely want to ensure the secondary working groups have reviewed and agreed with the overall process as described in the business practice prior to their approval of the RR

• Tariff language not currently written
  • Once developed and approved by SPP’s internal RR review process, the RR will be posted including business practice
Generator Retirement Schedule

• Process intended to be completed in the 6 month notification period required in the Integrated Marketplace Protocols

• High Level Schedule
  • Month 1: Scoping and Model Updates
  • Months 2-5: Analysis and Solution Development
  • Month 6: Reporting

• Depending upon solution identified, Board approval may be required
  • May add administrative time to the end of the study timeline
Generator Retirement Flowchart

SPP Notification

NTC Needed?
- Yes
  - Board Approval
  - Issue NTC per current tariff process
- No

Online in any Planning Models?
- Yes
- No

Operational Reliability Concerns?
- Yes
- No

Planning Analysis Violations?
- Yes
- No

Solution Determination

Resource Retires

Resource Undesignates
SPP Notification

• Retirement Notification submitted to SPP
  • Utilize existing 6 month notification period required in Integrated Marketplace Protocols

• Required Information
  • Resource(s) retiring
  • Bus Number & Unit ID
  • MMU ‘Going Forward Cost’ Template

• Requests will be evaluated on an ad hoc basis
  • Entities with multiple resources retiring may request a single assessment by submitting multiple resources
Screening

- Planning
  - Does resource have firm service?
  - Has resource been dispatched in latest ITP/MDWG models?

- Operations
  - Calculate total use of resource over previous 2 years?
    - Has resource provided BES with energy for more than 4 months?
  - Has resource been committed for reliability purposes?
  - Are there any concerns from SPP Operations staff?

- If analysis is warranted, completed application and deposit must be received by SPP prior to analysis starting
Scoping

• SPP staff will participate in a scoping call with affected party

• Identify any specific issues that should be considered in analysis
  • Model adjustments or corrections
  • Dispatch changes, specifically MDWG
  • Critical Contingencies
  • Study areas
Model Updates

• Staff will update the ITP and MDWG Models with appropriate changes using standard SPP processes

• Base case set will be the latest approved ITP/MDWG series

• Change cases will consider the application of the retiring resource and possible addition of:
  - Known model adjustments or corrections
  - NTC additions or withdrawals
  - Incremental AQ load or transmission service requests as appropriate
Analysis

• Steady State Powerflow
  • Contingency analysis consistent with the ITP Manual
  • Utilize SPP Criteria and appropriate Local Planning Criteria to identify violations ‘new’ to the change case

• Transient Stability
  • Utilize Fast Fault Scan from V&R Energy to identify any new concerning contingencies due to a retirement
  • If warranted based upon results, comprehensive time domain analysis on concerning contingencies performed
  • SPP Disturbance Performance Requirements used to verify BES stability
Solution Development

• SPP will work with stakeholders to develop a regional solution

• Solutions include:
  • Op Guides
  • Reactive Devices
  • New/Rebuilt/Reconductor lines
  • Terminal Equipment
  • Others
Short Circuit Assessment

• Short Circuit current generally decreases when resources are removed from the system, therefore an assessment will not be necessary for every study

• Short circuit current will be calculated on the change case if any NTCs affecting system impedance are added

• Results will be provided to transmission owners for confirmation of any breakers incapable of interrupting current for potential NTC issuance
Reporting

- SPP will develop a report outlining the analysis performed and the results of analysis including project recommendation
- SPP Board of Directors endorsement or approval needed if a Network Upgrade is identified
- Follow Transmission Owner Selection Process
Option to Withdraw Request & Undesignation

• Generator Owner may elect to withdraw retirement request at any time

• Once the process has been completed, the resource has 6 months to begin the process of undesignation.
Next Steps

- Continue to review business practice language and process with interested working groups
  - ORWG, MWG, TWG, BPWG, MDWG
  - Request business practice endorsement

- Develop appropriate tariff language before submitting official revision request
Organizational Roster

The following members and staff represent the Model Development Working Group (MDWG):

<table>
<thead>
<tr>
<th>MDWG Member</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nate Morris</td>
<td>Empire District Electric Company</td>
</tr>
<tr>
<td>Derek Brown</td>
<td>Evergy Companies</td>
</tr>
<tr>
<td>Andrew Berg</td>
<td>Missouri River Energy Services</td>
</tr>
<tr>
<td>Dustin Betz</td>
<td>Nebraska Public Power District</td>
</tr>
<tr>
<td>John Boshears</td>
<td>City Utilities of Springfield</td>
</tr>
<tr>
<td>Jerad Ethridge</td>
<td>Oklahoma Gas &amp; Electric</td>
</tr>
<tr>
<td>Joe Fultz</td>
<td>Grand River Dam Authority</td>
</tr>
<tr>
<td>Holli Krizek</td>
<td>Western Area Power Administration</td>
</tr>
<tr>
<td>Reené Miranda</td>
<td>Southwestern Public Service</td>
</tr>
<tr>
<td>Alex Mucha</td>
<td>Oklahoma Municipal Power Authority</td>
</tr>
<tr>
<td>Scott Rainbolt</td>
<td>American Electric Power</td>
</tr>
<tr>
<td>Scott Schichtl</td>
<td>Arkansas Electric Cooperative Company</td>
</tr>
<tr>
<td>Jason Shook</td>
<td>GDS Associates</td>
</tr>
<tr>
<td>Liam Stringham</td>
<td>Sunflower Electric Power Corporation</td>
</tr>
<tr>
<td>Sunny Raheem</td>
<td>Southwest Power Pool, Inc.</td>
</tr>
</tbody>
</table>
Activity Update

MDWG Update:

- Andrew Berg (Missouri River Energy Services) and Scott Rainbolt (American Electric Power) filled the two previous open voting membership seats.

- MDWG recently had a face-to-face meeting in January to discuss the following items:
  - 2019 MDWG power flow, short circuit, dynamic model set build updates
  - 2020 ITP project status update
  - 2020 ITP generation and load Review
  - TPL-001-5 standard review
  - PSSE v34.5 demonstration
  - Overview of revision request AQ RR 262
  - Engineering Data Submission Tool (EDST) update
  - Total number of model reduction effort update
  - MDWG Manual language review and approval
  - Review of 2019 SPP Working Group Survey

- MDWG discussed and approved the following updates in its manual:
  - Non-conforming and On-Peak/Off-Peak model MDWG manual
  - Development of SECTION 8: MOD-032-1 ATTACHMENT 1 to provide a summary of responsibilities for each applicable entity under MOD-032-1.

- Based on benchmarking results, MDWG voted to reduce the total number of detailed full eastern interconnection dynamic models as part of the 2019 MDWG dynamic model build project by ten models. As part of the coordination portion of the effort, the group did not identify negative impacts to modeling needs of Stakeholders and Staff. The benchmarking results identified stability responses to be comparable between the detailed full eastern interconnection vs equivalence (reduced) representation of eastern interconnection dynamic models.

- 2019 MDWG dynamic model set schedule and seasonal model set approved

- MDWG will be having an onboarding event for model builders in June/July of this year. Onboarding will provide model builders overview of SPP’s modeling practices and software tools.

- Upcoming Meetings:
  - 2/15/2019 9-11am (CST) – Approval conference call for 2019 MDWG power flow model set

Antitrust: SPP strictly prohibits use of participation in SPP activities as a forum for engaging in practices or communications that violate the antitrust laws. Please avoid discussion of topics or behavior that would result in anti-competitive behavior, including but not limited to, agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition.
• Model Status:
  
  o Power Flow:
    ▪ Latest Project Status: On-Schedule
  
  o Short Circuit:
    ▪ 2019 MDWG Short Circuit Pass 1 models posted on January 11th, 2019. Pass 2 is currently under way with approval scheduled for February 28th.
    ▪ Latest Project Status: On-Schedule
  
  o Dynamics:
    ▪ 2019 MDWG Dynamics Model set build started on January 14th, 2019. The initial data upload milestone started on January 16th, 2019 and will conclude on March 8th, 2019.
    ▪ Latest Project Status: On-Schedule

Other Items:
• The group is interested in total model reduction for the upcoming 2020 MDWG (2021ITP) model series including identifying common Year 1 definitions and minimum compliance and operation cases needs for MDWG models for Stakeholders and Staff.
• The group has an effort under way to identify MOD-032-1 data submitting responsibilities in SPP GIA milestones rather than during the start of the MDWG model builds.

Respectfully submitted,

Sunny Raheem
MDWG Secretary
Organizational Roster

The following members and staff represent the Dynamic Load Task Force (DLTF):

Derek Brown, Chairman – Evergy Companies (WERE and KCPL)
Brian Brownlow - Nebraska Public Power District (NPPD)
Reené Miranda – Xcel Energy (SPS)
Mathew Stoltz – Basin Electric Power Cooperatives (BEPC)
Liam Stringham – Sunflower Electric (SUNC)
Chris Colson – Western Area Power Administration (WAPA)
Scott Jordan, Secretary - Southwest Power Pool (SPP)

Dynamic Load Task Force Activity Update

- The DLTF continues to be involved with WECC, EPRI, MEPPI, and NERC LMTF to gain industry knowledge of the CMLD Load Model.
  - Attending and Presenting at January NERC LMTF

- The DLTF CMLD Activities:
  - The 2018 Series MDWG Dynamic Cases contain the SPP DLTF CMLD Industrial Composite load model representations as developed by the DLTF. SPP Staff, the MDWG Members and Modeling contacts worked together to gather, compile, and verify the application of the Industrial CMLD load models. All loads contained in the cases that were greater than 10MWs and non-scalable have had a CMLD load model applied to them to help assess the effects of induction motors loads during the TPL-001-4 Stability Assessment.
  - Provided NERC LMTF feedback in November 2018 of issues experienced during TPL-001-4 Stability Assessment. Other Industry Participants in the Eastern Interconnect had seen similar issues. Working towards better and more robust testing.
  - The DLTF has begun to develop the remaining set of CMLD models to cover Residential and Commercial loads with EPRI. The DLTF will develop dyre file models, benchmark them, and present results and recommendations on their use to the TWG and MDWG. Target completion is the mid 2019.

- DLTF “SPP Disturbance Performance Requirements” Activities:
  - The DLTF has submitted a response to the VIS TWG action item regarding the review of the damping criteria. There will be further activities in support of the response to the VIS TWG action item due to the complexity of the situation. The DLTF will be looking for synergies between SPP Staff and Members to develop the technical verbiage around this issue along with tools to assess dynamic simulation results.

Respectfully submitted,

Derek Brown, DLTF Chairman
Scott Jordan, DLTF Secretary
TPL TASK FORCE REPORT

Report to the Transmission Working Group

February 05, 2019

Organizational Roster

The following members and staff represent the TPL Task Force:

Chris Colson, Chairperson (WAPA) | Brian Brownlow (NPPD) | Marcus Moor (Evergy, KCPL)
Reené Miranda (Xcel Energy, SPS) | Liam Stringham (SUNC) | Steve Hardebeck (OG&E)
Gimod Olapurayil (ITC Great Plains) | Qiushi Wang (AEP) | Scott Jordan, Secretary (SPP)

TPL Task Force Activity Update

- TPL-007-1/2 past and immediately upcoming milestones.
  - R1 (Roles and Responsibilities) – July 1, 2017.
  - R2 (Models) – July 1, 2018.
    - “2017 TPLTF GIC Data Collection Template” - Complete (released June 2017).
    - “TPL-007-1 Data Collection Template User Guide” - Complete (released June 2017).
    - SPP member data collection - Complete (March 2018).
    - GIC model building - Complete (June 2018).
    - Supplementary data collection – Perpetually on-going as MDWG process.
    - Preliminary study findings – Transformer findings discussed with affected entities.
    - Final study findings – Complete (December 21, 2018)
  - R6 (Thermal Assessment) – NLT January 1, 2021 (based upon TPL-007-1 implementation)
    - Thermal impact upon applicable transformers identified in the GIC flow analysis.
  - TPL-007-2
    - TPLTF to assess the impact to the SPP PC footprint and stakeholders.

- On-going activity highlights:
  - SPP staff, with the support of the TPLTF, have completed the GIC flow analysis. The GIC flow information has been distributed to Transmission Owners and Generator Owners for use in transformer thermal impact assessments, as well as for use as evidence of compliance for Requirement R5 of TPL-007-1.
  - TOs and GOs in the SPP PC footprint will now conduct activities specified in Requirement R6, assessing the thermal impact upon applicable transformers for Benchmark and Supplemental GMD event conditions identified in the GIC flow analysis. SPP staff and the TPLTF will provide support to stakeholders throughout the thermal assessment process.
  - Throughout 2019, SPP staff and the TPLTF will continue efforts to refine the GMD System Models towards improved performance of GIC assessments. Increased awareness and attention by Model Data Owners/Submitters to GMD-related modeling data is critical to the success of these efforts.
FERC has approved TPL-007-2 (Order No. 851 on November 15, 2018) and directed that TPL-007-3 be drafted by NERC to:

- Require CAPs for failures to meet System performance requirements given the supplemental GMD event (paragraph 39).
- Eliminate the PC/TP control of CAP timeline extensions and require NERC and/or Regional Entity approval of CAP extensions on a case-by-case basis (paragraph 54).

TPL-007-2 already “raises the bar” with the Supplemental GMD event; the TPL-007-3 changes will be even more challenging and likely impactful to SPP members.

The following table shows the impact upon TPL-007-1 enforcement dates given the approval and resulting Effective Date of TPL-007-2 of 01 July 2019. It is noted that all TPL-007-1 Compliance Dates are enforceable until TPL-007-1 is retired upon the Effective Date of TPL-007-2.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>TPL-007-1 Implementation Plan Effective Dates</th>
<th>Compliance Date (TPL-007-2)</th>
<th>Updated Compliance Date calendar (and practical effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>7/1/2017</td>
<td>Effective Date of TPL-007-2</td>
<td>7/1/2017 (no change, occurred before Retirement Date of TPL-007-1)</td>
</tr>
<tr>
<td>R2</td>
<td>7/1/2018</td>
<td>Effective Date of TPL-007-2</td>
<td>7/1/2018 (no change, occurred before Retirement Date of TPL-007-1)</td>
</tr>
<tr>
<td>R3</td>
<td>1/1/2022 42 months after Effective Date of TPL-007-2</td>
<td>1/1/2023 (Compliance Date delayed one year from TPL-007-1)</td>
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</tr>
<tr>
<td>R4</td>
<td>1/1/2022 42 months after Effective Date of TPL-007-2</td>
<td>1/1/2023 (Compliance Date delayed one year from TPL-007-1)</td>
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</tr>
<tr>
<td>R5</td>
<td>1/1/2019 6 months after Effective Date of TPL-007-2</td>
<td>1/1/2019 (no change, occurred before Retirement Date of TPL-007-1)</td>
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</tr>
<tr>
<td>R6</td>
<td>1/1/2021 30 months after Effective Date of TPL-007-2</td>
<td>1/1/2022 (Compliance Date delayed one year from TPL-007-1)</td>
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<tr>
<td>R7</td>
<td>1/1/2022 54 months after Effective Date of TPL-007-2</td>
<td>1/1/2024 (Compliance Date delayed two years from TPL-007-1)</td>
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<tr>
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<td>n/a 42 months after Effective Date of TPL-007-2</td>
<td>1/1/2023</td>
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</tr>
<tr>
<td>R9</td>
<td>n/a 6 months after Effective Date of TPL-007-2</td>
<td>1/1/2020</td>
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<td>R10</td>
<td>n/a 30 months after Effective Date of TPL-007-2</td>
<td>1/1/2022</td>
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<tr>
<td>R11</td>
<td>n/a 24 months after Effective Date of TPL-007-2</td>
<td>7/1/2021</td>
<td></td>
</tr>
<tr>
<td>R12</td>
<td>n/a 24 months after Effective Date of TPL-007-2</td>
<td>7/1/2021</td>
<td></td>
</tr>
</tbody>
</table>

Respectfully submitted,

Chris Colson, TPLTF Chairperson
Scott Jordan, TPLTF Secretary
HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
SPP Planning Model
Year One Alignment

Michael Odom
Engineering Modeling
Background

- Currently MDWG/MMWG models and ITP/TPL models have different Year One definitions.
- Aligning Year One lessens confusion for which models are needed and are being built.
- NERC defines Year One as: The first twelve month period that a Planning Coordinator or a Transmission Planner is responsible for assessing. For an assessment started in a given calendar year, Year One includes the forecasted peak Load period for one of the following two calendar years.
  - For example, if a Planning Assessment was started in 2011, then Year One includes the forecasted peak Load period for either 2012 or 2013.
- The SPP TPLTF recommended to the MDWG that Year One be defined as current study year plus one year.
Powerflow Model Build Timeframes

- **July 2018**: 2019 MDWG
  - **Year 1 = 2020**, based on model build completion

- **July 2018**: 2020 ITP
  - **Year 1 = 2021**, based on study year completion

- **July 2019**: 2019 MMWG
  - **Year 1 = 2020**, based on model build completion
Year One Alignment

• ITP/TPL Year 1 = Study year completion + 1
• MDWG/MMWG Year 1 = Model Build completion + 1

• Year One current example:
  • 2020 ITP/TPL Study completes in 2020, Year 1 = 2021
  • 2019 MMWG Model build completes in 2019, Year 1 = 2020

• Change the ITP/TPL Year One definition to be based on when the Model build completes

• Year One aligned example:
  • 2020 ITP/TPL Model build completes in 2019, Year 1 = 2020
  • 2019 MMWG Model build completes in 2019, Year 1 = 2020
Impacts

• The 2021 ITP/TPL would be performed on the same years/seasons as the 2020 ITP/TPL, but with updated models

• 2021 ITP/TPL Powerflow model build completes 2020, so Year One = 2021

<table>
<thead>
<tr>
<th>2021 ITP Year 2</th>
<th>2021 ITP Year 5</th>
<th>2021 ITP Year 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022 – Light Load</td>
<td>2025 – Light Load</td>
<td>2030 – Light Load</td>
</tr>
<tr>
<td>2022 – Summer</td>
<td>2025 – Summer</td>
<td>2030 – Summer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2021 TPL Year 2</th>
<th>2021 TPL Year 5</th>
<th>2021 TPL Year 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022 – Light Load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022 – Summer</td>
<td>2025 – Summer</td>
<td>2030 – Summer</td>
</tr>
</tbody>
</table>
Next Steps

• Update processes, governing document, scopes, and schedules
  • Revision Request(s) could be needed for ITP Manual update

• Implement for the 2020 MDWG/MMWG and 2021 ITP/TPL assessments

• Year One Definition:
  • Year One is the model build completion year + 1

• Can update the MDWG Procedure Manual and reference from the ITP Manual (if necessary)
Helping our members work together to keep the lights on... today and in the future.
TPL 001-5 update
Agenda

• Presenters
  • Standard Drafting Team
    • Chair, Jonathan Hayes, SPP

• Project 2015-10 Status

• FERC Order No. 754 and Order No. 786

• Implementation Plan

• Next Steps

• Questions and Answers
Project 2015-10 (TPL 001-5) status

• Project 2015-10 - TPL-001-5 – Single Points of Failure (SPF)

• TPL-001-5 addresses:
  • FERC Order 754 (SPF)
  • FERC Order 786 (Maintenance Outages in the Near-Term Transmission Planning Horizon; stability analysis for loss of long lead time equipment)

• Final Ballot Concluded October 22, 2018

• NERC Board approved November 7th 2018

• Filed at FERC December 14th 2018
FERC Order No. 754

- Changes to TPL-001-5 (754):
  - "Revision to Table 1 – Steady State and Stability Performance Planning Events"
  - Modified Category P5 event to include SPF
  - Footnote 13 – describes the non-redundant Protection System components considered for Category P5
Footnote 13. For purposes of this standard, non-redundant components of a Protection System to consider are as follows:

a. A single protective relay which responds to electrical quantities, without an alternative (which may or may not respond to electrical quantities) that provides comparable Normal Clearing times;

b. A single communications system associated with protective functions, necessary for correct operation of a communication-aided protection scheme required for Normal Clearing (except a single communication system that is both which is not monitored or not-and reported at a Control Center shall not be considered non-redundant);

c. A single station dc supply associated with protective functions required for Normal Clearing, and that (except a single station dc supply that is not both monitored or not and reported at a Control Center for both low voltage and open circuit shall not be considered non-redundant);

d. A single control circuitry (including auxiliary relays and lockout relays) associated with protective functions, from the dc supply through and including the trip coil(s) of the circuit breakers or other interrupting devices required for Normal Clearing (except a single trip coil that is both monitored and reported at a Control Center shall not be considered non-redundant).
FERC Order No. 786

- Moved known outages selection to Requirement R2
- Change to Requirement R2 is not a prescriptive, continent-wide procedure
- Entity must have a process and procedure that conform with a technical rationale which must be made available
  - Consistent with other requirements in TPL-001-4, such as Voltage Criteria, Low Voltage Ride Through, etc.
- Removed the six-month time horizon for significant outages occurring within the period of the Near-Term Assessment studies (Year 1 or 2 and Year 5)
- Proposed revisions to Requirement R2 also include stability studies for long lead equipment without a spare equipment strategy
Implementation Plan

TPL-001-5 becomes effective.
- Changes to R1, R2, R4, and Table 1 enforceable.
- Requirement R2, Part 2.7 not enforceable for non-redundant components of a Protection System identified in Table 1 Category P5, footnote 13, items b, c, and d.
- R3, R5, R6, R7, R8 unchanged.
- The first annual Planning Assessment shall be completed in accordance with TPL-001-5, but without CAPs for revised P5, by this date.

CAPs required for all failures to meet Table 1 performance requirements, but the planned System is not required to meet the performance requirements in Table 1 for category P5 events only.
- All Planning Assessment(s) completed after this date shall include CAPs for failures to meet Table 1 performance requirements for the revised P5, when identified.

TPL-001-5 fully enforceable.
Next Steps

• PCs and TPs will have some work to do prior to the effective date of TPL-001-5

• SPP and its TPs jointly developed the TPL-001-4 Guidance Document under the TPLTF.

• TPLTF has since changed its charter to focus on the ongoing implementation of TPL-007

• SPP is requesting assistance from the TWG to form a “Technical Focus Group” of TPs:
  • Develop technical rationale for outage coordination
    • SPP staff will develop an initial proposal
  • Work with Appropriate SPP staff and Working Groups to implement the rationale
  • The technical rationale, resulting coordination, and implementation need to be completed, so that it can be included in the models for 2021 TPL assessment.
HELPING OUR MEMBERS WORK TOGETHER TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
2019 Flowgate Assessment

Compliance and Advanced Studies
MOD-030-3 Flowgate Assessment Scope Approval

- Assessment will use the 2019 ITP models
- Staff recommendation for TWG to approve scope
2019 Flowgate Assessment
Scope

January 29, 2019

SPP Engineering and Operations
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## Revision History

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<tr>
<th>Date or Version Number</th>
<th>Author</th>
<th>Change Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/29/2019</td>
<td>SPP Staff</td>
<td>Initial Draft</td>
</tr>
</tbody>
</table>
Overview

The purpose of this document is to outline the scope and schedule of work for performing the annual flowgate assessment in accordance with SPP Planning Criteria 6.4.2 as well as to assist Transmission Operators (TOPs) to comply with requirements set forth in the MOD-030-3 NERC standard, requirement R2. This document will be reviewed and approved by the Transmission Working Group (TWG). SPP, as the Transmission Service Provider (TSP), will coordinate with TOPs to exchange data in order to assess the adequacy of the existing list of flowgates and thereby recommend necessary additions, modifications and deletions. Although transfer values will be involved in this process, this process is not intended to produce any viable ATC values for use commercially or otherwise. Rather, ATC values are determined as described in SPP Planning Criteria section 6.5.

The annual flowgate assessment process is detailed in SPP Planning Criteria 6.4. The process will commence with updates to the data input files. Transmission Operators will provide updates to their participation points for both imports and exports. Monitor and contingency files will also be updated. Transfer capabilities will be calculated using the PSS®MUST tool (see Data Inputs and Assumptions for more information).

An initial AC First Contingency Incremental Transfer Capability (FCITC) analysis will be performed to determine the top three limits per transfer. After the results are reviewed and filtered down, potential flowgate candidates will be determined. If a potential flowgate candidate is identified as a top three constraint, the potential flowgate will be considered for addition. Conversely, if an existing flowgate is not identified as one of the top three limiting constraints, it will be considered for removal.

Any flowgate removal candidates that have had a Congestion Management Event (CME) or Transmission Loading Relief (TLR) in the last 12 months will not be removed. In addition, if a member or SPP staff requests to keep the flowgate, the candidate will not be removed. Conversely, any identified limiting element/contingency that is not due to temporary conditions will be recommended for addition by SPP Operation Planning if a CME/TLR occurred in the last 12 months. All of the FCITC results will be posted on a secure site (GlobalScape) for Transmission Operators to review.

Remedial Action Schemes (RAS) and Transmission Operating Guides (TOGs) will be taken into consideration during this review process.

Furthermore, any potential flowgates that are determined to operate within the limits of existing flowgates will be removed from the list, and only the top limit in a series configuration will be kept as a potential flowgate.

After reviewing all the feedback from TOs, the updated list of flowgate additions, modifications, or deletions will be presented to the Transmission Working Group (TWG) for approval. Transmission Reliability Margin (TRM) values will then be calculated on the updated list of SPP flowgates. The TRM calculation process will be completed prior to updating the SPP master flowgate list.
Data Inputs and Assumptions

Models:
The power flow models to be used in the assessment will be based on the models developed annually by the SPP Model Development Working Group (MDWG). The MDWG model building process is performed in accordance with the applicable NERC Modeling, Data, and Analysis (MOD) Standards as described in the Model Development Procedure Manual and ITP Manual. The study will be performed using the final 2019 base reliability model (BR models) series approved by the TWG:
- 2019 Summer
- 2019 Fall
- 2019 Winter
- 2020 Spring

Software:
The study will be performed using PSS MUST under the following assumptions:
- 3% OTDF cutoff
- Base case using rate A
- Contingency checking using rate B

Monitored Facilities:
The following Facilities will be monitored during system intact and contingency analysis:
- All BES Facilities in the SPP Planning Coordinator (PC) footprint
- Additional facilities provided by the Transmission Operators
- All tie-lines between the SPP PC footprint and its first tier areas

The SPP TSP footprint will include the modeling areas listed in the table below:

<table>
<thead>
<tr>
<th>Area Number</th>
<th>Entity Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>515</td>
<td>Southwestern Power Administration (SWPA)</td>
</tr>
<tr>
<td>520</td>
<td>American Electric Power (AEPW/CSWS)</td>
</tr>
<tr>
<td>523</td>
<td>Grand River Dam Authority (GRDA)</td>
</tr>
<tr>
<td>524</td>
<td>Oklahoma Gas &amp; Electric Company (OKGE)</td>
</tr>
<tr>
<td>525</td>
<td>Western Farmers Electric Cooperative (WFEC)</td>
</tr>
<tr>
<td>526</td>
<td>Southwestern Public Service Company (SPS)</td>
</tr>
<tr>
<td>527</td>
<td>Oklahoma Municipal Power Authority (OMPA)</td>
</tr>
<tr>
<td>531</td>
<td>Midwest Energy, Inc. (MIDW)</td>
</tr>
<tr>
<td>534</td>
<td>Sunflower Electric Power Corporation (SECI)</td>
</tr>
<tr>
<td>536</td>
<td>Westar Energy, Inc. (WR)</td>
</tr>
<tr>
<td>541</td>
<td>Kansas City Power &amp; Light Company (KCPL)</td>
</tr>
</tbody>
</table>
Contingency Analysis:

All single contingencies (both transmission and generation) as well as multi-terminal contingencies will be considered in the study. The contingencies include:

- All SPP and first tier Facilities that are 100 kV and above
- All tie-lines between SPP and its first tier areas
- Additional contingencies provided by Transmission Operators

All invalid single contingencies will be excluded from the contingency analysis.

Transfer Directions/Transfer Level:

MUST determines the export level for each POR subsystem as the sum of the quantity (PMAX – PGEN) and determines the import level for each POD subsystem as (PGEN – PMIN). The maximum export and import levels will then be determined by adding 25% or higher to the quantities (PMAX – PGEN) and (PGEN – PMIN) as necessary. The lesser of the maximum export level and maximum import level for each path at 125% or higher will be used as the transfer level. The diagram below shows an example of how transfer levels are determined.
Parameters Supplied by the Transmission Operators:

Transmission Operators will be responsible for providing the following parameters to SPP staff:

- Participation points of MW decrease/increase in the TO area subsystem file. A Transmission Operator can specify generators to be excluded from use as participation points, such as generators that serve base load. The generation reduction should be based on economics, operating constraints or other criteria as specified by the Transmission Operator. The participation points used for import will be consistent for all transfer directions.
- A contingency list including all critical single contingencies (both transmission and generation) as well as multi-terminal facilities.
- All contingencies suspected of causing voltage limitations and the transfers for which they should be studied.
- Any additional BES Facilities below 100 kV that have followed the BES inclusion process to be monitored.
- High and low voltage limits for system and/or individual buses.
- All Contractual Requirements.
- Any known system conditions that would cause a reduction in transfer limits.
- Any additional information that SPP and the TOP might deem appropriate.

The following parameters will be used in the event that a Transmission Operator does not submit the area specific parameters (SPP Planning Criteria 6.4.2.3):

- For exports, the participation points will include all on-line generating facilities in the model with unused generating capacity available. The export participation factors will be the amount of unused generating capacity at each point divided by the sum of the unused generating capacity at all export participation points. (i.e., PMAX-PGEN).
• For imports, all on-line generators will be decreased prorated by their capable generation (i.e., PGEN-PMIN).
• Transfer directions will be a set of all commercial paths.
• Exports from Independent Power Producers (IPPs) will be considered in the determination of Flowgates.
• The transfer test levels are specified at the time of the ATC calculations, and are determined by SPP staff.
• All Facilities 100 kV and above will be included in the contingency list and the monitored facility list. In addition, the largest unit within the area will be included in the contingency list.
• Voltage limits will be as specified in SPP Planning Criteria section 5.
Source/Sink Subsystems

All Market Operating Areas in the SPP Balancing Authority and 1st tier Balancing Authorities are defined as a POR and POD. Each POR/POD combination is used in determination of flowgates as required in MOD-030-3 R2.1.2. The POR/POD list representative of these Balancing Authorities can be found on the SPP OASIS site under the ATC Info link.

In addition to POR/POD systems, sources and sinks will also be used in determination of flowgates. These sources and sinks are defined by the document, Seams & AFC Support: Available Transfer Capability Implementation Document (ATCID). Sources and sinks are mapped to AFC zones in accordance with the ATCID and are provided by SPP Operations. The table below shows some POR/POD subsystems that will be used in the assessment:

<table>
<thead>
<tr>
<th>Point Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AECI</td>
<td>Associated Electric Cooperative, Inc.</td>
</tr>
<tr>
<td>ALTW</td>
<td>Alliant Energy West</td>
</tr>
<tr>
<td>AMMO</td>
<td>Ameren Missouri</td>
</tr>
<tr>
<td>BLKW</td>
<td>Blackwater DC Tie</td>
</tr>
<tr>
<td>CBPC</td>
<td>Corn Belt Power Cooperative</td>
</tr>
<tr>
<td>CLEC</td>
<td>Central Louisiana Electric Company</td>
</tr>
<tr>
<td>CSWS</td>
<td>Central and Southwest Services (AEP)</td>
</tr>
<tr>
<td>DPC</td>
<td>Dairyland Power Cooperative</td>
</tr>
<tr>
<td>EDDY</td>
<td>Eddy DC Tie</td>
</tr>
<tr>
<td>EDE</td>
<td>Empire District Electric</td>
</tr>
<tr>
<td>EES</td>
<td>Entergy Electric System</td>
</tr>
<tr>
<td>ERCOTE</td>
<td>Welsh/ERCOT East DC Tie</td>
</tr>
<tr>
<td>ERCOTN</td>
<td>Oklaunion/ERCOT North DC Tie</td>
</tr>
<tr>
<td>GRDA</td>
<td>Grand River Dam Authority</td>
</tr>
<tr>
<td>GRE</td>
<td>Great River Energy</td>
</tr>
<tr>
<td>INDN</td>
<td>City of Independence, MO</td>
</tr>
<tr>
<td>KACY</td>
<td>Kansas City, MO Board of Public Utilities</td>
</tr>
<tr>
<td>KCPL</td>
<td>Kansas City Power and Light</td>
</tr>
<tr>
<td>LAMAR</td>
<td>Lamar DC Tie</td>
</tr>
<tr>
<td>LES</td>
<td>Lincoln Electric System</td>
</tr>
<tr>
<td>MCDC</td>
<td>Miles City DC Tie</td>
</tr>
<tr>
<td>MDU</td>
<td>Montana-Dakota Utilities Co.</td>
</tr>
<tr>
<td>MEC</td>
<td>Mid-American Energy Company</td>
</tr>
</tbody>
</table>

1 This list is not an all-inclusive list of sources and sinks. Wind farms and IPPs will be added as sources.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPPD</td>
<td>Nebraska Public Power District</td>
</tr>
<tr>
<td>OKGE</td>
<td>Oklahoma Gas and Electric</td>
</tr>
<tr>
<td>OPPD</td>
<td>Omaha Public Power District</td>
</tr>
<tr>
<td>OTP</td>
<td>Otter Tail Power Company, Minnkota Power Coop.</td>
</tr>
<tr>
<td>RCDC</td>
<td>Rapid City DC Tie</td>
</tr>
<tr>
<td>SCSE</td>
<td>Sydney DC Tie</td>
</tr>
<tr>
<td>SECI</td>
<td>Sunflower Electric Cooperative, Inc.</td>
</tr>
<tr>
<td>SGDC</td>
<td>Stegall DC Tie</td>
</tr>
<tr>
<td>SPA</td>
<td>Southwestern Power Administration</td>
</tr>
<tr>
<td>SPC</td>
<td>Saskatchewan Power Co.</td>
</tr>
<tr>
<td>SPRM</td>
<td>City Utilities of Springfield, MO</td>
</tr>
<tr>
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An AC FCITC analysis will determine the top three limits per transfer. SPP Planning staff will provide preliminary list of potential flowgate candidates for addition and removal to SPP Operations (RC) and TOPs/TWG members for review. These list will be updated based on feedback from Operations and/or TOP/TWG.

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## Changes in Process and Assumptions

In order to protect against changes in process and assumptions that could present a significant risk to the completion of the study, any such changes must be vetted. If TWG votes on any process steps or assumptions to be used in the study, those assumptions will be used for the 2019 flowgate assessment. Changes to process or assumptions recommended by stakeholders must be approved by the TWG. This process will allow for changes if they are deemed necessary and critical to the study, while also ensuring that changes, and the risks and benefits of those changes, will be fully vetted and discussed.

---

\(^2\) This schedule is a draft and hence subject to change
Throughout the flowgate assessment process, SPP will generate several raw data files that will be used as intermediate steps to the results mentioned above. SPP will post these materials for member reference on GlobalScape (https://sppdocushare.spp.org, posted underneath Compliance and Advanced Studies (CEII, RSD) → CAS (Global Access) → MOD-030 → 2019).

[2019 Flowgate Assessment Preliminary Data.xls] - contains the following tabs:

- **1-All Results**: lists the top limits for each transfer direction for all cases
- **2-Top 3**: list the top 3 limits per path per season
- **3-No Limits**: transfers where no violations were encountered
- **4-High FCITC**: limits removed that had FCITC limit greater than transfer level for that path
- **5-Low TDF**: limits removed whose AC TDF factor was below the 3% cutoff
- **6-Non SPP**: transfers between non SPP BAs
- **7-Not Converged**: transfers where solution did not converge
- **8-Series Elements**: series monitored elements in transfer path removed. Kept most limiting element per series path. Also, removed redundant transformer results.
- **9-Fall, Spring, Summer, Winter**: raw MUST results per season
- **10-Potential Flowgate Candidates**: identified potential future flowgates
- **11-Potential Flowgate Removal**: identified existing flowgates for removal
- **12-Duplicates**: removed duplicate limits from remaining results to get a unique set of limits
Some of the terms pertinent to this study are defined below:

1) **Contractual Limit:** Contractual arrangements between Transmission Providers that define transfer capability between the two.

2) **Critical Contingency:** Any generation or transmission facility that, when outaged, is deemed to have an adverse impact on the reliability of the transmission network.

3) **Emergency Voltage Limits:** The operating voltage range on the interconnected system that is acceptable for the time sufficient for system adjustments to be made following a Critical Contingency.

4) **Participation Factor:** The percentage of the total power adjustment that a participation point will contribute when simulating a transfer.

5) **Participation Points:** Specified generators that will have their power output adjusted to simulate a transfer.

6) **Outage Transfer Distribution Factor (OTDF):** The percentage of a power transfer that flows through the monitored facility for a particular transfer when the contingency facility is switched out of service.

7) **Power Transfer Distribution Factor (PTDF):** The percentage of power transfer flowing through a facility or a set of facilities for a particular transfer when there are no contingencies.

8) **Transfer Distribution Factor (TDF):** A general term, which may refer to either PTDF or OTDF – The TDF represents the relationship between the participation adjustment of two areas and the Flowgates within the system.

9) **Transfer Test Level:** The amount of power that will be transferred to determine facility TDFs for use in DC linear analysis.

10) **Transmission Reliability Margin (TRM):** The amount of Flowgate capacity necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions.
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## Revision History

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<tr>
<th>Date or Version Number</th>
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<tbody>
<tr>
<td>1/29/2019</td>
<td>SPP Staff</td>
<td>Initial Draft</td>
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Overview

The purpose of this document is to outline the scope and schedule of work for performing the annual flowgate assessment in accordance with SPP Planning Criteria 6.4.2 as well as to assist Transmission Operators (TOPs) to comply with requirements set forth in the MOD-030-3 NERC standard, requirement R2. This document will be reviewed and approved by the Transmission Working Group (TWG). SPP, as the Transmission Service Provider (TSP), will coordinate with TOPs to exchange data in order to assess the adequacy of the existing list of flowgates and thereby recommend necessary additions, modifications and deletions. Although transfer values will be involved in this process, this process is not intended to produce any viable ATC values for use commercially or otherwise. Rather, ATC values are determined as described in SPP Planning Criteria section 6.5.

The annual flowgate assessment process is detailed in SPP Planning Criteria 6.4. The process will commence with updates to the data input files. Transmission Operators will provide updates to their participation points for both imports and exports. Monitor and contingency files will also be updated. Transfer capabilities will be calculated using the PSS®MUST tool (see Data Inputs and Assumptions for more information).

An initial AC First Contingency Incremental Transfer Capability (FCITC) analysis will be performed to determine the top three limits per transfer. After the results are reviewed and filtered down, potential flowgate candidates will be determined. If a potential flowgate candidate is identified as a top three constraint, the potential flowgate will be considered for addition. Conversely, if an existing flowgate is not identified as one of the top three limiting constraints, it will be considered for removal.

Any flowgate removal candidates that have had a Congestion Management Event (CME) or Transmission Loading Relief (TLR) in the last 12 months will not be removed. In addition, if a member or SPP staff requests to keep the flowgate, the candidate will not be removed. Conversely, any identified limiting element/contingency that is not due to temporary conditions will be recommended for addition by SPP Operation Planning if a CME/TLR occurred in the last 12 months. All of the FCITC results will be posted on a secure site (GlobalScape) for Transmission Operators to review.

Remedial Action Schemes (RAS) and Transmission Operating Guides (TOGs) will be taken into consideration during this review process.

Furthermore, any potential flowgates that are determined to operate within the limits of existing flowgates will be removed from the list, and only the top limit in a series configuration will be kept as a potential flowgate.

After reviewing all the feedback from TOs, the updated list of flowgate additions, modifications, or deletions will be presented to the Transmission Working Group (TWG) for approval. Transmission Reliability Margin (TRM) values will then be calculated on the updated list of SPP flowgates. The TRM calculation process will be completed prior to updating the SPP master flowgate list.
Data Inputs and Assumptions

Models:
The power flow models to be used in the assessment will be based on the models developed annually by the SPP Model Development Working Group (MDWG). The MDWG model building process is performed in accordance with the applicable NERC Modeling, Data, and Analysis (MOD) Standards as described in the Model Development Procedure Manual and ITP Manual. The study will be performed using the final 2019 base reliability model (BR models) series approved by the TWG:

- 2019 Summer
- 2019 Fall
- 2019 Winter
- 2020 Spring

Software:
The study will be performed using PSS MUST under the following assumptions:

- 3% OTDF cutoff
- Base case using rate A
- Contingency checking using rate B

Monitored Facilities:
The following Facilities will be monitored during system intact and contingency analysis:

- All BES Facilities in the SPP Planning Coordinator (PC) footprint
- Additional facilities provided by the Transmission Operators
- All tie-lines between the SPP PC footprint and its first tier areas

The SPP TSP footprint will include the modeling areas listed in the table below:

<table>
<thead>
<tr>
<th>Area Number</th>
<th>Entity Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>515</td>
<td>Southwestern Power Administration (SWPA)</td>
</tr>
<tr>
<td>520</td>
<td>American Electric Power (AEPW/CSWS)</td>
</tr>
<tr>
<td>523</td>
<td>Grand River Dam Authority (GRDA)</td>
</tr>
<tr>
<td>524</td>
<td>Oklahoma Gas &amp; Electric Company (OKGE)</td>
</tr>
<tr>
<td>525</td>
<td>Western Farmers Electric Cooperative (WFEC)</td>
</tr>
<tr>
<td>526</td>
<td>Southwestern Public Service Company (SPS)</td>
</tr>
<tr>
<td>527</td>
<td>Oklahoma Municipal Power Authority (OMPA)</td>
</tr>
<tr>
<td>531</td>
<td>Midwest Energy, Inc. (MIDW)</td>
</tr>
<tr>
<td>534</td>
<td>Sunflower Electric Power Corporation (SECI)</td>
</tr>
<tr>
<td>536</td>
<td>Westar Energy, Inc. (WR)</td>
</tr>
<tr>
<td>541</td>
<td>Kansas City Power &amp; Light Company (KCPL)</td>
</tr>
</tbody>
</table>
Contingency Analysis:

All single contingencies (both transmission and generation) as well as multi-terminal contingencies will be considered in the study. The contingencies include:

- All SPP and first tier Facilities that are 100 kV and above
- All tie-lines between SPP and its first tier areas
- Additional contingencies provided by Transmission Operators

All invalid single contingencies will be excluded from the contingency analysis.

Transfer Directions/Transfer Level:

MUST determines the export level for each POR subsystem as the sum of the quantity (PMAX – PGEN) and determines the import level for each POD subsystem as (PGEN – PMIN). The maximum export and import levels will then be determined by adding 25% or higher to the quantities (PMAX – PGEN) and (PGEN – PMIN) as necessary. The lesser of the maximum export level and maximum import level for each path at 125% or higher will be used as the transfer level. The diagram below shows an example of how transfer levels are determined.
Parameters Supplied by the Transmission Operators:

Transmission Operators will be responsible for providing the following parameters to SPP staff:

- Participation points of MW decrease/increase in the TO area subsystem file. A Transmission Operator can specify generators to be excluded from use as participation points, such as generators that serve base load. The generation reduction should be based on economics, operating constraints or other criteria as specified by the Transmission Operator. The participation points used for import will be consistent for all transfer directions.
- A contingency list including all critical single contingencies (both transmission and generation) as well as multi-terminal facilities.
- All contingencies suspected of causing voltage limitations and the transfers for which they should be studied.
- Any additional BES Facilities below 100 kV that have followed the BES inclusion process to be monitored.
- High and low voltage limits for system and/or individual buses.
- All Contractual Requirements.
- Any known system conditions that would cause a reduction in transfer limits.
- Any additional information that SPP and the TOP might deem appropriate.

The following parameters will be used in the event that a Transmission Operator does not submit the area specific parameters (SPP Planning Criteria 6.4.2.3):

- For exports, the participation points will include all on-line generating facilities in the model with unused generating capacity available. The export participation factors will be the amount of unused generating capacity at each point divided by the sum of the unused generating capacity at all export participation points. (i.e., PMAX-PGEN).
For imports, all on-line generators will be decreased prorated by their capable generation (i.e., PGEN-PMIN).

Transfer directions will be a set of all commercial paths.

Exports from Independent Power Producers (IPPs) will be considered in the determination of Flowgates.

The transfer test levels are specified at the time of the ATC calculations, and are determined by SPP staff.

All Facilities 100 kV and above will be included in the contingency list and the monitored facility list. In addition, the largest unit within the area will be included in the contingency list.

Voltage limits will be as specified in SPP Planning Criteria section 5.
Source/Sink Subsystems

All Market Operating Areas in the SPP Balancing Authority and 1st tier Balancing Authorities are defined as a POR and POD. Each POR/POD combination is used in determination of flowgates as required in MOD-030-3 R2.1.2. The POR/POD list representative of these Balancing Authorities can be found on the SPP OASIS site under the ATC Info link.

In addition to POR/POD systems, sources and sinks will also be used in determination of flowgates. These sources and sinks are defined by the document, *Seams & AFC Support: Available Transfer Capability Implementation Document (ATCID)*. Sources and sinks are mapped to AFC zones in accordance with the ATCID and are provided by SPP Operations. The table below shows some POR/POD subsystems that will be used in the assessment:

<table>
<thead>
<tr>
<th>Point Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>AECI</td>
<td>Associated Electric Cooperative, Inc.</td>
</tr>
<tr>
<td>ALTW</td>
<td>Alliant Energy West</td>
</tr>
<tr>
<td>AMMO</td>
<td>Ameren Missouri</td>
</tr>
<tr>
<td>BLKW</td>
<td>Blackwater DC Tie</td>
</tr>
<tr>
<td>CBPC</td>
<td>Corn Belt Power Cooperative</td>
</tr>
<tr>
<td>CLEC</td>
<td>Central Louisiana Electric Company</td>
</tr>
<tr>
<td>CSWS</td>
<td>Central and Southwest Services (AEP)</td>
</tr>
<tr>
<td>DPC</td>
<td>Dairyland Power Cooperative</td>
</tr>
<tr>
<td>EDDY</td>
<td>Eddy DC Tie</td>
</tr>
<tr>
<td>EDE</td>
<td>Empire District Electric</td>
</tr>
<tr>
<td>EES</td>
<td>Entergy Electric System</td>
</tr>
<tr>
<td>ERCOTE</td>
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</tr>
<tr>
<td>ERCOTN</td>
<td>Oklaunion/ERCOT North DC Tie</td>
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<td>Grand River Dam Authority</td>
</tr>
<tr>
<td>GRE</td>
<td>Great River Energy</td>
</tr>
<tr>
<td>INDN</td>
<td>City of Independence, MO</td>
</tr>
<tr>
<td>KACY</td>
<td>Kansas City, MO Board of Public Utilities</td>
</tr>
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<td>LAMAR</td>
<td>Lamar DC Tie</td>
</tr>
<tr>
<td>LES</td>
<td>Lincoln Electric System</td>
</tr>
<tr>
<td>MCDC</td>
<td>Miles City DC Tie</td>
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<tr>
<td>MDU</td>
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</tr>
<tr>
<td>OPPD</td>
<td>Omaha Public Power District</td>
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<tr>
<td>OTP</td>
<td>Otter Tail Power Company, Minnkota Power Coop.</td>
</tr>
<tr>
<td>RCDC</td>
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<td>Saskatchewan Power Co.</td>
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</table>

### Changes in Process and Assumptions

In order to protect against changes in process and assumptions that could present a significant risk to the completion of the study, any such changes must be vetted. If TWG votes on any process steps or assumptions to be used in the study, those assumptions will be used for the 2019 flowgate assessment. Changes to process or assumptions recommended by stakeholders must be approved by the TWG. This process will allow for changes if they are deemed necessary and critical to the study, while also ensuring that changes, and the risks and benefits of those changes, will be fully vetted and discussed.

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2 This schedule is a draft and hence subject to change
Appendix A

Throughout the flowgate assessment process, SPP will generate several raw data files that will be used as intermediate steps to the results mentioned above. SPP will post these materials for member reference on GlobalScape ([https://sppdocushare.spp.org](https://sppdocushare.spp.org), posted underneath Compliance and Advanced Studies (CEII, RSD) → CAS (Global Access) → MOD-030 → 2019).

[2019 Flowgate Assessment Preliminary Data.xls] - contains the following tabs:

- **1-All Results**: lists the top limits for each transfer direction for all cases
- **2-Top 3**: list the top 3 limits per path per season
- **3-No Limits**: transfers where no violations were encountered
- **4-High FCITC**: limits removed that had FCITC limit greater than transfer level for that path
- **5-Low TDF**: limits removed whose AC TDF factor was below the 3% cutoff
- **6-Non SPP**: transfers between non SPP BAs
- **7-Not Converged**: transfers where solution did not converge
- **8-Series Elements**: series monitored elements in transfer path removed. Kept most limiting element per series path. Also, removed redundant transformer results.
- **9-Fall, Spring, Summer, Winter**: raw MUST results per season
- **10-Potential Flowgate Candidates**: identified potential future flowgates
- **11-Potential Flowgate Removal**: identified existing flowgates for removal
- **12-Duplicates**: removed duplicate limits from remaining results to get a unique set of limits
Appendix B

Some of the terms pertinent to this study are defined below:

1) **Contractual Limit**: Contractual arrangements between Transmission Providers that define transfer capability between the two.

2) **Critical Contingency**: Any generation or transmission facility that, when outaged, is deemed to have an adverse impact on the reliability of the transmission network.

3) **Emergency Voltage Limits**: The operating voltage range on the interconnected system that is acceptable for the time sufficient for system adjustments to be made following a Critical Contingency.

4) **Participation Factor**: The percentage of the total power adjustment that a participation point will contribute when simulating a transfer.

5) **Participation Points**: Specified generators that will have their power output adjusted to simulate a transfer.

6) **Outage Transfer Distribution Factor (OTDF)**: The percentage of a power transfer that flows through the monitored facility for a particular transfer when the contingency facility is switched out of service.

7) **Power Transfer Distribution Factor (PTDF)**: The percentage of power transfer flowing through a facility or a set of facilities for a particular transfer when there are no contingencies.

8) **Transfer Distribution Factor (TDF)**: A general term, which may refer to either PTDF or OTDF – The TDF represents the relationship between the participation adjustment of two areas and the Flowgates within the system.

9) **Transfer Test Level**: The amount of power that will be transferred to determine facility TDFs for use in DC linear analysis.

10) **Transmission Reliability Margin (TRM)**: The amount of Flowgate capacity necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions.
HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
Base Reliability Needs Assessment (Complete)

• Start: 9/19/2018

• End: 1/7/2019

• Staff Leader: Jason Speer (jspeer@spp.org)
BA Reliability Needs Assessment (Complete)

- Start: 11/13/2018
- End: 1/7/2019
- Staff Leader: Jason Speer (jspeer@spp.org)
Economic Needs Assessment (Complete)

- Start: 11/07/2018
- End: 1/7/2019
- Staff Leader: Nikki Roberts (nroberts@spp.org)
Public Policy Needs Assessment (Complete)

- Start: 11/13/2018
- End: 1/7/2019
- Staff Leader: Nikki Roberts (nroberts@spp.org)
Operational Needs Assessment (Complete)

• Start: 11/1/2018
• End: 1/7/2019
• Staff Leader: Will Tootle (wtootle@spp.org)
Short Circuit Needs Assessment (Complete)

- Start: 11/1/2018
- End: 1/7/2019
- Staff Leader: Jason Terhune (jterhune@spp.org)
DPP Window

- Start: 1/8/2019
- End: 2/6/2019
- Member Review Time:
  - Transmission-planning response window (30 calendar days)
- Staff Leader: Ellen Bailey (ebailey@spp.org)
Solutions Development & Validation

• Start: 1/8/2019

• End: 3/13/2019

• Staff Leaders:
  • Reliability: Kelsey Allen (kallen@spp.org)
  • Economic/Policy: Nikki Roberts (nroberts@spp.org)
  • Operational: Will Tootle (wtootle@spp.org)
  • Short Circuit: Jason Terhune (jterhune@spp.org)
Solutions Evaluations

• Start: 1/8/2019

• End: 3/13/2019

• Staff Leaders:
  • Reliability: Kelsey Allen (kallen@spp.org)
  • Economic: Liz Gephardt (lgephardt@spp.org)
  • Policy: Nikki Roberts (nroberts@spp.org)
  • Operational: Will Tootle (wtootle@spp.org)
  • Short Circuit: Jason Terhune (jterhune@spp.org)
Initial Reliability Portfolio Development

- Start: 3/11/2019
- End: 4/03/2019
- Staff Leader: Kelsey Allen ([kallen@spp.org](mailto:kallen@spp.org))
Project Grouping – Phase 1  
(Conceptual Costs)

• Start: 1/18/2019  
• End: 4/03/2019  
• Staff Leader: Amber Greb (agreb@spp.org)
Study Cost Estimates – Round 1

- Start: 4/04/2019
- End: 5/08/2019
- Member Response Time: 4/11/19 – 5/08/19 (20 days)
- Staff Leader: John O’Dell (jodell@spp.org)
Reliability Portfolios Development

- Start: 5/08/2019
- End: 6/06/2019

- Staff Leader: Kelsey Allen (kallen@spp.org)
Project Grouping – Phase 2
(Study Cost Estimates)

• Start: 5/08/2019
• End: 5/14/2019
• Staff Leader: Amber Greb (agreb@spp.org)
Planning Summit

• Start: 5/10/2019

• End: 5/28/2019

• Member Review Time:
  • Summit Materials (7 days prior to meeting)

• Staff Leader: Ellen Bailey (ebailey@spp.org)
Project Grouping – Phase 3
(Summit Feedback)

• Start: 5/29/2019

• End: 6/06/2019

• Staff Leader: Amber Greb (agreb@spp.org)
study cost estimates – round 2

• Start: 6/07/2019

• End: 6/26/2019

• Member Response Time:
  • 6/13/2019 – 6/26/2018 (10 days)

• Staff Leader: John O’Dell (jodell@spp.org)
Final Reliability Portfolios Development

• Start: 6/27/2019
• End: 6/28/2019
• Staff Leader: Kelsey Allen (kallen@spp.org)
Project Grouping – Phase 4 (Final)

- Start: 6/27/2019
- End: 6/28/2019
- Staff Leader: Amber Greb (agreb@spp.org)
Project Grouping – Final Determination

• Start: 7/01/2019
• End: 7/8/2019
• Staff Leader: Amber Greb (agreb@spp.org)
Optimization

- Start: 7/9/2019
- End: 7/17/2019
- Staff Leader: James Bailey (jbailey@spp.org)
Portfolio Consolidation

• Start: 7/18/2019
• End: 8/2/2019
• Staff Leader: Liz Gephardt (lgephardt@spp.org)
Project Staging

• Start: 8/5/2019
• End: 8/15/2019
• Staff Leader: Kirk Hall (khall@spp.org)
Benefit Metrics Calculation

• Start: 8/2/2019

• End: 8/26/2019

• Staff Leader: Antonio Barber (abarber@spp.org)
Stability Analysis

• Start: 8/5/2019
• End: 8/26/2019
• Staff Leader: Chris Jamieson (cjamieson@spp.org)
Sensitivity Analysis

• Start: 8/5/2019

• End: 8/26/2019

• Member Review Time:
  • 8/19/2019 – 8/23/2019 (5 days)

• Staff Leader: Kirk Hall (khall@spp.org)
Final Reliability Assessment

- Start: 8/5/2019
- End: 8/27/2019
- Staff Leader: Dee Edmondson (dedmondson@spp.org)
Rate Impacts/ATRR

• Start: 8/15/2019
• End: 8/28/2019
• Staff Leader: Antonio Barber (abarber@spp.org)
Final Report

- Start: 8/1/2019
- End: 9/18/2019
- Staff Leader: Ellen Bailey (ebailey@spp.org)
TWG/ESWG Final Approvals

• Start: 9/26/2019

• End: 10/3/2019

• Member Review Time:
  • 9/26/2019 – 10/3/2019 (5 days)

• Staff Leaders:
  • TWG – Aaron Stewart (astewart@spp.org)
  • ESWG – Amber Greb (agreb@spp.org)
MOPC and SPP Board

• Start: 9/6/2019

• End: 10/29/2019

• Member Review Time:
  • MOPC: 10/7/2019 – 10/15/2019 (7 days)
  • SPP Board: 10/22/2019 – 10/29/2019 (5 days)
DPP Window Update

Ellen Cook
Engineering Support
DPP Window

• Opened Tuesday, January 8 at 12:00am
• Closes Wednesday, February 6 at 11:59pm
Submittals Received*

- 12 Total
  - 1 Operating Guide
  - 1 Model Correction
  - 10 Potential Project

*as of 1/28/19 at 8:30am
Frequently Asked Questions (FAQ)

• A DPP FAQ page has been added to SPP.org
  • [https://www.spp.org/engineering/transmission-planning/detailed-project-proposals/frequently-asked-questions/](https://www.spp.org/engineering/transmission-planning/detailed-project-proposals/frequently-asked-questions/)

• Updated regularly with answers to questions about posted needs, submittal form, file requirements, etc.
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TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
2020 ITP Schedule

Sherri Maxey

February 6, 2019
Scope Development
(Complete)

• Start: 7/23/2018

• End: 1/16/2019 (Member’s Final Approval)
  • MOPC Approval: 1/16/2019

• Member Review Time:
  • 12/12/2018 – 12/19/2018 (8 days)
  • Approved by TWG/ESWG: 12/19/18

• Staff Leader: Kirk Hall (khall@spp.org)

• Working Group Approvals: ESWG and TWG
Powerflow Model

• Start: 7/09/2018

• End: 2/15/2019 (Final Approval)

• Member Review Time:
  • Pass 0 – Trial 1: 7/13/2018 – 7/20/2018 (5 days)
  • Pass 0 – Trial 2: 8/03/2018 – 8/24/2018 (15 days)
  • Pass 1: 9/14/2018 – 9/21/2018 (5 days)
  • Pass 2: 10/05/2018 – 10/26/2018 (15 days)
  • Pass 3: 11/16/2018 – 12/07/2018 (15 days)
  • Pass 4: 12/21/2018 – 1/11/2019 (15 days)
  • Final Data Submission Deadline: 1/11/2019
  • Final Initial ITP: 2/11/2019 – 2/15/2019 (5 days)
  • Final Initial ITP Approval: 2/15/2019
  • Final ITP Approval with Oct. 2019 Board approved projects in Nov. 2019

• Staff Leader: David Duhart (dduhart@spp.org)

• Working Group Approval: TWG
Short Circuit Model

- Start: 11/14/2018
- End: 2/28/2019
- Member Review Time:
  - Pass 1: 12/14/2018 – 1/11/2018 (6 days)
  - Pass 2: 2/08/2019 – 2/15/2019 (6 days)
  - Pass 3: 2/21/2019 – 2/28/2019 (6 days) (MDWG Approval)
  - Final ITP Approval with Oct. 2019 Board approved projects in Nov. 2019
- Staff Leader: Theva Coleman (tcoleman@spp.org)
- Working Group Approval: TWG
Load Review

• Start: 7/23/2018

• End: 2/15/2019 (Member’s Final Approval)

• Member Review Time:
  • Load Pass 1: 9/17/2018 – 9/28/2018 (10 days)
  • Load Pass 2: 10/15/2018 – 10/26/2018 (10 days)
  • Load Pass 2 Update*: 10/18/2018 – 10/31/2018 (10 days)
  • Load Pass 3: 11/26/2018 – 12/07/2018 (10 days)
  • Final Posting for Approval: 2/08/2019 (7 days)

• Staff Leader: Theva Coleman (tcoleman@spp.org)

• Working Group Approval: ESWG

* Posting based on approved ESWG items
Generation Review

- Start: 7/23/2018
- End: 2/15/2019 (Member’s Final Approval)

- Member Review Time:
  - Gen Pass 1: 9/17/2018 – 9/28/2018 (10 days)
  - RAR & Waiver Request to Stakeholders: 9/21/2018 – 10/26/2018 (25 days)
  - Gen Pass 2: 10/15/2018 – 10/26/2018 (10 days)
  - Gen Pass 2 Update*: 10/18/2018 – 10/31/2018 (10 days)
  - Gen Pass 3: 11/26/2018 – 12/07/2018 (10 days)
  - Final Posting for Approval: 2/08/2019 (7 days)

- Staff Leader: Theva Coleman (tcoleman@spp.org)
- Working Group Approval: ESWG

* Posting based on approved ESWG items
Renewable Policy Review

• Start: 2/01/2019

• End: 2/22/2019 (Member’s Final Approval)

• Member Review Time:
  • 2/08/2019 – 2/15/2019 (5 days)

• Staff Leader: Joshua Norton (jnorton@spp.org)

• Working Group Approval: ESWG
Policy Renewable Resource Plan – Phase 1

• Start: 2/22/2019

• End: 3/12/2019 (Member’s Final Approval)

• Member Review Time:
  • 3/05/2019 – 3/12/2019 (5 days)

• Staff Leader: Joshua Norton (jnorton@spp.org)

• Working Group Approval: ESWG
Renewable & Conventional Resource Plan – Phase 2

- Start: 2/6/2019
- End: 5/23/2019 (Member’s Final Approval)
- Member Review Time:
  - 5/15/2019 – 5/23/2019 (6 days)
- Staff Leader: Antonio Barber (abarter@span.org)
- Working Group Approval: ESWG
Siting Plan & Generator Outlet Facilities (GOFs)

- Start: 2/01/2019
- End: 7/25/2019 (Member’s Final Approval)
- Staff Leader: Joshua Norton (jnorton@spp.org)
- Working Group Approval: ESWG
Market Economic Model Build

• Start: 2/01/2019
• End: 12/10/2019 (Member’s Final Approval)

• Staff Leader: Clayton Mayfield (cmayfield@spp.org)
• Working Group Approval: ESWG
Economic Benchmarking

• Start: 4/30/2019

• End: 8/01/2019 (Member’s Final Approval)

• Staff Leader: Clayton Mayfield (cmayfield@spp.org)

• Working Group Approval: ESWG
Model Updates

• Start: Pass 1 Powerflow Model (7/09/2018)

• Initial End: 2/15/2019

• Final End: 11/15/2019
  • (New NTCs and withdrawals approved by the Oct. 2019 MOPC/Board, and NTC re-evaluations)

• Staff Leader: David Duhart (dduhart@spp.org)

• Working Group Approval: TWG
Constraint Assessment

• Start: 8/2/2019
• End: 10/30/2019 (Member’s Final Approval)

• Staff Leader: Kirk Hall (khall@spp.org)
• Working Group Approval: TWG
Market Powerflow Models (BA Reliability)

- Start: 11/15/2019
- End: 1/15/2020 (Member’s Final Approval)

- Staff Leader: Theva Coleman (tcoleman@spp.org)
- Working Group Approval: TWG
Base Reliability Needs Assessment

- Start: 11/15/2019
- End: 3/14/2020

- Staff Leader: Jason Speer (jspeer@spp.org)
Market Powerflow Reliability Needs Assessment

- Start: 1/02/2020
- End: 3/14/2020
- Staff Leader: Jason Speer (jspeer@spp.org)
Economic Needs Assessment

- Start: 1/02/2020
- End: 3/14/2020
- Staff Leader: Liz Gephardt (lgephardt@spp.org)
Public Policy Needs Assessment

• Start: 1/02/2020
• End: 3/14/2020

• Staff Leader: Liz Gephardt (lgephardt@spp.org)
Operational Needs Assessment

• Start: 1/02/2020

• End: 3/14/2020

• Staff Leader: Will Tootle (wtootle@spp.org)
Short Circuit Needs Assessment

- Start: 1/02/2020
- End: 3/14/2020

- Staff Leader: Jason Terhune (jterhune@spp.org)
DPP Window

• Start: 3/15/2020 12:00 a.m.
• End: 4/13/2020 11:59 p.m.
• Member Review Time:
  - Transmission-planning response window (30 calendar days)
• Staff Leader: Ellen Bailey (ebailey@spp.org)
Solutions Development & Validation

- Start: 3/15/2020
- End: 6/10/2020

- Staff Leaders:
  - Reliability: Kelsey Allen (kallen@spp.org)
  - Economic: Liz Gephardt(lgephardt@spp.org)
  - Policy: Liz Gephardt(lgephardt@spp.org)
  - Operational: Will Tootle (wtootle@spp.org)
  - Short Circuit: Jason Terhune (jterhune@spp.org)
Solutions Evaluations

- Start: 3/15/2020
- End: 6/10/2020

- Staff Leaders:
  - Reliability: Aaron Stewart (astewart@spp.org)
  - Economic: Amber Greb (agreb@spp.org)
  - Policy: Amber Greb (agreb@spp.org)
  - Operational: Will Tootle (wtootle@spp.org)
  - Short Circuit: Jason Terhune (jterhune@spp.org)
Initial Reliability Portfolio Development

• Start: 2/15/2020
• End: 6/10/2020

• Staff Leader: Kelsey Allen (kallen@spp.org)
Project Grouping & Ranking

• Start: 3/15/2020
• End: 8/14/2020

• Staff Leaders: Nikki Roberts (nroberts@spp.org)
Study Cost Estimates – Round 1

• Start: 6/10/2020
• End: 6/25/2020
• Staff Leader: John O’Dell (jodell@spp.org)
Planning Summit

• Start: 6/25/2020

• End: 7/10/2020

• Member Review Time:
  • Summit Materials (7 days prior to meeting)

• Staff Leader: Ellen Bailey (ebailey@spp.org)
Study Cost Estimates – Round 2

• Start: 7/10/2020

• End: 7/25/2020

• Staff Leader: John O’Dell (jodell@spp.org)
Final Reliability Portfolios Development

- Start: 7/26/2020
- End: 8/14/2020

- Staff Leader: Kelsey Allen (kallen@spp.org)
Optimization & Portfolio Consolidation

• Start: 8/16/2020

• End: 9/18/2020

• Staff Leaders:
  • Liz Gephardt (lgephardt@spp.org)
  • Amber Greb (agreb@spp.org)
Project Staging

• Start: 8/14/2020
• End: 9/18/2020

• Staff Leader: Liz Gephardt (lgephardt@spp.org)
Benefit Metrics Calculation

• Start: 8/14/2020

• End: 9/18/2020

• Staff Leader: Antonio Barber (abarber@spp.org)
Stability Analysis

- Start: 8/14/2020
- End: 9/18/2020

- Staff Leader: Dee Edmondson (dedmondson@spp.org)
Sensitivity Analysis

• Start: 8/14/2020
• End: 9/18/2020

• Staff Leader: James Bailey (jbailey@spp.org)
Final Reliability Assessment

• Start: 8/14/2020
• End: 9/18/2020
• Staff Leader: Aaron Stewart (astewart@spp.org)
Rate Impacts/ATRR

• Start: 8/14/2020
• End: 9/18/2020

• Staff Leader: Antonio Barber (abarber@spp.org)
Final Report

- Start: 8/1/2020
- End: 9/18/2020

- Staff Leader: Ellen Bailey (ebailey@spp.org)
TWG/ESWG Final Approvals

• Start: 9/25/2020

• End: 10/2/2020

• Staff Leaders:
  • TWG – Aaron Stewart (astewart@spp.org)
  • ESWG – Amber Greb (agreb@spp.org)
MOPC and SPP Board

- Start: 9/6/2020
- End: 10/27/2020
- Member Review Time:
  - MOPC: 10/2/2020 – 10/13/2020 (7 days)
  - SPP Board: 10/20/2020 – 10/27/2020 (5 days)
HELPING OUR MEMBERS WORK TOGETHER TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
2020 ITP Powerflow Update

David Duhart
Engineering Modeling
Objective

- Review Schedule
- Review Model Build Notes
Posting Dates

• Final Pass posting 2/8/2019
  • Any updates after January 11, 2019 will go through 10.3 process

• This is the final scheduled pass

• Stakeholders Review to approve the 2020 ITP models
  • February 11, 2019 - February 15, 2019
Model Build Notes

- Rayburn County is represented in the 2020 ITP models
- Lubbock is removed from the 2020 ITP starting 2021 Summer
Review

- Any model correction that was submitted for the Pass 4 feedback
- Retirement updates submitted for Pass 4
- Model updates identified after January 11, 2019 will follow the 10.3 process
SPP-MISO Coordinated System Plan (CSP) Process

SPP-MISO IPSAC
1/31/2019
New CSP Study Process

- Continued focus on SPP-MISO Coordination
  - Futures Development
  - Model Development
  - Needs Identification
  - Solution Development
  - Solution Evaluation
SPP ITP

SPP-MISO CSP

SPP-MISO Regional Modeling Coordination

MISO MTEP

2018

Jun | Jul | Aug | Sept | Oct | Nov | Dec

Needs Posted

Model Completion

2019

Jun | Jul | Aug | Sept | Oct | Nov | Dec

MOPC & Board Approval

Initial Portfolio Selected

Determine SPP-MISO Cost Allocation

Interregional Project Evaluation

IPSAC Solutions

Post "CSP" Needs for IPSAC

SPP-MISO Regional Needs Coordination

SPP-MISO Futures Coordination for 2020 Study

Initial Portfolio Selected

Board Approval

IPSAC, SPP-MISO JPC, SPP Board, and MISO Board Approvals

SPP-MISO Regional Modeling Coordination

Model Completion

Needs Posted
MISO - SPP – Model Building and Coordination

- **MISO Economic Model Building**
  - 4 MTEP Futures, evenly weighted
    - MTEP19 Futures development Q1-Q3 2018
    - MTEP19 Economic Models completed Q4 2018
    - Utilizes MTEP18 topology and approved projects

- **SPP Economic Model Building**
  - 2 ITP Futures, no specific weighting
    - Reference Case (Business as Usual)
    - Emerging Technologies
  - Scope and futures development takes place July – December the year prior to the study

- MISO and SPP exchange models and data in Q4 and will provide more emphasis on this step with each iteration of the new CSP

- All stakeholder input and updates on models should be provided through the respective regional model building process
SPP and MISO – Needs Coordination & CSP

• MISO and SPP coordinate needs from the ITP and MTEP to determine the subset of regional needs along the seam that will be emphasized in the CSP

• CSP needs are identified for the purpose of providing the IPSAC transparency and a “picture” of the SPP and MISO regional needs along the seam

*Interregional Projects could be approved to address regional needs not included in the CSP needs highlighted at the IPSAC
SPP-MISO Solution Coordination

• Solutions may be provided to either RTO’s Regional Process or directly to CSP:
  • SPP and MISO will consider solution ideas independent of where it is submitted
  • Solutions submitted to the regional process do not need to be resubmitted to the CSP

• Regional and Interregional solutions will be exchanged between RTOs throughout the CSP process

• Stakeholders may submit issues or feedback to the CSP in any format they choose and staff will reach out to discuss any questions

• Use the RTO Regional Processes if seeking to qualify for:
  • MISO planning participation credit
  • SPP incentive points
2018

SPP ITP

- Model Completion
- Needs Posted

2019

MOPC & Board Approval

Initial Portfolio Selected

SPP-MISO CSP

- SPP-MISO Regional Modeling Coordination
- SPP-MISO Regional Needs Coordination
- Post "CSP" Needs for IPSAC
- IPSAC Solutions
- Interregional Project Eval

Determine SPP-MISO Cost Allocation

IPSAC, SPP-MISO JPC, SPP Board, and MISO Board Approvals

MISO MTEP

- Model Completion
- Needs Posted
SPP-MISO Cost Allocation

• SPP and MISO each calculate project benefits using their respective regional models
  • 20 year benefit
    • APC
    • Avoided Cost

• SPP and MISO’s share of project costs are based on the % of the total project benefit
  • MISO Cost = (MISO Benefit)/(MISO Benefit + SPP Benefit)
    • MISO Benefit = NPV of MISO’s benefits as calculated in MISO’s MTEP process
  • SPP Cost = (SPP Benefit)/(MISO Benefit + SPP Benefit)
    • SPP Benefit = NPV of SPP’s benefits as calculated in SPP’s ITP process.
SPP-MISO Cost Allocation -> Regional Processes

• SPP and MISO will use the Interregional Cost Allocation to evaluate potential projects against other potential regional and interregional solutions through the regional processes
  • The solution will utilize the new cost responsibility for each RTO as determined by the CSP
Coordinated System Plan and Regional Project Approvals

- Results of CSP analysis and recommended projects presented to the IPSAC
- Official Joint Planning Committee (JPC) Vote and Recommendation
- MISO Regional Approvals
  - CSP study details provided with MTEP Report and presented to MISO PAC
  - Board of Directors approves project(s) for MTEP “Appendix A”
- SPP Regional Approvals
  - Markets and Operations Policy Committee provide recommendation to the Board on all ITP and CSP projects
    - All projects with cost sharing between SPP and MISO must be approved through the CSP
    - Board of Directors approve all ITP and CSP projects
Coordinated System Plan – Construction and Ownership

• Interregional Projects solely interconnected to either SPP or MISO, will utilize that Party’s OATT to designate the entity to construct, implement, own, operate, maintain, repair, restore, and finance the applicable Interregional Project.

• Tie-line Interregional Projects interconnected to both SPP and MISO will utilize each Party’s OATT to designate the entity to construct, implement, own, operate, maintain, repair, restore, and finance the applicable Interregional Project based on the benefits determined in the CSP study

• Additional information in Section 9.7.1 of the SPP-MISO JOA
Future CSP Coordination Improvements

• Continue to improve understanding of each others respective regional planning processes
• Increase focus in future studies on reliability, operational, and policy needs in addition to economic needs
• Coordinate models earlier in the planning process
• Further coordination of regional futures as a part of regional planning processes
• Single Q1 IPSAC (timing misalignment during this transition year required scheduling 2 Q1 IPSACs for JOA compliance)
• Continue to check and adjust the new process as we learn potential short falls
Questions?
SPP-MISO Coordinated System Plan Next Steps

1-31-19 IPSAC Meeting
SPP-MISO CSP Next Steps

• IPSAC / Annual Issues Review Meeting – February 26, 2019
  • 2-hr webex/conference call
  • Continue Needs Discussion
    • Stakeholder’s Opportunity to Discuss Needs
  • IPSAC Recommendation to the JPC on whether to officially perform a CSP in 2019
  • Discuss path forward for potential 2019 SPP-MISO CSP
  • Relay any new information on status of FERC Filing
Questions?
HELPING OUR MEMBERS WORK TOGETHER TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE.
Transmission Operating Guide Process Draft
Today’s Objective

• Review previous TWG discussion and key points
• Discuss the potential TOG Process Draft and receive feedback
Previous Feedback

- RAS/SPS process could offer insights as to how we approach TOGs
- TOGs should be validated early in the process
- TOGs should be categorized to help clarify their intended usages
- Criteria should attempt to quantify the risk associated with a TOG
- Frequency of TOG usage in real-time could play a factor in potential removal from consideration in planning processes
TOG Process Draft

• Similar to the RAS/SPS process, SPP plans to create and maintain a TOG list consisting of all TOGs that SPP has on file

• Members will be solicited for updates to the list as part of the annual data request

• Potential TOG Categorization
  • Pre/post contingency action
  • Prior outage-related
  • Non-contingency event
  • Automatic/Manual

• Certain TOGs will be marked as being approved for use in planning processes

• TOGs can be added or removed from consideration in planning processes based upon certain criteria

• TOGs that are applicable for planning processes may be considered during the Needs Assessment process as potential mitigations and provided as information to the stakeholders during solution development
TOG Process Draft: Addition and Applicability

- TOGs may derive from multiple sources:
  - Annual data request
  - DPP process
  - Operations
  - Planning

- SPP staff will develop criteria to determine what TOGs would be considered potentially applicable in planning processes

- These criteria may leverage the TOG categorization process to help ensure their proper development and usage
TOG Process Draft: Evaluation

• If the TO/TOP no longer wishes for an effective TOG to be utilized as a potential solution, the TO/TOP can request that the TOG be removed from consideration in a given assessment.

• For withdrawal from consideration in a given planning assessment, the TOG may go through the following checks:
  • Risk assessment check
  • Potential frequency check

• TOGs submitted through any avenue may still be considered a valid solution, even if they meet criteria for potential withdrawal from consideration in the given assessment.
Next Steps

• Determine potential impacts on 2019 and 2020 ITP processes

• Develop implementation schedule for potential use in the 2019 ITP

• Determine synergies within SPP’s study processes
NERC Update

- System Planning Impacts from Distributed Energy Resources Working (SPIDERWG)
- Standards Efficiency Review (SER)
- Functional Model and Technical Documentation
- SOL/IROL
System Planning Impacts from Distributed Energy Resources Working Group (SPI DERWG)
Scope Document
December 2018

Purpose
The NERC Planning Committee (PC) identified key points of interest that should be addressed related to a growing penetration of distributed energy resources (DER). The purpose of the System Planning Impacts from Distributed Energy Resources (SPI DERWG) is to address aspects of these key points of interest related to system planning, modeling, and reliability impacts to the Bulk Power System (BPS). This effort builds off of the work accomplished by the NERC Distributed Energy Resources Task Force (DERTF)\(^1\) and the NERC Essential Reliability Services Task Force/Working Group (ERSTF/ERSWG)\(^2\), and addresses some of the key goals in the ERO Enterprise Operating Plan\(^3\).

Activities
NERC SPI DERWG will serve as a stakeholder forum for focusing on DER from a transmission planning and system analysis perspectives. Some of the primary focuses of SPI DERWG will be DER data collection, modeling practices, model improvements, and steady-state and dynamic simulation assessments. On a secondary level, SPI DERWG will be a stakeholder forum for focusing on system planning impacts to BPS essential reliability services (ERS), load forecasting, and other considerations that develop as the industry assesses the increasing influences of DER on the BPS. SPI DERWG will work with the Planning Committee and other Planning Committee subcommittees, working groups, and task forces as necessary to provide as complete an analysis that is required. Key activities of the SPI DERWG include, but are not limited to, the following:

1. Develop detailed guidelines related to recommended information sharing and data collection for necessary information to flow across the transmission-distribution interface effectively to support BPS reliability needs.
2. Develop recommended practices and guidance for system planning assessments of the performance\(^4\) of the BPS under increasing penetrations of aggregate DER.
3. DER model benchmarking and development of guidelines for model verification comparing modeled performance against actual system data, as available.

\(^1\) DERTF Final Report
\(^2\) ERSWG Final Framework Report
\(^3\) See Goal 4 in the NERC ERO Operating Plan
\(^4\) This may include ERS, planning criteria impacts, system stability impacts, and other performance metrics.
4. Provide guidance for distribution-level monitoring that will provide the data necessary to improve steady-state and dynamic modeling of aggregate DER. Monitoring includes the use of smart meters, dynamic disturbance recorders (DDR), phasor measurement units (PMUs), and other recording devices.

5. Provide technical recommendations for the adoption and use of IEEE Std. 1547-2018.

6. Provide guidelines, white papers, compliance guidance, etc. in support of NERC Reliability Standards addressing interconnection requirements.

7. Provide technical assistance in support for assessing DER and DER aggregations in other NERC program areas.

8. Build off of existing NERC Reliability Guidelines for DER modeling and modeling practices, particularly for inclusion of DER in dynamic load models.

9. Develop recommended practices for representing aggregate DER in interconnection-wide planning base cases. This includes developing practices for expected DER dispatches, time of day, DER set points, and other aspects that impact base case configuration.

10. Coordinate with NERC and the MOD-032 Designees to develop processes to include DER in future interconnection-wide base cases consistently.

11. Coordinate with simulation software vendors to seek consistent implementation of DER models in steady-state powerflow and dynamic simulations.

12. Provide assistance to NERC Event Analysis evaluations of BPS disturbances when aggregate DER are involved in the disturbance, as necessary.

13. Provide guidance on impacts that higher penetration of DER may have on system restoration, UVLS, and UFLS, and potential solutions or recommended practices to overcome any identified issues.

14. Support the development of any data collection requirements by the NERC Reliability Assessment Subcommittee (RAS), as necessary, for inclusion in the NERC Long Term Reliability Assessment (LTRA) and other assessments.

15. Develop educational materials that can be used for a range of audiences that describe any potential emerging risks and possible solutions to address these risks.

16. Coordination with NERC System Analysis and Modeling Subcommittee (SAMS) and its technical groups.

**Deliverables**

The SPIDERWG will develop technical reference documents, guidelines, and other educational materials to support industry efforts in BPS planning under higher penetrations of DER with the following objectives:

1. Assessment of DER performance and event analyses (possible industry survey) and aggregate DER impacts, including expected projections of penetration level and other relevant impacts.

2. Reliability Guideline(s) on system planning and reliability impacts that aggregated DER can have; focus on study approaches and potential solutions to these impacts. System impacts include traditional planning analyses and may also include system restoration, UVLS, and UFLS.

3. Reliability Guideline(s) on data collection and information sharing with respect to DER penetration levels and necessary information for BPS planning and system operation.
4. Modeling Notification or guidance material on DER models and how to use these models appropriately.
5. Recommendations for improvements to DER modeling and model benchmarking.
6. Recommendations to software vendors on DER modeling consistency, including any recommended improvements to software platforms (coordinated with the software vendors) to gain this consistency.
7. Recommendations to the MOD-032 Designees on inclusion of DER in interconnection-wide planning cases, including recommendations on the dispatch and case setup for various scenarios of DER.
8. Recommendations for distribution system monitoring to support understanding of aggregate DER performance.
9. Recommendations to the adoption of IEEE Std. 1547-2018 to ensure necessary state regulators and policymakers clearly understand the needs for BPS reliability.
10. Educational materials, workshops, webinars, etc., that can be used for a range of audiences that describe any potential emerging risks and possible solutions to address these risks.
11. Other tasks as deemed appropriate.

**Membership**
The SPIDERWG will include members who have technical or policy level expertise in the following areas:

- Modeling and or implementing aggregate DER in BPS planning studies and for real-time operations
- Assessing the reliability impacts of increasing penetration of DER on the BPS
- Load forecasting and load modeling with the inclusion of DER
- IEEE Std. 1547-2003 and IEEE Std. 1547-2018

The SPIDERWG will consist of a chair and vice chair appointed by the PC leadership. NERC staff will be assigned as Coordinator(s). Decisions will be consensus-based of the membership, led by the chairmen and staff coordinators. Any minority views can be included in an addendum.

**Reporting & Duration**
The SPIDERWG will report to the NERC PC. SPIDERWG work products will be approved by the NERC PC. The group will submit a work plan to the PC following its inception, and will develop the deliverables outlined.

**Meetings**
The group is expected to have two to three in-person meetings, supplemented with conference calls to continue workload throughout the year.

*Approved by the NERC Planning Committee on December 12, 2018.*
## System Planning Impacts of Distributed Energy Resources Working Group (SPI DERWG)

Website: [SPIDERWG](#)

Chair: Jeff Billinton (July 2018)

NERC Lead: Ryan Quint

Hierarchy: Reports to PC

Vice-Chair: Bill Quaintance (July 2018)

Scope Approved: Dec 2018 PC Mtg

### Modeling Subgroup (Co-Leads: Irina Green, CAISO; Mohab Elnashar, IESO)

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### SPIDERWG Work Plan 2

#### SYSTEM PLANNING IMPACTS FROM DISTRIBUTED ENERGY RESOURCES WORKING GROUP WORK PLAN

| M5 | **Modeling Notification: Dispatching DER off Pmax in Case Creation**  
    | Modeling notification on recommended practices and considerations for DER modeling when dispatching DER at output levels other than Pmax in the powerflow and dynamics data. Practices to ensure expected response from DER in these modeled conditions. | Q2-2019 | No |

**Verification Subgroup (Co-Leads: Michael Lombardi, NPCC;_____,_____)**

| V1 | **Reliability Guideline: DER Performance and Model Verification**  
    | Reliability Guideline covering the following topics:  
    - Recommendations and industry practices for placement of recording devices, acceptable types of recording devices, measurement requirements, and how to use data for performance and model verification  
    - Recommended practices for tracking aggregate DER performance during large BPS disturbances.  
    - Recommendations for leveraging individual DER performance testing to develop aggregate level modeling, and how to perform model verification for aggregate DER performance.  
    - Guidance on how to perform model benchmarking, and when this is needed; benchmarking study results against different software platforms (e.g., positive sequence RMS simulations against more detailed three-phase distribution feeder modeling), and how this can be applied for model verification.  
    - Recommended approaches for localized model verification of individual feeders.  
    - Recommended approaches for accounting for DER in both steady state powerflow and dynamic model verification for system-wide model validation (i.e., MOD-033-1); consideration for DER in model conversion between real-time EMS model and planning model.  
    - Considerations of the ways to aggregate DER data depending on the types of studies being performed. | Q4-2019 | Yes |

**V2**  
**Reliability Guideline: DER Forecasting Practices and Relationship to DER Modeling for Reliability Studies**  
Guidance providing how forecasting practices are linked to DER modeling for reliability studies. DER forecasting practices are important for accurately representing the correct amount and type of DER, particularly at an aggregate level representation for BPS studies.

**Studies Subgroup (Co-Leads: Peng Wang, IESO; Jameson Thornton, PGE)**
### Reliability Guideline: Bulk Power System Planning under Increasing Penetration of Distributed Energy Resources

Guideline providing recommendations and industry practices for performing planning studies considering the impacts of aggregate DER behavior.

- Review and documentation of existing study approaches currently used by industry, development of findings and recommendations from these studies incorporating DER.
- Review and highlight of DER study practices and known DER impacts from various entities around the world.
- Guidelines on how to incorporate and represent DER in planning studies for potential reliability issues, such as selection of study scenarios with system gen/load conditions, and different approaches to incorporate DER in different types of studies.
- Guidelines on study assumptions and approaches considering single-phase installation of DER; consideration of co-simulation tools and techniques.
- Guidelines on types of reliability issues encountered with high DER penetration and potential solutions to these issues.
- Recommended practices and approaches for reporting gross load, net load, and DER tripping/reconnection as part of simulation results.

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<th>S1</th>
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### Review of TPL-001 Standard for Incorporation of DER

Technical review of NERC TPL-001-S, and development of any recommendations pertaining to consideration and study of DER impacts to the BPS.

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### Recommended Simulation Improvements and Techniques

 Guidance to software vendors on tools enhancements for improved accounting and study of aggregate DER.

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<th>S3</th>
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### Reliability Guideline: Recommended Approaches for Developing Underfrequency and Undervoltage Load Shedding Programs with Increasing DER Penetration

Guidance on how to study UFLS and UVLS programs and ensure their effectiveness with increasing penetration of DER represented.

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<th>S4</th>
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### White Paper: Beyond Positive Sequence RMS Simulations for High DER Penetration Conditions

Considerations for high penetration DER systems and the need for more advanced tools (e.g., co-simulation tools) for studying DER impacts on the BPS.

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<th>S5</th>
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**Coordination Subgroup** (Co-Leads: Taylor Woodruff, Oncor; Kun Zhu, MISO)
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| C1            | **Review of IEEE Std. 1547-2018 for impacts to BPS**  
Technical review of IEEE Std. 1547-2018 and development of any guidance on determination and effective use of performance requirements and settings within IEEE St. 1547-2018. | Q3-2019     | No       |        |
| C2            | **Reliability Guideline: Communication and Coordination Strategies for Transmission Entities and Distribution Entities regarding Distributed Energy Resources**  
Develop recommended strategies to encourage coordination between Transmission and Distribution entities on issues related to DER such as information sharing, performance requirements, DER settings, etc. | Q4-2019     | Yes      |        |
| C3            | **Educational Material to Support Information Sharing between Industry Stakeholders**  
Develop material to educate industry stakeholders on practices, recommendations and technical work developed by other industry organizations. | C4-2019     | No       |        |
| C4            | **Review of MOD-032-1 for DER Data Collection**  
(In coordination with activity M4) White paper reviewing MOD-032-1 and providing potential modifications to the standard to facilitate data collection for DERs for interconnection-wide modeling. | Q2-2019     | Yes      |        |
| C5            | **Coordination of Terminology**  
Review of existing definitions and terminology and development and coordination of new terms, for consistent reference across sub-groups. | Q2-2019     | No       |        |
| C6            | **NERC Reliability Standards Review**  
Review EPRI and prior NERC documentation regarding possible Reliability Standards modifications; work with NERC Staff to develop any prioritization of possible standards modifications. | Q3-2019     | Yes      |        |
| C7            | **Tracking and Reporting DER Growth**  
Coordinated review of information regarding DER growth, including types of DER, size of DER, etc. Consideration for useful tracking techniques for modeling and reliability studies. | Ongoing     | No       |        |
SPP RELIABILITY STANDARDS
OUTREACH REPORT

TWG
February 5, 2019
Shannon V. Mickens
SPP Reliability Standards
NERC STANDARDS – UPCOMING EFFECTIVE DATES

April 1, 2019

- BAL-002-3 – Disturbance Control Standard Contingency Reserve for Recovery from a Balancing Contingency Event
- EOP-004-4 – Event Reporting
- EOP-005-3 – System Restoration from Black start Resources
- EOP-006-3 – System Restoration Coordination
- EOP-008-2 – Loss of Control Center Functionality

July 1, 2019

- PER-003-2 – Operating Personnel Credentials

January 1, 2020

- CIP-003-7 – Cyber Security — Security Management Controls
- PRC-026-1 – Relay Performance During Stable Power Swings (Requirements 2–4)

July 1, 2020

- CIP-005-6 – Cyber Security – Electronic Security Perimeter(s)
- CIP-010-3 – Cyber Security – Configuration Management and Vulnerability Assessments
- CIP-013-1 – Cyber Security — Supply Chain Risk Management
- PRC-002-2 – Disturbance Monitoring and Reporting Requirements (50% compliance for Requirements 2-4 and 6-11)

October 1, 2020

- PER-006-1 – Specific Training for Personnel
- PRC-027-1 – Coordination of Protection Systems for Performance During Faults

January 1, 2021

- PRC-012-2 – Remedial Action Schemes
- TPL-007-1 – Transmission System Planned Performance for Geomagnetic Disturbance Events (Requirements 6.6.1-6.4)

January 1, 2022

- TPL-007-1 – Transmission System Planned Performance for Geomagnetic Disturbance Events (Requirements 3, 4, and 7)
July 1, 2022

- PRC-002-2 – Disturbance Monitoring and Reporting Requirements (100% Compliance for Requirements 2-4 and 6-11)
NERC RESOURCES

One new Proposed Implementation Guidance document has been posted on the Compliance Guidance page. The new proposed guidance addresses **MOD-025-2, R1, R2, R3 – Verification and Data Reporting of Generator Real and Reactive Power Capability.** This document was submitted by the MRO Standards Committee (MROSC).
PRC-024-2 COMMENTS

Project 2018-04 Modifications to PRC-024-2

SPP Reliability Standards would like to remind parties of interest that SPP has no compliance implications in PRC-024-2 based on their registered functions.

In an effort to provide continued service to our members, we hosted an external call on January 11, 2019 for impacted members to discuss and develop comments.

For a copy of the compiled comments, please contact Shannon Mickens.
NERC NOTEWORTHY

Functional Model Advisory Group (FMAG)

The purpose of the FMAG, as outlined in the FMAG Scope document, is to

(1) Maintain the FM and FMTD to ensure the model correctly reflects the industry today, and

(2) Evaluate and incorporate new and emergent reliability-related tasks.

The FMAG reports to the Standards Committee (SC), and works with the Planning Committee (PC), Operating Committee (OC), and Critical Infrastructure Protection Committee (CIPC) to obtain consensus regarding any proposed changes to the FM and FMTD.

All proposed changes to the FM must be posted for industry comment, obtain consensus agreement from the PC, OC, and CIPC, and, ultimately, approval by the SC.

FMAG redlined documents are included in your meeting materials.

System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG)

The purpose of the System Planning Impacts from Distributed Energy Resources (SPIDERWG) is to address aspects of these key points of interest related to system planning, modeling, and reliability impacts to the Bulk Power System (BPS). This effort builds off of the work accomplished by the NERC Distributed Energy Resources Task Force (DERTF) and the NERC Essential Reliability Services Task Force/Working Group (ERSTF/ERSWG), and addresses some of the key goals in the ERO Enterprise Operating Plan.

Project 2015-09 Establish and Communicate System Operating Limits

Background

Facilities Design, Connections, and Maintenance (FAC) standards fulfill an important reliability objective for determining and communicating System Operating Limits (SOLs) used in the reliable planning and operation of the Bulk Electric System (BES). This project will revise requirements for determining and communicating these SOLs. Revisions are necessary to improve the requirements by eliminating overlap with approved Transmission Planning (TPL) requirements, enhancing consistency with Transmission Operations (TOP) and Interconnection Reliability Operations (IRO) standards, and addressing issues with determining and communicating SOLs and Interconnection Reliability Operating Limits (IROLs).
Standards Affected:

- CIP-014-2 – Physical Security
- FAC-003-4 – Transmission Vegetation Management
- FAC-010-3 – System Operating Limits Methodology for the Planning Horizon
- FAC-011-3 – System Operating Limits Methodology for the Operations Horizon
- FAC-013-2 – Assessment of Transfer Capability for the Near-term Transmission Planning Horizon
- FAC-014-2 – Establish and Communicate System Operating Limit
- PRC-002-2 – Disturbance Monitoring and Reporting Requirements
- PRC-023-4 – Transmission Relay Loadability
- PRC-026-1 – Relay Performance During Stable Power Swings

Purpose/Industry Need

The project will revise the requirements for determining and communicating SOLs and IROLs to address the issues identified in Project 2015-03 Periodic Review of System Operating Limit Standards. The resulting standard(s) and definition(s) will benefit reliability by improving alignment with approved TPL and proposed TOP and IRO standards. The project may result in development of one or more proposed Reliability Standards and definitions.

Standards Efficiency Review

SER Phase 1 has transitioned to formal standards development process. Updates on SER Phase 1 project can be found here: Project 2018-03 Standard Efficiency Review Retirements. SER Phase 2 has formed a working team and project scope.

SER Phase 2 Scope is to evaluate NERC Reliability Standards (O&P and CIP), as informed by implementation experiences and compliance practices, to develop and recommend standards-based solutions intended to reduce inefficiencies and unnecessary regulatory burdens for the purpose of supporting continued safe, secure and reliable operations.
SPP RELIABILITY STANDARDS CONTACT INFORMATION

Shannon Mickens, Sr. Standards Engineer

- Planning Authority and Planning Standards
- **Transmission Working Group (TWG)**
- System Protection and Control Working Group (SPCWG)
- NERC Planning Technical Committee
- NERC Drafting Team Participation
2019 TWG Goals

Casey Cathey, P.E.
Manager, Reliability Planning & Seams
ccathey@spp.org
501-614-3267
Purpose

• Discuss and document a clear high-level overview of what we would like to accomplish in 2019 as the Transmission Working Group

• Gather feedback from TWG members if modifications, priorities, and/or additions are necessary
High-level TWG goals for 2019

1. Develop an approach to embrace LPC/LPP process
2. 2019 ITP approvals needed for finalization
3. 2020 ITP approvals needed for successful completion
4. Develop process for handling Transmission Operating Guides
5. Develop an approach to evaluating risk and value-based transmission planning
6. Working with MDWG:
   A. Develop an approach for Distributed Energy Resources (DERs)
   B. Develop an approach for Energy Storage Resources (ESRs)
   C. Model reduction effort
      a) Year one redefinition
   D. Multiple model pass scorecard development and approval clarification
7. Support development of Generation Retirement process
8. Support Coordinated System Planning incorporation into ITP
IBIS Study Update

TWG Meeting
February 5-6, 2019

Douglas Bowman, P.E.
dbowman@spp.org
Contents

• Transient and Small Signal Stability Analysis
• SCR Work
• Project Schedule
# Transient Stability Studies

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</table>
Method

The maximum time during which a disturbance can be applied without losing system stability

Critical Clearing Time
Transient Stability Studies

Status

- TSAT response of the provided model is benchmarked against PSS/E results
  - Data assembly is finalized
  - Two major faults are applied and results match well
  - A dominant oscillatory mode around 0.56 Hz with sufficient damping is observed in SPP footprint for both sets of results
- TSAT responses of 8 screened faults by FFS are simulated and compared with those of PSS/E responses
  - The results are in close agreement
  - Instability occurs for faults close to Wolf Creek U1 unit
  - Sensitivity studies points to its exciter model data issue
  - Prony analysis finds the dominant mode indicating sufficient damping in all cases except those close to Wolf Creek; the issue disappears once Wolf Creek exciter model is removed
Small Signal Stability Studies

Status

- Eigenvalue scans of the base cases and all 8 FFS contingency cases are performed
  - Two inter-area modes are identified, ~ 0.5 – 0.6 Hz with different mode shapes, having significant participations of the generators in SPP footprint
  - Damping ratios are around 6% or more in all cases except for cases with contingencies close to Wolf Creek
  - Damping issues resolve if Wolf Creek exciter model is removed
- In general TSAT, PSS/E, Prony, and SSAT results are all consistent
  - They do not show any sign of a real small signal stability issue
  - The outstanding issue is to rectify the parameter settings of the Wolf Creek exciter model
- Draft Final Report should be ready by the end of January
**Inter-area Mode 1**

**Mode Shape**

<table>
<thead>
<tr>
<th>Real</th>
<th>Imaginary</th>
<th>Frequency</th>
<th>Damping</th>
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<tbody>
<tr>
<td>-0.2125</td>
<td>3.5160 rad/s</td>
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**Case:** 22L0_Faults.ssa  **Scenario:** 22L0  **Contingency:** No fault

**Dominant State:** 532751 : WCGS U1 25.0 : 0 : 1 : GENPJ : 0 : 1 : GENROE : Psi_fd

**Mode Shape Reference:** 527902 : HOBBS_PL18.0 : 0 : 1 : GENROE : 0 : Speed

---

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Inter-area Mode 2

Mode Shape
Real = -0.2833 1/s  Imaginary = 3.7464 rad/s  Frequency = 0.5963 Hz  Damping = 7.54 %
Case: 22L_0_Faults.ssa  Scenario: 22L_0  Contingency: No fault
Dominant State: 383753 : 1VOGTLE326.0 : 0 : 3 : GENROU : Speed
Mode Shape Reference: 527902 : HOBBS_PL18.0 : 0 : 3 : GENROE : Speed

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<th>0.47</th>
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SSAT
SPP 2019 inverter based generation integration study (IBIS) – progress update

Deepak Ramasubramanian
Evangelos Farantatos
Anish Gaikwad

Grid Operations and Planning
Electric Power Research Institute
Task 1 – Identifying low short circuit regions

• Case details:
  • Light load case - 18L_Hour_001_2018_02_19_03_IBIS_60_psse31-7 with both Waverly OFF and ON (with system re-dispatch)
  • Total of around 220 locations including existing wind plants, and plants from the DIS-16-2 GI Queue were screened for low SCR

• Evaluated using EPRI’s Grid Strength Assessment Tool (GSAT) v1.0
  • Available at: https://www.epri.com/#/pages/product/000000003002013640/?lang=en-US
  • Calculates short circuit metrics (simple, weighted, & composite) as well as an advanced metric to take into consideration controller gains and possibility of oscillatory instability

• Analysis completed
  • SCR calculations as well as computation of the advanced metric for the 220 locations
  • Determination of electrical close by wind generators that may have potential control interaction
  • Statistical analysis to observe correlation between short circuit ratio and possibility of oscillatory instability
Inverter Oscillatory Instability

- Inverter Oscillatory Instability – adverse control interactions between inverter controllers
  - Of two or more inverter-based plants
  - Of one inverter-based wind plant and a synchronous machine
  - Of one inverter-based wind plant and any other controller present in the system

- May lead to negative damping and system instability

- May lead to sustained inter-area oscillations
POI vs Generator Terminals

Point of Interconnection Bus

Generator Terminal Bus

Inverter-Based Wind Plant
SCR changes a lot from the POI to the actual inverter terminals...

- SCR at POI can be high, while it can be low at the individual inverter terminal.
- Transformers and collector network add radially connected impedances.
- Although correlation is positive, it is not strong.
SCR does not provide the entire picture...

- For an inverter plant, a low or high value of SCR may not provide the entire picture.

- The possibility of instability is governed by,
  - The short circuit capacity at the converter plant's terminals and the POI
  - The values of the controller gains
  - The MW power output level of the converter plant
  - The fault clearance time of transmission protection

- For this purpose, a new advanced metric termed as critical clearing time has been developed.

- CCT in this context is the maximum time a fault near the POI of the inverter plant is allowed to remain on the system to eliminate the possibility of instability of the inverter plant
How does CCT relate to SCR?

- The correlation is positive, but also weak (strong correlation is indicated by the $y=x$ line).
- Because, SCR is only one component that plays a role in determining instability.
- A low SCR value of 3.0 for example, can result in a wide variation of critical clearing times, from 10 cycles to 50 cycles.
Example comparisons of CCT and SCR

CCT for lower values of SCR

- Buses where SCR is low, critical clearing time can be high.
- If the inverter plant is at 0 MW, or placed out of service, then CCT cannot be evaluated.
- The values of CCT would reduce as the values of the controller gains increase.

SCR for lower values of CCT

- Location where CCT is low, can have a high SCR.
- These locations where CCT is low is a good starting point for a more detailed analysis.
- A detailed analysis can be first conducted with more detailed positive sequence models, and then followed by an EMTP study.
Results – Base and N-1 Cases

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<th>Plant Name</th>
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<th>MW</th>
<th>Area</th>
<th>SCR (Gen)</th>
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Remaining Work

- An EMTP study (PSCAD) encompassing the noted locations will be performed to determine controller interactions.
- Up to 100 buses will be included in this three phase transient analysis.