SOUTHWEST POWER POOL
MARKET WORKING GROUP MEETING
August 23, 2016
AEP Office – Dallas, TX
• Summary of Motions •

Motions:

Agenda Item 4: RR179 Trading Hubs and Resource Hubs Compliance
Shawn McBroom (OG&E) motioned to approve RR179 as submitted, Valerie Weigel (Basin) seconded. Motion passed with no opposition and no abstention.

Agenda Item 5: RR181 Annual Allocation Percent Change Compliance
Shawn McBroom (OG&E) motioned to approve RR181 as submitted, Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstention.

Agenda Item 6: RR175 Ramp Shortage Compliance
Shawn McBroom (OG&E) motioned to approve RR175 as submitted, Kevin Galke seconded. Motion passed with one opposition (GSEC) and one abstention (NPPD).

Agenda Item 9: RR173 Instantaneous Peak Load
Shawn McBroom (OG&E) motioned to reject RR173, no second was provided. Motion did not carry. It is noted that this motion was based on a modification made to the language during the review of the RR. Once the modification was removed, OG&E supported RR173 based on the original proposed language.

Richard Ross (AEP) motioned to approve RR173 as modified, Carrie Dixon (Xcel) seconded. Motion passed with two oppositions (WR and GSEC) and one abstention (OPPD).

Agenda Item 14: RR183 VRL Annual Update 2016
Ron Thompson (NPPD) motioned to approve RR183 as submitted, Brad Johnston (AECC) seconded. Motion passed with one opposition (WR) and one abstention (GSEC).

Agenda Item 15: RR184 Clarification to Outage Deviation
Shawn McBroom (OG&E) motioned to approve RR184 as submitted, Lee Anderson (LES) seconded. Motion passed with no opposition and no abstention.
Motion to expedite RR178, 177, 182, and 185
Aaron Rome (Midwest Energy) motioned to approve the RR178, 177, 182 and 185 for expedited treatment and Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstention.

Agenda Item 17: RR178 Validation of Mitigated Resource Offer Parameters
Shawn McBroom (OG&E) motioned to approve RR178 as submitted and Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstention.

Agenda Item 18: RR177 Remove Reference to NERC Standards in Protocols and Tariff
Shawn McBroom (OG&E) motioned to approve RR177 as submitted and Aaron Rome (Midwest Energy) seconded. Motion passed with one opposition (NPPD) and one abstention (WR).

Agenda Item 19: RR182 Control Area Clarification
Ron Thompson (NPPD) motioned to approve RR182 as modified, Jim Flucke (KCP&L) seconded. Motion passed with no opposition and no abstention.

Agenda Item 20: RR185 Clarify SPP Operating Criteria
Jack Madden (ETEC/Tex-La/NTEC) motioned to approve RR185 as submitted, Ron Thompson (NPPD) seconded. Motion passed with no opposition and no abstention.

Agenda Item 21: Revision Request Process Changes
Shawn McBroom (OG&E) motioned to approve the MOPC RR Process changes as modified and with the future addition of language to state that Primary Working Group approved RRs will move forward through the stakeholder approval process to the MOPC, Richard Ross (AEP) seconded. Motion passed with one opposition (WR) and no abstention.
SOUTHWEST POWER POOL
MARKET WORKING GROUP MEETING
August 23, 2016
AEP Office – Dallas, TX
• Minutes •
8:00 a.m. – 6:00 p.m.

Agenda Item 1 – Call to Order, Proxies, Agenda Discussion
Call to Order
Richard Ross (AEP) called the meeting to order at 8:00 a.m.

Attendance & Proxies
The attendance was recorded and proxies were announced. See Attachment 1 - MWG Attendance August 23 2016.

Review of Agenda
Richard Ross reviewed the agenda with the group. It was noted agenda items may be adjusted throughout the meeting to ensure the review of priority items. See Attachment 2 - MWG Agenda for August 2016.

Agenda Item 2 – Consent Agenda (approval items)
Richard Ross introduced the consent items set for approval by the group.

Agenda Item 2a – MWG July 19 Minutes Approval
The group took no action on the MWG August 23, 2016 minutes, noting no changes. See Attachment 3 - MWG August 23 2016 Minutes.

Agenda Item 3a – Working Group/Committee Updates – PFTF Update
Matt Moore (GSEC) provided an update on the Price Formation Task Force (PFTF). Matt summarized the outcome of the previous PFTF meeting and provided an overview of the agenda for the August 24, 2016 PFTF meeting.

Agenda Item 4 – RR179 Trading Hubs and Resource Hubs Compliance (approval)
Jared Greenwalt (SPP) provided background on Trading Hubs and Resource Hubs compliance and an overview of the changes requested in FERC Order (ER15-2265). The original order required two changes by SPP: 1) FERC ordered SPP to explicitly state that any long-term TCR based on a settlement location associated with Resource hub will be honored by SPP for the full term of those TCRs, and 2) FERC ordered SPP to revise Tariff section 3.1.6 to specify that termination of a Resource hub tied to a bilateral contract, and related bilateral settlement schedule, is prohibited unless agreed upon by both parties to
the transaction. SPP responded in a compliance filing to FERC on October 22, 2015 fully addressing the requirements noted above and including a qualifying statement which FERC did not approve. SPP removed the qualifying statement in a subsequent compliance filing to FERC on March 30, 2016. RR179 incorporates the necessary language changes in the Market Protocols. See Attachment 4 - RR179 Trading Hubs and Resource Hubs Compliance.

**Motion:** Shawn McBroom (OG&E) motioned to approve RR179 as submitted, Valerie Weigel (Basin) seconded. Motion passed with no opposition and no abstention.

**Agenda Item 5 – RR181 Annual Allocation Percent Change Compliance (approval)**
Jared Greenwalt provided background and an overview of the changes in compliance filing (ER16-13-002). FERC made SPP aware of incorrect section references which are removed in RR181. See Attachment 5 – RR181 Annual Allocation Percent Change Compliance.

**Motion:** Shawn McBroom (OG&E) motioned to approve RR181 as submitted, Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstention.

**Agenda Item 6 – RR175 Ramp Shortage Compliance (approval)**
Jared Greenwalt provided a summary of FERC Order 825 and SPP’s practice regarding the trigger of Scarcity Pricing prior to the order. FERC Order 825 requires RTO/ISOs to trigger shortage pricing for any interval in which a shortage of Energy or Operating Reserve is indicated during the pricing of Resources for that interval. FERC further ordered that any shortage, regardless of duration or cause, shall be subject to scarcity pricing. Jared explained how the revisions included in RR175 will bring the Tariff and Market Protocols in compliance with the Order. The group voiced concern that this could result in an increase in scarcity pricing events. Gary Cate (SPP) explained SPP will propose a revised Operating Reserve demand curve to mitigate the concern of increased scarcity events. See Attachment 6 – RR175 Ramp Shortage Compliance.

**Motion:** Shawn McBroom (OG&E) motioned to approve RR175 as submitted, Kevin Galke seconded. Motion passed with one opposition (GSEC) and one abstention (NPPD).

**Agenda Item 7 – RR Scarcity Pricing Demand Curve**
Yasser Bahbaz (SPP) explained that demand curves are currently setting price only when there is capacity scarcity of a product. FERC Order 825 requires that RTOs/ISOs trigger scarcity pricing in ramp or capacity shortages regardless of the duration of the shortage. Yasser walked through a detailed presentation explaining the methodology SPP will follow to accomplish what is proposed. SPP is proposing to remove the relaxation logic that currently occurs due to ramp constraints. Yasser provided an evaluation of the current demand curves, and proposed a change to the current curves set in place.
Demand curves will set price if a shortage is due to capacity or ramp. Yasser noted the demand curves will be evaluated and could change on a monthly, or as needed, basis and will be made available to Market Participants. The group discussed the proposed design and voiced support of the proposal. SPP plans to develop an RR for approval during the September MWG meeting. See Attachment 7 - RR Scarcity Pricing Demand Curve.

**Action Item:** Yasser will perform an analysis on the impact of not relaxing ramp rate and allowing scarcity pricing to occur when there is no capacity shortage for the September 7th conference call.

**Agenda Item 8 – SPP Comments RR154 Repricing Timelines and Requirements**

This topic was deferred to the September 20, 2016 MWG meeting. See Attachment 8 – SPP Comments RR154 Repricing Timelines and Requirements.

**Agenda Item 9 – RR173 Instantaneous Peak Load (approval)**

Jared Greenwalt reviewed RR173 noting the overall intent is to clarify the terms, “Head-room” and “Floor-room.” Jared explained that the manner in which the terms are used and defined in SPP’s market causes confusion as SPP’s definition varies from standard industry definitions. Moreover, SPP’s definition and supporting language states uncertainty of forecasts and Variable Energy Resources are considered while neither are used in the calculation. To remedy the disconnect between the definition and language and the calculation, SPP proposed removing the terms, “Head-room” and “Floor-room” and proposed a new term and revised language to clarify the inputs to the calculation, and thus the purpose. Gary stated that the term, “Instantaneous Peak Load”, more accurately represents SPP’s use. Gary Cate reiterated that SPP is not changing the calculation. Matt Moore expressed concern that the Revision Request does not go far enough to address GSEC’s concern that by procuring rampable capacity for things such as instantaneous load change, hourly load forecast or variable resource output through RUCs masks shortage conditions in a manner inconsistent with the requirements of FERC’s Shortage Pricing Rule. The group discussed the changes proposed within the Revision Request and made modifications to remove the phrase, “…due to uncertainty” where used to describe RUC inputs. See Attachment 9 – RR173 Instantaneous Peak Load.

**Motion:** Shawn McBroom (OG&E) motioned to reject RR173, no second was provided. Motion did not carry. It is noted that this motion was based on a modification made to the language during the review of the RR. Once the modification was removed, OG&E supported RR173 based on the original proposed language.

Richard Ross (AEP) motioned to approve RR173 as modified, Carrie Dixon (Xcel) seconded. Motion passed with two oppositions (WR and GSEC) and one abstention (OPPD).
**Agenda Item 10 – Adding Round 2 to Monthly ARR Allocation**

JJ Guo (AEP) presented a proposal from AEP to change to monthly ARR allocations. JJ provided an overview of the annual ARR allocation process, emphasizing the three rounds, with round 3 nominations being open to any source to sink path, and provided an overview of the purpose of R91, highlighting the reduced percentages. JJ stated RR91 resulted in varying degrees of loss in round 3 ARR awards for all ARR holders due to lower transmission system capabilities that is not compensated for at subsequent monthly ARR processes. JJ proposed two solutions: 1) One additional round of allocation is added to each monthly ARR process: round 1 where only candidate ARRs are to be nominated remains the same; in round 2 any source to sink path can be nominated, and 2) Monthly TCR auctions for October through May are reduced to one round with 100% of Residual Transmission System Capability. AEP requested MWG provide support of this proposal. Jim Flucke (KCP&L) voiced support and discussed with AEP other options considered from a scheduling perspective for maintaining a second round nomination period. Jim stated he had concern with the potential reduction in opportunity to gain TCRs due to the loss of the second round nomination period. Shawn McBroom (OG&E) noted he felt it is best to give the market a full year with the changes implemented from RR91 in place before moving forward with a new process. Richard Ross thanked the group for their feedback. See Attachment 10 – Adding Round 2 to Monthly ARR Allocation.

**Agenda Item 11 – Multi-Month Auctions in Integrated Marketplace**

Jim Flucke presented a proposal to introduce multi-month auctions into the SPP market. Jim highlighted potential TCR market improvements, potential auction schedule changes, potential multi-month auction logistics, and noted the benefits and costs associated with the proposal. Jim noted the main goals are market funding and more liquidity. Jim stated he recognizes this change may be a major change and may potentially be cost prohibitive, but thinks it is worth the effort to evaluate. Carrie Dixon (Xcel) noted a concern that this would create additional work with an unknown benefit. Ty Mitchell (SPP) stated this approach would create more work for SPP staff that is levelized rather than concentrated as it is now due to the Annual auction. Charles Cates (SPP) made the group aware of budget constraints as SPP does not have a budget to support this in the next year. Valerie Weigel (Basin) stated she supports the proposal and feels it is a good idea. Jim requested anyone with addition ideas or concerns email him. Attachment 11 – Multi-Month Auctions in Integrated Marketplace.

**Agenda Item 12 – SPP Residual Transmission System Capability**

Ty Mitchell (SPP) provided an update to let the group know that SPP will propose an RR to change language in the Protocols in the TCR section related to Residual Transmission System Capability. Ty explained that the Residual Transmission System Capability calculation in Protocols section 5.2.3(2) should include “previous award impact” to account for LTCR awards.. See Attachment 12 – SPP Residual Transmission System Capability.
Agenda Item 13 – 2016 Annual VRL Analysis
Gary Cate presented details of the 2016 Annual VRL Analysis and discussed SPP’s recommendation. Gary noted that although no changes to the VRLS related to Resource Capacity, Power Balance, Ramp, and Spinning Reserve Requirements are recommended, SPP does recommend a change to the first VRL block value for Operation Constraints. Gary explained through the analysis a value equal to $750 has shown to provide a better combination of reliability and cost, thus reducing the number of flowgate breach instances, with small impacts to system cost. The group discussed the causes of the increased occurrence of breach instances and the possibility of further changes that may be made to the Operational Constraint VRLs. Gary stated SPP will continue analysis to identify improvements to reduce the large number of breach instances and will keep the group apprised of additional opportunities for improvement as they are determined. See Attachment 13 – 2016 Annual VRL Analysis.

Agenda Item 14 – RR183 VRL Annual Update 2016 (approval)
Erin Cathey provided an overview of the revisions to update the first Operating Constraint VRLs to equal $750 in the Tariff and Market Protocols. Erin stated that the RR proposes revisions to the first VRL block value for Operation Constraints as stated in the 2016 Annual VRL Analysis. Erin reiterated that this change should bring about fewer violations and prices which more accurately reflect the needed redispacht. Nick Parker (SPP MMU) submitted comments in support of the VRL change. The group voiced support of the Revision Request. See Attachment 14 – RR183 VRL Annual Update 2016.

Motion: Ron Thompson (NPPD) motioned to approve RR183 as submitted, Brad Johnston (AECC) seconded. Motion passed with one opposition (WR) and one abstention (GSEC).

Agenda Item 15 – RR184 Clarification to Outage Deviation (approval)
John Luallen (SPP) provided background explaining that the intent of RR106 was not fully realized. The previously approved formula in RR106 would exempt all Resources that clear in the DAMKT that were following SPP’s Dispatch to zero from receiving the RtOutageDevHrlyQty in the RUC MWP distribution. However, the formula would also charge every Resource RtOutageDevHrlyQty that cleared in the DAMKT and submitted meter data in Real-Time. The changes in RR184 reflect the intent of RR106. If a Resource clears in the DAMKT and is off line in RT (meters zero) then the amount of MWs cleared in the DAMKT will be included in the RUC MWP distribution via the RtOutageDevHrlyQty charge type. If a Resource clears in the DAMKT and meters zero in RT, and that Resource was either decommitted by SPP or was following SPP’s Dispatch to zero, then the Resource will be exempted from RtOutageDevHrlyQty. The changes also add a check for the RtOomSminFig to verify that the Resource was following SPP dispatch via OOME. The group voiced support for the change. The group approved the Revision Request. See Attachment 15 – RR184 Clarification to Outage Deviation.
Motion: Shawn McBroom (OG&E) motioned to approve RR178 as submitted and Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstention.

Agenda Item 16 – RR Solar Generation Updates
Erin Cathey (SPP) provided an overview of the draft Revision Request to propose rules for solar Resources. Erin explained that the number of solar Resources in SPP’s footprint is increasing with 2,800 MW of planned solar generation currently in the SPP GI study queue. The group requested SPP review the language proposed in the Dispatchable Variable Energy Resource (DVER) section of the Tariff and the Protocols to ensure the language does not inadvertently require Resources currently registered as Non-Dispatchable Variable Energy Resources (NDVER) to re-register as DVERs. The group also discussed the accuracy of the draft Solar Generation Resource Data Requirements. Erin stated SPP will review the DVER language and verify the requirements prior to submitting a final Solar Generation Revision Request to the group for approval. See Attachment 16 – RR Solar Generation Updates.

Motion to expedite RR178, 177, 182, and 185
Aaron Rome (Midwest Energy) motioned to approve the RR178, 177, 182 and 185 for expedited treatment and Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstentions

Agenda Item 17 – RR178 Validation of Mitigated Resource Offer Parameters (approval)
Erin Cathey provided an overview of the purpose of RR178 and walked the group through the revised language. Erin explained that the SPP Market Protocols and SPP Tariff do not clearly prescribe that the SPP MMU review of the costs included in each mitigated Resource offer is performed on an ex-post basis. The group held some discussion about the MMU’s review process before stating support of the Revision Request. See Attachment 17 – RR178 Validation of Mitigated Resource Offer Parameters.

Motion: Shawn McBroom (OG&E) motioned to approve RR178 as submitted and Jack Madden (ETEC/Tex-La/NTEC) seconded. Motion passed with no opposition and no abstention.

Agenda Item 18 – RR177 Remove Reference to NERC Standards in Protocols and Tariff (approval)
Erin Cathey reviewed the proposed changes to remove reference to NERC standards in the Protocols and Tariff. Erin highlighted the intent of the Revision Request stating that, in some cases, referencing NERC Standards in the Market Protocols and Tariff creates confusion regarding whether or not entities are performing obligations for Market reasons or NERC standard reasons. Erin noted other changes were due to staff determination that some of the references are unnecessary or duplicative of standing NERC requirements. The group expressed concern with removing references to NERC standards during the initial review of the changes, but determined through discussion that it was the correct direction
and approved the RR as submitted. See Attachment 18 – RR177 Remove NERC Reference to NERC Standards in Protocols and Tariff.

**Motion:** Shawn McBroom (OG&E) motioned to approve RR177 as submitted and Aaron Rome (Midwest Energy) seconded. Motion passed with one opposition (NPPD) and one abstention (WR).

**Agenda Item 19 – RR182 Control Area Clarification (approval)**
Erin Cathey provided an overview of the purpose of RR182 stating the term “Control Area” was inadvertently used in the Market Protocols in Appendix C – Meter Technical Specifications and in the Tariff at Attachment AE in the Market Participant Access and Transmission Provider Use of Confidential Information section. Erin reviewed the revisions as proposed by NPPD in their comments and agreed to the modifications. The group approved the revisions as modified by NPPD. See Attachment 19 – RR182 Control Area Clarification.

**Motion:** Ron Thompson (NPPD) motioned to approve RR182 as modified, Jim Flucke (KCP&L) seconded. Motion passed with no opposition and no abstention.

**Agenda Item 20 – RR185 Clarify SPP Operating Criteria (approval)**
Erin Cathey presented changes to clarify references to SPP Criteria in the Market Protocols and Tariff. Erin explained that since the SPP Criteria is now two separate documents, SPP Planning Criteria and SPP Operating Criteria, references to SPP Criteria should be clarified to point specifically to the correct Criteria document. The group voiced support of the changes presented and approved the Revision Request. See Attachment 20 – RR185 Clarify SPP Operating Criteria.

**Motion:** Jack Madden (ETEC/Tex-La/NTEC) motioned to approve RR185 as submitted, Ron Thompson (NPPD) seconded. Motion passed with no opposition and no abstention.

**Agenda Item 21 – Revision Request Process Changes (approval)**
Erin Cathey presented the changes to the MOPC Revision Request Process. The group discussed the Revision Request submission and Revision Request Comment submission timelines. The group approved the changes as modified and with the future addition of language to state, that Primary Working Group approved RRs will move forward through the stakeholder approval process to the MOPC. See Attachment 21 – Revision Request Process Changes.

**Motion:** Shawn McBroom (OG&E) motioned to approve the MOPC RR Process changes as modified and with the future addition of language to state that Primary Working Group approved RRs will move forward through the stakeholder approval process to the MOPC, Richard Ross (AEP) seconded. Motion passed with one opposition (WR) and no abstention.

**Relationship-Based • Member-Driven • Independence Through Diversity**

**Evolutionary vs. Revolutionary • Reliability & Economics Inseparable**
**Agenda Item 22 – Short-Term Stored Energy Resources**
Yasser Bahbaz, Erin Cathey and John Luallen (SPP) facilitated discussion regarding Short-Term Stored Energy Resource (STSER) market design. John reviewed the proposed settlement design for SERs at a high-level and highlighted feedback received from the Settlements User Group (SUG). The group held discussion on the operational design. Yasser explained SPP’s approach to implementing STSER market design. SPP proposed to begin by implementing design to allow STSER’s to participate in SPP’s Regulation market with SPP managing the Resources’ state of charge. SPP noted that some time in the future a phase 2 may be discussed in which STSERs may be Energy qualified and offer in both Regulation and Energy. Yasser reiterated the approach, at this time, is to develop market design, which allows STSERs to participate as Regulation only qualified Resources. The group held significant discussion as to whether or not the STSER design should include a settlement for Energy in an effort to ‘future-proof’ for the potential phase 2 STSER design. The group recommended SPP develop a Revision Request for September focused on phase 1 STSER design including any forward-looking settlements language to ensure minimal design impacts when phase 2 is developed. See Attachment 22 – Short-Term Stored Energy Resources.

**Agenda Item 23 – Markets Protocols Document Proposed Changes**
Debbie James (SPP) explained the Integrated Market Protocols document is becoming too large and unmanageable. Debbie offered two possible solutions to the group: 1) Settlements breakout - breakout only the Settlements sections/appendices as a single separate document and 2) Market Protocols breakout every section/appendix of the Protocols as individual documents. The group preference was to break the document into individual sections based on the current Market Protocol section headings with the addition of a standalone Settlements section. Some concern was noted about the potential loss of search ability and the group requested a full master version be provided along with the sections as they are divided and republished. See Attachment 23 – Market Protocols Document Proposed Changes.

**Agenda Item 24 – Marketplace Updates**
This agenda item was deferred to the September 7, 2016 MWG net-conference. See Attachment 24 – Marketplace Updates.

**Agenda Item 24a – RTO Marketplace Update**
This agenda item was deferred to the September 7, 2016 MWG net-conference. See Attachment 24a – RTO Marketplace Update.

**Agenda Item 24b – MMU Marketplace Update**
This agenda item was deferred to the September 7, 2016 MWG net-conference. See Attachment 24b – MMU Marketplace Updates.

**Agenda Item 24c – Quarterly MWG Action Items**
This agenda item was deferred to the September 7, 2016 MWG net-conference. See Attachment 24c – Quarterly MWG Action Items.

**Agenda Item 25 – Written Reports**
This agenda item was deferred to the September 7, 2016 MWG net-conference.

**Agenda Item 25a – Marketplace RR January 2017 MOPC Schedule**
This agenda item was deferred to the September 7, 2016 MWG net-conference. See Attachment 25a – Marketplace RR January 2017 MOPC Schedule.

**Agenda Item 25b – Regulatory Report**
This agenda item was deferred to the September 7, 2016 MWG net-conference. See Attachment 25b – Regulatory Report.

**Agenda Item 26 – Review of Motions, Action Items and Future Meetings**
This agenda item was deferred to the September 7, 2016 MWG net-conference.

**Action Items:**
- Agenda Item 7 - Yasser will perform an analysis on the impact of not relaxing ramp rate and allowing scarcity pricing to occur when there is no capacity shortage for the September 7th conference call.

**Future Agenda Items:**
- RR Scarcity Pricing Demand Curve
- RR Planning Reserve Margin Language
- RR Solar Generation
- RR Short-Term Stored Energy
- Daily TCRs (Linked Virtuals)
- RR114 Add Energy Storage Rules to Marketplace
- RR154 Repricing Timelines and Requirements

**Future MWG Meetings:**
**MWG Conference Call** - Wednesday, September 7, 2016 (9:00 a.m. – 12:00 p.m.)
MWG Meeting - Tuesday, September 20, 2016 (8:00 a.m. – 6:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

PFTF Meeting - Wednesday, September 21, 2016 (8:00 a.m. – 12:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

MWG Meeting - Tuesday, October 18, 2016 (8:00 a.m. – 6:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

PFTF Meeting - Wednesday, October 19, 2016 (8:00 a.m. – 12:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

**Agenda Item 27 – RR4_MPRR 130b Must Offer Penalty Calculation and Clarification (postpone)**
This item is postponed.

**Agenda Item 28 – RR10_MPRR 169 Clear and Unambiguous Must Offer Proposal (postpone)**
This item is postponed.

**Agenda Item 29 – RR114 Add Energy Storage Rules to Marketplace (postpone)**
This item is postponed.

**Agenda Item 30 – Adjournment**
Richard Ross adjourned the meeting at 6:08 p.m.

Respectfully Submitted - Debbie James, MWG Staff Secretary
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<td>Ty Mitchell</td>
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<td>Veronica Bosquez</td>
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<td>501-688-1607</td>
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MARKET WORKING GROUP MEETING
August 23, 2016
AEP Office – Dallas, TX

• A G E N D A •

Day 1: 8:00 a.m. – 6:00 p.m.

1. Call to Order, Proxies, Agenda Discussion ................................................................. Richard Ross

2. Consent Agenda (approval items)
   a. MWG July 19 Minutes Approval ........................................................................ Richard Ross

3. Working Group/Committee Updates ........................................................................... Richard Ross
   a. PFTF Update ........................................................................................................ Matt Moore

4. RR179 Trading Hubs and Resource Hubs Compliance (approval) ......................... Jared Greenwalt

5. RR181 Annual Allocation Percent Change Compliance (approval) ......................... Jared Greenwalt

6. RR175 Ramp Shortage Compliance (approval) .......................................................... Jared Greenwalt

7. RR Scarcity Pricing Demand Curve ........................................................................... Gary Cate

8. SPP Comments RR154 Repricing Timelines and Requirements ............................. Jodi Woods

9. RR173 Instantaneous Peak Load (approval) ............................................................... Jared Greenwalt

10. Adding Round 2 to Monthly ARR Allocation ............................................................ AEP

11. Multi-Month Auctions ............................................................................................... Jim Flucke

12. SPP Residual Transmission System Capability ...................................................... Ty Mitchell

13. 2016 Annual VRL Analysis ...................................................................................... Gary Cate

14. RR183 VRL Annual Update 2016 (approval) ............................................................ Erin Cathey

15. RR184 Clarification to Outage Deviation (approval) ................................................. John Luallen
16. RR Solar Generation Updates...........................................................................................................Erin Cathey
17. RR178 Validation of Mitigated Resource Offer Parameters (approval)............................................Erin Cathey
18. RR177 Remove Reference to NERC Standards in Protocols and Tariff (approval) .........................Erin Cathey
19. RR182 Control Area Clarification (approval)......................................................................................Erin Cathey
20. RR185 Clarify SPP Operating Criteria (approval)...............................................................................Erin Cathey
21. Revision Request Process Changes (approval)....................................................................................Erin Cathey
22. Short-Term Stored Energy Resources .............................................................................................John Luallen
23. Markets Protocols Document Proposed Changes.............................................................................Debbie James
24. Marketplace Updates
   a. RTO Marketplace Update .............................................................................................................Gary Cate
   b. MMU Marketplace Update ..........................................................................................................Jason Bulloch
   c. Quarterly MWG Action Items.......................................................................................................Erin Cathey
25. Written Reports
   a. Marketplace RR January 2017 MOPC Schedule ..............................................................................Erin Cathey
   b. Regulatory Report .........................................................................................................................Marisa Choate
26. Review of Motions, Action Items and Future Meetings.......................................................................Erin Cathey
27. RR4_MPRR 130b Must Offer Penalty Calculation and Clarification (postpone)..................Jared Greenwalt
28. RR10_MPRR 169 Clear and Unambiguous Must Offer Proposal (postpone) ..........................Richard Ross
29. RR114 Add Energy Storage Rules to Marketplace (postpone).........................................................Erin Cathey
30. Adjournment .....................................................................................................................................Richard Ross
Motions:
No motions were taken during the July MWG meeting.
SOUTHWEST POWER POOL  
MARKET WORKING GROUP MEETING  
July 19, 2016  
AEP Office – Dallas, TX  
• Minutes •

8:00 a.m. – 6:00 p.m.

Agenda Item 1 – Call to Order, Proxies, Agenda Review

Call to Order
Richard Ross (AEP) called the meeting to order at 8:00 a.m.

Attendance & Proxies
The attendance was recorded and proxies were announced. See Attachment 1 - MWG Attendance July 19 2016. The following members were represented by proxy:

- Terry Wright (EDE) for Rick McCord (EDE).

Review of Agenda
Richard Ross reviewed the agenda with the group. One change was noted. Agenda Item 9c (Action Item 305-Determine if MP Line of Credit will cover DAMKT Error) would be taken out of order to accommodate staff time constraints. See Attachment 2 - MWG Agenda for July 2016.

Agenda Item 2 – Consent Agenda
Richard Ross introduced the consent items set for approval by the group.

Agenda Item 2a – Consent Agenda – MWG June 21 Minutes
The group took no action on the MWG June 21, 2016 minutes, noting no changes. See Attachment 3 - MWG June 21 2016 Minutes.

Agenda Item 3a – Working Group/Committee Updates – PFTF Update
Matt Moore (GSEC) provided an update on the Price Formation Task Force (PFTF). Matt provided a high-level overview of the top concerns discussed during the April 25th PFTF meeting. Top concerns include: Headroom Definition and Language Clarification, Headroom Commitment Impact, Headroom Transparency, Day-Ahead and Real-Time Clearing, Scarcity Pricing, and the Regulation Selection Process. Stakeholders are encouraged to participate in future meetings and submit additional concerns. Concerns may be submitted to Jared Greenwalt at jgreenwalt@spp.org using the PFTF Issues Template. See Attachment 4 – SPP Market Working Group – July PFTF Update.

Agenda Item 3b – Working Group/Committee Updates – MOPC Update
Richard Ross provided an update on the July MOPC meeting. Richard specifically noted the MOPC decision to postpone RR125-Removal of Day-Ahead Limited Must-Offer, with a deadline for the MOPC to take action no later than the July 2017 MOPC meeting. The MOPC directed SPP staff to improve the Revision Request (RR) process such that working group approved RRs may not be placed on hold or
withdrawn without the approval of all groups that previously approved. Richard also provided an update on the MOPC discussion regarding the Annual State of the Market Update.

**Agenda Item 4 – Written Reports**
Richard Ross provided an opportunity for the group to discuss topics submitted as written reports.

**Agenda Item 4a – Written Reports – GFA Quarterly Report**
No discussion. See Attachment 5 – GFA Quarterly Report

**Agenda Item 4b – Written Reports – Congestion Hedging Quarterly Report**
No discussion. See Attachment 6 – Limit Expansion Q4 and Annual Markets

**Agenda Item 5 – Marketplace RR January 2017 MOPC Schedule**
Richard Ross called attention to the January 2017 MOPC RR submission schedule. See Attachment 7 – Marketplace RR January 2017 MOPC Schedule.

**Agenda Item 6 – Potential Manipulation of MWP Provisions**
Micha Bailey (SPP) summarized SPP’s recommendations to address the risk associated with potential manipulation of MWP provisions, as they were noted by the SPP MMU during the December 2013 MWG meeting. SPP RTO collaborated with the SPP MMU to determine the most effective means to mitigate each possible manipulation noted by the MMU: a) Crossing Midnight Hour, b) Fixed Regulation Offers, and c) Automate Mitigation for Local Reliability OOMEs. See Attachment 8 – Potential Manipulation of MWP Provisions.

**Agenda Item 6a – Potential Manipulation of MWP Provisions – Crossing Midnight Hour**
SPP MMU recommended SPP RTO work to reduce exposure to market manipulation due to commitment across the midnight hour. Micha Bailey reviewed an example previously provided to the MWG in December 2013 and detailed SPP RTO’s recommendation to mitigate this issue. SPP RTO supports the MMU’s plan to monitor for this behavior and report any occurrence. Jason Bullock (SPP MMU) provided information regarding the monitoring and verification process. SPP RTO also supports the MMU’s recommendation to remove the local market power test for MWP mitigation, but only for those Resources with a market commitment over 25 hours and extending to three or more Operating Days. Finally, SPP RTO recommends Settlements use the As-Committed Minimum Run Time offer to address the SPP MMU’s third recommendation to apply previous as-committed offers to the Minimum Run Time period across days. The group noted the recommended actions would require system changes and discussed the value of implementation considering the risk and frequency of occurrence. The group requested SPP bring a cost estimate to the MWG for further consideration. See Attachment 8 – Potential Manipulation of MWP Provisions.

**Action Item:** SPP to provide an impact assessment on the potential manipulation of MWP provisions - crossing the midnight hour.

**Agenda Item 6b – Potential Manipulation of MWP Provisions – Fixed Regulation Offers**
SPP MMU recommended SPP RTO work to reduce exposure to market manipulation by disqualifying Resources with fixed Regulation bids from receiving the Regulation Deployment Adjustment Charge. Micha Bailey reviewed an example previously provided to the MWG in December 2013 and detailed SPP RTO’s recommendation to mitigate this issue. Micha explained that in order to revise the Tariff and Market Protocols to disqualify a Resource with a fixed Regulation bid from receiving the Regulation Deployment Adjustment Charge, SPP RTO will need to do the following: change the MCE and Settlements system to track both the Energy Offer and the mitigated Energy Offer curves, use the Energy Offer curve for Resources that cleared equal to, or less than, the fixed Regulation bids, and not allow new MWPs to be created which may easily be inflated by changes to operating parameters. The group requested SPP RTO develop an impact assessment to aid in further consideration. See Attachment 8 – Potential Manipulation of MWP Provisions.

**Action Item:** SPP to provide an impact assessment on the potential manipulation of MWP provisions - Fixed Regulation Offers.

**Agenda Item 6c – Potential Manipulation of MWP Provisions – Automate Mitigation for Local Reliability OOMEs**
SPP MMU recommended SPP RTO work to reduce exposure to market manipulation by utilizing automatic mitigation provisions for local reliability commitments for local reliability OOME events. SPP RTO recommends no changes, continue monitoring as currently performed. The group agreed with SPP’s recommendation. See Attachment 8 – Potential Manipulation of MWP Provisions.

**Agenda Item 7 – RR82 Modification of MWP Grace Period Update**
Micha Bailey provided an update on the implementation status of RR82-Modification of MWP Grace Period. Revision Request 82, approved by the BOD in October 2015, changes the MWP grace period for Staggered Start Resources from one hour to two hours, adds an attestation requirement for these Resources, and allows any Resource registered prior to August 1, 2016 to be considered Staggered Start Resources. Micha explained that due to SPP staff constraints causing a delay in implementation, the grandfather date of August 1, 2016 must be adjusted. SPP staff will determine a new date and bring a proposal to the MWG for review. See Attachment 9 – RR82 Recommendation Report.

**Action Item:** SPP to provide an update on the grandfather date change related to RR82.

**Agenda Item 8 – Short-Term Stored Energy Resource Market Design**
Daniel Baker (SPP) and John Luallen (SPP) presented an overview of the proposed market design for Short-Term Stored Energy Resources (STSER). Daniel explained the objectives are to utilize the fast ramping ability of STSERs to provide Regulation service, reduce wear and tear on other Resources, reduce total operational cost, and maintain reliability. John explained the objectives of the Settlements design are to not settle Energy, have no Energy offer curve, treat all SPP STSER injection and withdrawal during Regulation clearing as Regulation deployment, only measure mileage during actual Regulation Deployment, and model auxiliary load as a separate load Settlement Location. MWG requested the SPP proposal for STSER settlement be reviewed with the Settlements User Group (SUG). John will report the recommendation of the SUG to the MWG during the August MWG meeting. Erin Cathey (SPP) explained
SPP will submit a new Revision Request for Short-Term Stored Energy reflecting the presented design in August. The group discussed the design with staff. Erin requested MWG members and stakeholders submit their feedback and questions to her at ecathey@spp.org. See Attachment 10 – Stored Energy.

Action Item: SPP staff to discuss the STSER Settlements design with the SUG and provide an update on their recommendation in August 2016.

Agenda Item 9 – SPP Comments RR154 Repricing Timelines and Requirements
Micha Bailey noted SPP’s concerns with repricing the DA Market and detailed SPP’s recommendation. Micha also provided some information regarding how other ISO/RTOs manage this process. SPP proposed to not perform repricing in the Day-Ahead market and to utilize the dispute process instead. The group voiced concern with removing the ability to reprice and requested clarification. Jodi Woods (SPP) stated the initial intent of the RR was to address concerns with the current language requiring SPP to reprice for every error, regardless of magnitude. SPP is seeking to define parameters which would set an expectation for which errors need repricing and/or stakeholder involvement. Matt Morais (SPP Legal) requested additional time for SPP to further research and discuss having heard the group’s concerns. SPP staff will bring a refined recommendation to the MWG in August. See Attachment 11 – RR154 Repricing the DAMKT.

Action Item: SPP staff to provide a refined recommendation on how to adjust market design for RR154 repricing timelines and requirements during the August MWG meeting.

Agenda Item 9a – MWG Action Item 303-SPP Cost Estimate to Reprice DAMKT
Gary Cate provided an update on MWG Action Item 303 – SPP cost estimate to reprice the Day-Ahead market. Gary reported the current amount of time spent by SPP staff on repricing is approximately 4.5 hours, with a cost of approximately $67k. With the additional monitoring for thresholds and additional analysis, Gary projects the total staff time required will increase to 7 hours, with a total cost of approximately $104k. The group expressed appreciation for the update. The action item was closed. See Attachment 12 – RR154 Projected Reprice Costs.

Agenda Item 9b – MWG Action Item 304-Impact of MP's Daily Production Cost on DAMKT Repricing
Gary Cate provided an update on MWG Action Item 304 – Impact of MP’s Daily Production Cost on DAMKT Repricing. Gary provided details on the monthly minimum, maximum and average Day-Ahead and Real-Time Resource Settlement Cost and Market Threshold amounts across a January 2015 to June 2016 timeframe, using a 20% threshold. The information provided represents what the threshold would be, on average, to reprice the Day-Ahead market. The group expressed appreciation for the information. This action item was closed. See Attachment 13 – RR154 Projected Reprice Costs.

Agenda Item 9c – Action Item 305-Determine if MP Line of Credit will cover DAMKT Error
Scott Smith (SPP) provided an update on MWG Action Item 305 – Determine if MP line of credit will cover DAMKT error. Scott noted that market participants’ Day-Ahead credit exposure may be covered by unsecured and/or secured credit. The group was interested in understanding the minimum capital requirements for market participation. Scott explained there are two minimum capital requirements in...
the SPP Tariff; greater than one million or total assets greater than 10 million. The group expressed appreciation for the information. The action item was closed.

**Agenda Item 10 – FERC Order 825 - Shortage Pricing Update**

Patti Kelly (SPP) provided an update on FERC Order 825 – the FERC’s final rule on settlement intervals and shortage pricing in markets operated by RTOs and ISOs. Patti summarized the requirements of the original NOPR and provided background information leading to Order 825. FERC issued Order 825 on June 16, 2016. The Order does not substantially change the original proposal but does seek to provide some clarification on certain issues. Regarding the requirements for settlement and dispatch intervals, organized markets are required to align settlement and dispatch intervals in Real-Time energy, Operating Reserve, intertie transactions, and trigger shortage pricing for any dispatch interval during which a shortage of Energy and Operating Reserve occurs. Regarding shortage pricing requirements, it is made clear that ramp-constraints are seen as true shortages. Until the shortages are resolved, prices are expected to reflect the system conditions and appropriate action should be taken to resolve the shortage in an expeditious manner. Patti detailed the timeline of when the order becomes effect and when revisions are expected to be complete and implemented. SPP staff is actively discussing the needed changes and plans to bring a Revision Request to the August MWG meeting with plans for approval by the MOPC in October. See Attachment 14 – Order 825.

**Agenda Item 11 – Action Item 302 – Hourly Regulation Clearing Pre-positioning**

Gary Cate (SPP) provided an update on Action Item 302 – Hourly Regulation Clearing Pre-Positioning. Gary highlighted problems with the current design and proposed a simple design change involving pre-processing in the RTBM solution to begin moving Resources to their Regulation range prior to the top of the hour. Gary further explained that two intervals prior to the top of the hour, RTBM will begin ensuring that Resources are able to ramp to their Regulation range if they are on Regulation for the next hour. This change will decrease top of the hour Regulation shortages due to Resources being outside of their limits. No settlement changes are required to implement this solution so the timeline will have fewer implementation constraints. The group discussed the proposal and was in favor of moving forward to implementation. The action item was closed. See Attachment 15 – Action Item 302.

**Agenda Item 12 – Alternative Transmission Outage Methodologies**

Jason Robison (SPP MMU) presented alternative transmission outage methodologies to the group. Jason detailed the symptoms he has observed, noted his thoughts on the cause and provided a few possible solutions before providing MMU’s recommendation. SPP staff noted that current outage metrics are available in ORWG meeting materials on SPP.org, including metrics for the monthly TCR process. See Attachment 16 – Alternative Outage Methodologies.

**Agenda Item 13a – Marketplace Updates – MMU Marketplace Update**

Jason Bulloch (SPP MMU) presented the MMU Marketplace Update and answered questions from the group. See Attachment 17 – MMU Market Update

**Agenda Item 13b – Marketplace Updates – RTO Marketplace Update**
Gary Cate (SPP) updated the MWG on the Regulation Requirement Changes in the RTO Marketplace Update and answered questions from the group. See Attachment 18 and 18a – RTO Update and RTO UpdateDAvsRTBMPricing.

**Agenda Item 13c – Marketplace Updates – Regulatory Report**
Patti Kelly (SPP) presented the Regulatory Report and Answered questions from the group. See Attachment 19 – Regulatory Report.

**Agenda Item 13d – Marketplace Updates – Quarterly RR Report**
Erin Cathey (SPP) presented the Quarterly Revision Request Report of all open RRs with approved impact assessments. See Attachment 20 – RR IA QTRLY Report

**Agenda Item 13e – Marketplace Updates – Quarterly MWG Action Items**
Deferred to the August MWG meeting. See Attachment 21 – MWG Action Items.

**Agenda Item 14 – Review of Motions, Action Items, Future Agenda Items and Future Meetings**
Erin Cathey (SPP) reviewed motions, action items, future agenda items and future meetings with the group. No motions or action items were taken.

**Action Items:**
- Agenda Item 6a – SPP to provide an impact assessment on the potential manipulation of MWP provisions - crossing the midnight hour
- Agenda Item 6b – SPP to provide an impact assessment on the potential manipulation of MWP provisions - Fixed Regulation Offers
- Agenda Item 7 – SPP to provide an update on the grandfather date change related to RR82.
- Agenda Item 8 – SPP staff to discuss the STSER Settlements design with the SUG and provide an update on their recommendation in August 2016
- Agenda Item 9 – SPP staff to provide a refined recommendation on how to adjust market design for RR154 repricing timelines and requirements during the August MWG meeting

**Future Agenda Items:**
- Energy Storage Rules to Marketplace
- RR154 Repricing Timelines and Requirements
- Scarcity Pricing Compliance Filing

**Future MWG Meetings:**
**MWG Meeting:**
Tuesday, August 23, 2016 (8:00 a.m. – 6:00 p.m.)
**Location:** AEP Office – Dallas, TX
**Room:** 8th Floor

**PFTF Meeting:**
Wednesday, August 24, 2016 (8:00 a.m. – 12:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

MWG Meeting:
Tuesday, September 20, 2016 (8:00 a.m. – 6:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

PFTF Meeting:
Wednesday, September 21, 2016 (8:00 a.m. – 12:00 p.m.)
Location: AEP Office – Dallas, TX
Room: 8th Floor

**Agenda Item 15 – RR4_MPRR 130b Must Offer Penalty Calculation and Clarification (postpone)**
This item is postponed.

**Agenda Item 16 – RR10_MPRR 169 Clear and Unambiguous Must Offer Proposal**
This item is postponed.

**Agenda Item 17 – RR114 Add Energy Storage Rules to Marketplace**
This item is postponed.

**Agenda Item 18 – Adjournment**
Richard Ross adjourned the meeting at 4:45 p.m.

Respectfully Submitted - Debbie James, MWG Staff Secretary
### Revision Request Form

**SPP STAFF TO COMPLETE THIS SECTION**

<table>
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<tr>
<th>RR #: 0179</th>
<th>Date: 8/11/2016</th>
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**RR Title:** Trading Hubs and Resource Hubs Compliance Filing – ER15-2265

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<td>Process Changes?</td>
<td>Yes</td>
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<tr>
<td>Impact Analysis Required?</td>
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**SUBMITTER INFORMATION**

<table>
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<tr>
<th>Name: Jared Greenwalt</th>
<th>Company: SPP</th>
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<tbody>
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<td>Email: <a href="mailto:jgreenwalt@spp.org">jgreenwalt@spp.org</a></td>
<td>Phone: 501-688-8314</td>
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*Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).*

- ☑ SPP Staff
- ☐ SPP Market Participant
- ☑ SPP Member
- ☐ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
- ☐ SPP Market Monitor
- ☐ Staff of government authority with jurisdiction over SPP/SPP member
- ☐ Rostered individual of SPP Committee, Task Force or Working Group
- ☐ Transmission Customers or other entities that are parties to transactions under the Tariff

**REVISION REQUEST DETAILS**

**Requested Resolution Timing:** ☑ Normal  ☐ Expedited  ☐ Urgent Action

**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

- ☐ Correction
- ☐ Clarification
- ☐ Design Enhancement
- ☐ New Protocol, Business Practice, Criteria, Tariff  ☑ FERC Mandate (List order number(s))

- ☑ NERC Standard Impact *(Specifically state if revision relates to/or impacts NERC Standards, list standard(s))*

**REVISION REQUEST RISK DRIVERS**

**Are there existing risks to one or more SPP Members or the BES driving the need for this RR?** ☑ Yes  ☐ No

If yes, provided details to explain the risk and timelines associated:

- ☐ Compliance (Tariff, NERC, Other)
- ☐ Reliability/Operations
- ☐ Financial

**SPP Documents Requiring Revision:**

*Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).*

- ☑ Market Protocols  Section(s): 4.5.2.3.2  Protocol Version: 39a
- ☑ Operating Criteria  Section(s):  Criteria Date:
- ☑ Planning Criteria  Section(s):  Criteria Date:
- ☑ Tariff (OATT)  Section(s): Attachment AE, 3.1.6
- ☐ Business Practice  Business Practice Number:
Objectives of Revision Request:
On September 22, 2015, FERC issued an Order (152 FERC ¶ 61,225) in Docket ER15-2265 related to Resource Hubs that called for two changes:

1) we will require SPP in a compliance filing due within 30 days of the date of this order to make explicit in the Tariff that any long-term or incremental long-term TCR based on a settlement location associated with a resource hub will be honored by SPP for the full term of those TCRs.

2) we will require SPP to revise section 3.1.6 to specify that termination of a resource hub tied to a bilateral contract, and related bilateral settlement schedule, is prohibited unless agreed upon by both parties to the transaction.

These requirements were addressed by the changes immediately below noted in the 10/22/2015 SPP Compliance Filing.

The Transmission Provider: (a) shall honor any LTCR or ILTCR that is based on a Resource Hub for the full term of the LTCR or ILTCR; and (b) shall not terminate a Resource Hub that is tied to a bilateral contract and related Bilateral Settlement Schedule, where the Resource Hub was created by the seller associated with the Bilateral Settlement Schedule, unless both parties to the Bilateral Settlement Schedule agree to the termination of the Resource Hub.

On 2/29/2016, FERC issued an Order (154 FERC ¶ 61,148) conditionally accepting this language requiring the removal of the phrase as shown below.

The Transmission Provider: (a) shall honor any LTCR or ILTCR that is based on a Resource Hub for the full term of the LTCR or ILTCR; and (b) shall not terminate a Resource Hub that is tied to a bilateral contract and related Bilateral Settlement Schedule, where the Resource Hub was created by the seller associated with the Bilateral Settlement Schedule, unless both parties to the Bilateral Settlement Schedule agree to the termination of the Resource Hub.

SPP filed a compliance filing on 3/30/2016 which removed the sentence. SPP submitted this filing as a conditional filing based on the outcome of a rehearing request that was also submitted on 3/30/2016.

On 6/21/2016, FERC denied the rehearing request and accepted the 3/30/2016 SPP Compliance Filing with final (155 FERC ¶ 61,290).

These changes have already been incorporated into the posted SPP Tariff but have not been reflected in the Protocols. The final, FERC-approved language is redlined below without the strikethrough language above.

Describe the benefits that will be realized from this revision.

This language ensures that LTCRs and ILTCRs will not be affected for potential Resource Hub terminations. Resource Hubs associated with bilateral contracts and related BSSs can’t be unilaterally terminated by the Resource Hub owner. This language aligns the Protocols with the FERC-approved Tariff language.

REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

4.5.2.3.2 Resource Hubs

A Resource Hub is a Settlement Location representing an aggregation of Resource PNodes. SPP will not limit the number of Resource Hubs established at any one time. The Resource Hub proposal may be composed of any combination of Resources with which the requesting Market Participant has affiliation. Proposals for the establishment or termination of Resource Hubs shall be submitted by the Market Participants to SPP within the Settlement Location update duration set forth in Appendix E. SPP will review and approve Resource Hubs based on the criteria defined in the Resource Hubs process. SPP shall post any approved establishment of a Resource Hub at least forty-five (45) days prior to the proposed effective date. SPP shall post any approved termination of a Resource Hub at least six (6) months prior to the proposed effective date so the termination which will coincide
with the annual TCR auction period end. SPP: (a) shall honor any LTCR or ILTCR that is based on a Resource Hub for the full term of the LTCR or ILTCR; and (b) shall not terminate a Resource Hub that is tied to a bilateral contract and related Bilateral Settlement Schedule unless both parties to the Bilateral Settlement Schedule agree to the termination of the Resource Hub.

SPP Tariff (OATT)

Attachment AE

3.1.6 Resource Hub Establishment

A Resource Hub is a Settlement Location representing an aggregation of Resource Price Nodes. The Transmission Provider will not limit the number of Resource Hubs established at any one time. The Resource Hub proposal may be composed of any combination of Resources with which the requesting Market Participant has affiliation. Proposals for the establishment or termination of Resource Hubs shall be submitted to The Transmission Provider by the Market Participants within the Settlement Location update duration set forth in the Market Protocols. The Transmission Provider will review and approve Resource Hubs based on the criteria defined in this Resource Hubs process. The Transmission Provider shall post any approved establishment of a Resource Hub at least forty-five (45) days prior to the proposed effective date. The Transmission Provider shall post any approved termination of a Resource Hub at least six (6) months prior to the proposed effective date of the termination which will coincide with the annual TCR auction period end. The Transmission Provider: (a) shall honor any LTCR or ILTCR that is based on a Resource Hub for the full term of the LTCR or ILTCR; and (b) shall not terminate a Resource Hub that is tied to a bilateral contract and related Bilateral Settlement Schedule unless both parties to the Bilateral Settlement Schedule agree to the termination of the Resource Hub.

SPP Operating Criteria

NA

SPP Planning Criteria

NA

SPP Business Practices

NA
## Revision Request Form

### SPP STAFF TO COMPLETE THIS SECTION

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**System Changes**
- [ ] No
- [ ] Yes

**Process Changes?**
- [ ] No
- [ ] Yes

**Impact Analysis Required?**
- [ ] No
- [ ] Yes

### SUBMITTER INFORMATION

<table>
<thead>
<tr>
<th>Name: Jared Greenwalt</th>
<th>Company: SPP</th>
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</thead>
<tbody>
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*Only Qualified Entities may submit Revision Requests.*

Please select at least one applicable option below, as it applies to the named submitter(s).

- [ ] SPP Staff
- [ ] SPP Market Participant
- [ ] SPP Member
- [ ] An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
- [ ] SPP Market Monitor
- [ ] Staff of government authority with jurisdiction over SPP/SPP member
- [ ] Rostered individual of SPP Committee, Task Force or Working Group
- [ ] Transmission Customers or other entities that are parties to transactions under the Tariff

### REVISION REQUEST DETAILS

**Requested Resolution Timing:**
- [ ] Normal
- [ ] Expedited
- [ ] Urgent Action

**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

- [ ] Correction
- [ ] Clarification
- [ ] Design Enhancement
- [ ] New Protocol, Business Practice, Criteria, Tariff
- [ ] NERC Standard Impact *(Specifically state if revision relates to/or impacts NERC Standards, list standard(s))*
- [ ] FERC Mandate *(List order number(s))*

**ER16-13-002**

**REVISION REQUEST RISK DRIVERS**

**Are there existing risks to one or more SPP Members or the BES driving the need for this RR?**
- [ ] Yes [x] No

If yes, provided details to explain the risk and timelines associated:

- [ ] Compliance (Tariff, NERC, Other)
- [ ] Reliability/Operations
- [ ] Financial

**SPP Documents Requiring Revision:**

Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).

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<td>Tariff (OATT)</td>
<td>Section(s): Attachment AE, 7.7</td>
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<tr>
<td>Business Practice</td>
<td>Business Practice Number:</td>
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Objectives of Revision Request:
This is a compliance filing (ER16-13-002). FERC pointed out in [156 FERC ¶ 61,041](#) that there are some incorrect references that point to a section that no longer exists. This Revision Request removes these references.

### REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

**Market Protocols**

#### 5.7 ARR Allocation/TCR Auction Settlements

The charges and credits to ARR holders and TCR holders will be calculated on a daily basis and included on the settlement statements consistent with the timing of the Energy and Operating Reserve Markets settlement as described under Section **Error! Reference source not found.**. For the purposes of calculating charges and credits to ARR holders, the following amounts of ARR awards will be used:

(1) ARR Settlement for Annual TCR Auction by path will be the greater of (i) the auction available Transmission System capability percentage (June – 100%; July through September – 90%; and Fall, Winter, Spring – 60%) divided by the allocation available Transmission System capability percentage of annual ARR award (June – 100%; July through September – 90%; and Fall, Winter, Spring – 60%) or (ii) Self-Convert TCR Award:

Below is an example of the ratio used in (1) above:

**Annual Product ARR eligible for Auction revenues**

\[
= \frac{\text{TCR Auction Capacity Percent}}{\text{ARR Allocation Percent}} \times \text{ARR Allocation MWs}
\]

**June**  
100/100 x 100MWs = 100MWs

**July – September**  
90/90 x 90MWs = 90MWs

**Fall, Winter, & Spring**  
60/60 x 80MWs = 80MWs

(2) ARR Settlement for Monthly TCR Auction will be settled as described below:

(a) For the months of July through September all ARR awards;

(b) For the months of October through May for Round 1, the greater of (i) (50% of ARR awards plus: (50% of the difference between the annual ARR award and the ARRs accounted for in the Annual TCR Auction as described in (1)(c) above) or (ii) Self-Convert TCR awards; and

(c) For the months of October through May for Round 2 any remaining ARR awards.

**SPP Tariff (OATT)**

**Attachment AE**
7.7 Auction Revenue Right Allocation and Transmission Congestion Right Auction Settlements

The charges and payments to ARR and TCR holders will be calculated on a daily basis and included on the Settlement Statements consistent with the timing of the Energy and Operating Reserve Markets settlement as described in Section 8.7 of this Attachment AE. For the purposes of calculating charges and payments to ARR holders, the following amounts of ARR awards will be used:

(1) ARR Settlement for annual TCR auction:
   (a) For the month of June, one hundred percent (100%) of annual ARR award;
   (b) For the months of July through September, the greater of (i) ninety (90%) of annual ARR award or (ii) self-convert TCR award; and
   (c) For the Fall, Winter and Spring seasons, the greater of (i) sixty (60%) of annual ARR award or (ii) self-convert TCR award.

(2) ARR Settlement for monthly TCR auction:
   (a) For the months of July through September, ARRs not accounted for in ARR Settlement in the annual TCR auction as described in (1)(b) above plus all monthly ARR awards;
   (b) For the months of October through May for round 1, the greater of (i) fifty (50%) of monthly ARR awards plus: fifty percent (50%) of the difference between the annual ARR award and the ARRs accounted for in the annual TCR auction as described in (1)(c) above or (ii) Self-convert TCR awards; and
   (c) For the months of October through May for round 2, the difference between: (i) the sum of annual ARR awards and monthly ARR awards and (ii) the sum of ARR MW accounted for in Section (1)(c) above and the ARR MW accounted for in Section (2)(b) above.

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**Revision Request Form**

**SPP STAFF TO COMPLETE THIS SECTION**

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**System Changes**
- [ ] No
- [x] Yes

**Process Changes?**
- [x] Yes
- [ ] No

**Impact Analysis Required?**
- [x] Yes
- [ ] No

**SUBMITTER INFORMATION**

<table>
<thead>
<tr>
<th>Name: Erin Cathey</th>
<th>Company: Southwest Power Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email: <a href="mailto:ecathey@spp.org">ecathey@spp.org</a></td>
<td>Phone: 501-590-8298</td>
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*Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).*

- [x] SPP Staff
- [ ] SPP Market Participant
- [ ] SPP Member
- [ ] An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
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**REVISION REQUEST DETAILS**

**Requested Resolution Timing:**
- [x] Normal
- [ ] Expedited
- [ ] Urgent Action

Reason for Expedited/Urgent Resolution:

**Type of Revision (select all that apply):**

- [ ] Correction
- [ ] Clarification
- [ ] Design Enhancement
- [x] New Protocol, Business Practice, Criteria, Tariff
- [ ] NERC Standard Impact *(Specifically state if revision relates to/or impacts NERC Standards, list standard(s))*
- [ ] FERC Mandate *(List order number(s))*
  - FERC Order 825 *(155 FERC ¶ 61,276)*

**REVISION REQUEST RISK DRIVERS**

Are there existing risks to one or more SPP Members or the BES driving the need for this RR?  
- [x] Yes  
- [ ] No

If yes, provided details to explain the risk and timelines associated:

- [ ] Compliance (Tariff, NERC, Other)
- [ ] Reliability/Operations
- [ ] Financial

**SPP Documents Requiring Revision:**

*Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).*

- [x] Market Protocols  
  - Section(s): 4.1.5; 4.1.6; 4.3.1.2.1; 4.4.2.3.2  
  - Protocol Version: 39a
- [ ] Operating Criteria  
  - Section(s):  
  - Criteria Date:  
- [ ] Planning Criteria  
  - Section(s):  
  - Criteria Date:  
- [x] Tariff (OATT)  
  - Section(s): Att. AE 5.1.2.1; 8.3.4.2
- [ ] Business Practice  
  - Business Practice Number:
Objectives of Revision Request:
Describe the problem/issue this revision request will resolve.

FERC Order 825 (155 FERC ¶ 61,276) states, “[W]e require each RTO/ISO to trigger shortage pricing for any interval in which a shortage of energy or operating reserves is indicated during the pricing of resources for that interval.” Furthermore, FERC stated, “This rationale applies to any shortage ‘regardless of the duration or cause of [the] shortage.’” It thus would apply to ‘transient shortages.”

Prior to this order, SPP would not trigger Scarcity Pricing when Operating Reserve was short due to insufficient ramp. Statements in the Tariff and Protocols have been deleted below to trigger Scarcity Pricing for these transient situations.

Describe the benefits that will be realized from this revision.
This RR will bring SPP's Tariff and Protocols into compliance with FERC’s rule making order.

REVISIONS TO SPP DOCUMENTS
In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

4.1.5 Scarcity Pricing

(1) SPP uses Demand Curves to set Market Clearing Prices in both the DA Market and RTBM during times of capacity shortages ("Scarcity Pricing"), either on a Reserve Zone basis or system-wide basis. Capacity shortages do not include shortages of Operating Reserve relating to insufficient ramping capability and Scarcity Pricing triggered under this situation may be mitigated through the use of ramp-sharing as described below under Section 4.1.6 and ultimately mitigated through constraint relaxation as described under Section 4.1.4.1(3). There are three sets of Demand Curves that apply on a system-wide basis and a Reserve Zone basis: (1) Operating Reserve; (2) Regulation-Up Service; and (3) Regulation-Down Service. The Scarcity Pricing levels associated with each of these Demand Curves are as follows:

(a) Operating Reserve – The sum of the Safety-Net Energy Offer Cap and the Contingency Reserve Offer Cap as specified under Section Error! Reference source not found.;

(b) Regulation-Up Service – The sum of the Regulation-Up Service Offer Cap and the Contingency Reserve Offer Cap as specified under Section Error! Reference source not found.; and

(c) Regulation-Down Service - The sum of the Regulation-Down Service Offer Cap and the Contingency Reserve Offer Cap as specified under Section Error! Reference source not found..

(2) Capacity is required by Energy, Regulation-Up Service, Spinning Reserve and Supplemental Reserve, and Operating Reserve product-pricing rules (“price cascading”) require that the Regulation-Up Service MCP be greater than or equal to Spinning Reserve MCP and that the Spinning Reserve MCP be greater than or equal to the Supplemental Reserve MCP on both a system-wide basis and Reserve Zone basis. Therefore, any shortage in capacity to meet Energy, Regulation-Up, and Contingency Reserve requirements will be reflected in the pricing of all of these products.

(a) For example, if we assume that there is a 50 MW shortage of Supplemental Reserve, the Supplemental Reserve MCP would be set to $1100/MW and the Spinning Reserve MCP, Regulation-Up Service MCP and the Energy LMP would also reflect the impacts of this
$1100/MW price. The Energy LMP is increased by the Operating Reserve shortage price of $1100/MW if the cost of serving an incremental MW of energy worsens the Operating Reserve capacity shortage condition (i.e. Operating Reserve Demand Curve is included in the LMP calculation), otherwise it is not.

(3) The system-wide Regulation-Up Service and Regulation-Down Service Demand Curve prices are designed to reflect pricing signals that are commensurate with a shortage in Regulation-Up Service or Regulation-Down Service capability, not shortages in capacity (i.e. there may be sufficient capacity available to meet the Regulation-Up requirement but there is simply not enough Regulation Qualified Resources and Regulation-Up Qualified Resources available). A shortage of Regulation-Up Service capability will invoke Regulation-Up Service Scarcity Pricing. A shortage of Regulation-Down Service capability will invoke Regulation-Down Service Scarcity Pricing.

(a) In cases where there is no Operating Reserve capacity shortage, Energy LMPs will not be impacted by the Operating Reserve Demand Curve since there is no shortage of capacity, only Regulation-Up capability or Regulation-Down capability.

(b) If a Regulation-Up capability shortage also contributes to an Operating Reserve capacity shortage (i.e. if Contingency Reserve is depleted for the purposes of meeting Energy requirements), Regulation-Up MCPs will be impacted by both the Regulation-Up Demand Curve price and Operating Reserve Demand Curve price.

(c) If a Regulation-Down capability shortage is caused by an excess generation emergency situation as described under Sections Error! Reference source not found. and Error! Reference source not found., Regulation-Down MCPs will be impacted by the Regulation-Down Demand Curve.

(4) If there is a Reserve Zone Operating Reserve shortage that occurs simultaneously with a system-wide Operating Reserve shortage and there is no system-wide Regulation-Up capability shortage, both the system-wide Operating Reserve Demand Curve and Reserve Zone Operating Reserve Demand Curves will be applied (i.e. the system-wide and zonal Operating Reserve Demand Curves are additive) in the calculation of Supplemental Reserve MCPs for the Reserve Zone(s) with Operating Reserve shortage (which will also impact Spinning Reserve and Regulation-Up MCPs due to the price cascading rules described under Section Error! Reference source not found.).

(5) If there is a Reserve Zone Operating Reserve shortage that occurs simultaneously with a system-wide Operating Reserve shortage and a system-wide Regulation-Up capability shortage, the system-wide Operating Reserve Demand Curve, the system-wide Regulation-Up Demand Curve and the Reserve Zone Operating Reserve Demand Curves will be applied (i.e. the system-wide and zonal Demand Curves are additive) in the calculation of Regulation-Up MCPs for the Reserve Zone(s) with Operating Reserve shortage.

(6) If there is insufficient capacity to meet Energy requirements on a system-wide basis, Energy requirements are reduced to meet available capacity and LMPs are calculated normally which will include the impacts
of both the system-wide Operating Reserve Demand Curve and system-wide Regulation-Up Demand Curve.

### 4.1.6 Ramp Sharing

To reduce instances when ramping deficiencies across Hours in the DA Market or Dispatch Intervals in the RTBM initiate unjustified Scarcity Pricing (i.e. Scarcity Pricing should only be initiated when there is a capacity shortage), ramp sharing may be applied to clear sufficient amounts of Energy, Regulation-Up Service, Regulation-Down Service and Spinning Reserve to meet the requirements. This is accomplished through the use of tuning parameters within the SCED model that compensate for the inability of a static ramp offer to reflect the more dynamic actual ramping capability (a.k.a. ramp sharing). The values will range from 0% to 100% sharing of ramp between Energy and Regulation-Up Service, between Energy and Regulation-Down Service, and between Energy, Regulation-Up Service, and Spinning Reserve. The values will range from no sharing of ramp to 100% sharing of ramp between Energy and Regulation-Up Service, Regulation-Down Service and/or Energy and Spinning Reserve. SPP will update these tuning parameters from time to time based upon historical system performance. If ramp sharing is applied, it shall remain effective for all hours in the Day-Ahead Market, Reliability Unit Commitment, and Real-Time Balancing Market. SPP will not implement ramp sharing in the RTBM that will result in the inability to meet applicable NERC reliability standards and control performance requirements.

For example, if SPP institutes 20% ramp sharing between Energy and Spinning Reserve, this means that the effective remaining Ramp Rate available for Spinning Reserve clearing is divided by (1 – 20%) which may result in Spinning Reserve being cleared that is not 100% deployable.

**Example:**

Energy Ramp Rate = 10MW/min

Contingency Reserve Ramp Rate = 10 MW/Min

20 % Ramp sharing

As shown above the Energy Ramp Rate is 10 MW/min. Assuming Energy clears at 30 MW, Energy occupies 30MW/5min or 6MW/min of the 10MW/min ramp rate available for Spinning Reserve clearing. The remaining effective Ramp Rate available for Spinning Reserve clearing is 10 MW/min – 6 MW/min = 4 MW/min which means 40 MWs of Spinning Reserve could be cleared (4MW/min * 10 min = 40 MW) with no ramp sharing. With 20% ramp sharing, the amount of Spinning Reserve that could be cleared is increased by dividing 40 MW by (1 - 20%). This means based on 20% ramp sharing, we can actually clear up to 40 MW / (0.8) or 50 MW of Spin.

---

**Exhibit Error! No text of specified style in document.-1: Ramp Sharing Example**
4.3.1.2.1 Clearing During Capacity Shortage

(1) If there is an Operating Reserve shortage in any hour, Scarcity Pricing will be invoked as described under Section 0.

(2) If there is a shortage of capacity to meet the fixed Demand Bids and fixed firm Export Interchange Transactions in any hour, the SCED algorithm will reduce the fixed Demand Bids and fixed firm Export Interchange Transactions on a pro-rata reduction basis based on the fixed MW amounts to match the available capacity and Scarcity Pricing will be invoked as described under Section 0.

(3) Ramp sharing is applied to ensure, to the extent possible, that short-term ramping deficiencies from hour to hour do not initiate unjustified Scarcity Pricing (i.e. Scarcity Pricing should only be initiated when there is a capacity shortage) as described under Section 4.1.5.

If there is a transmission constraint that cannot be relieved due to a shortage of capacity in any hour, the SCED algorithm will clear the bid-in demands on a pro-rata basis based upon the impact on relieving the constraint.

4.4.2.3.2 Emergency Operations – Capacity Shortage

(1) In addition to the release of Emergency capacity limits prior to the Operating Hour as described under Sections Error! Reference source not found. and Error! Reference source not found., SPP operators may release any remaining Emergency capacity limits as needed during the Operating Hour. SPP shall continue implementation of Emergency procedures which may have been implemented prior to the
Operating Hour or shall begin implementation of Emergency procedures within the Operating Hour, as needed, in accordance with its authority as Reliability Coordinator.

(a) If there is an actual Operating Reserve shortage during any Dispatch Interval, either on a system-wide or a Reserve Zone basis, the system-wide or Reserve Zone Scarcity Prices will be invoked as described under Section 0.

(i) If there is a shortage of available capacity to meet Energy requirements on a system-wide basis, all LMPs will be set as described under Section 0.

Ramp sharing continues to be applied to ensure, to the extent possible, that short term ramping deficiencies within an Operating Hour do not initiate unjustified Scarcity Pricing (i.e. Scarcity Pricing should only be initiated when there is a capacity shortage) as described under Section 4.1.5.

---

**SPP Tariff (OATT)**

**Attachment AE**

### 5.1.2.1 Clearing During Capacity Shortage

(1) In the event of an Operating Reserve shortage in any hour—*that is not due to ramp limitations*, Scarcity Pricing shall be implemented.

(2) In the event of a capacity shortage to meet the fixed Demand Bids and fixed firm Export Interchange Transactions in any hour, the fixed Demand Bids and fixed firm Export Interchange Transactions will be reduced on a pro-rata reduction basis based on the fixed MW amounts to match the available capacity, and Scarcity Pricing shall be implemented.

(3) *The Transmission Provider may implement sharing of ramping capability between Energy and Operating Reserve product clearing to ensure, to the extent possible, that short term ramping deficiencies from hour to hour do not initiate Scarcity Pricing as described in Section 8.3.4.2(2) of this Attachment AE. To the extent that ramp sharing is implemented, it shall remain in effect in all hours of the Day-Ahead Market, in order to clear sufficient amounts of Energy, Regulation-Up Service, Regulation-Down Service and Spinning Reserve to meet the requirements. The Transmission Provider will not implement ramp sharing that will result in the inability to meet applicable NERC reliability standards and control performance requirements.*

(4) If a transmission constraint cannot be relieved due to a shortage of capacity in any hour, the SCED algorithm will clear the bid-in demands on a pro-rata basis based upon the impact on relieving the constraint.
6.2.2.1 Emergency Operations – Capacity Shortage

(1) In addition to the incorporation of the capacity up to Resources’ Maximum Emergency Capacity Operating Limits prior to the Operating Hour as described under Sections 5.1.2(1)(a)(i) and 5.2.2(2)(a) of this Attachment AE, the Transmission Provider may incorporate any remaining emergency capacity limits as needed during the Operating Hour. The Transmission Provider shall continue implementation of emergency procedures which may have been implemented prior to the Operating Hour or shall begin implementation of emergency procedures within the Operating Hour, as needed, in accordance with its authority as Reliability Coordinator.

(a) If there is an actual Operating Reserve shortage during a Dispatch Interval, either on a system-wide or a Reserve Zone basis, the system-wide or Reserve Zone Scarcity Prices will be implemented as specified in Sections 8.3.1 and 8.3.4.2 of this Attachment AE.

(b) If there is a shortage of available capacity to meet Energy requirements on a system-wide, LMPs will be set through Scarcity Pricing procedures as specified in Section 8.3.1 of this Attachment AE.

(2) Ramp sharing will continue to be applied consistent with its application in the Day-Ahead Market as described under Section 5.1.2.1(3) of this Attachment AE.

8.3.4.2 Impact of Scarcity Pricing on Market Clearing Prices

(1) The Transmission Provider shall use Demand Curves to reflect Scarcity Prices in MCPs in both the Day-Ahead Market and RTBM during times of Operating Reserve shortages, either on a system-wide and/or Reserve Zone basis.

(2) Operating Reserve shortages caused by insufficient ramping capability shall not be subject to Scarcity Pricing.

(3) Scarcity Prices are reflected in MCPs using the following Demand Curves:

(a) The Operating Reserve Demand Curve Price is equal to the sum of the safety-net Energy Offer cap and the Contingency Reserve Offer cap as specified in Section 4.1.1 of this Attachment AE and is applied on both a system-wide basis and zonal basis.

(b) The Regulation-Up Demand Curve Price is equal to the sum of the Regulation-Up Service Offer cap and the Contingency Reserve Offer cap as specified in Section 4.1.1 of this Attachment AE and is applied on a system-wide basis.

(c) Regulation-Down Demand Curve Price is equal to the sum of the Regulation-Down Service Offer cap and the Contingency Reserve Offer cap as specified in Section 4.1.1 of this Attachment AE and is applied on a system-wide basis.
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SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
Operating Reserves
Demand Curve Proposal
Background

• A Demand Curve is a pricing mechanism that assigns a value to a service. Specifying a value on the curve with respect to a demand quantity allows the market to set price from the curve as opposed to reaching out to a marginal resource to provide the service.

• Current Operating Reserves demand curves are:
  • Regulation Up: $600
  • Regulation Down: $600
  • Contingency Reserves: $1100

• Demand curves are currently triggered only when there is scarcity due to capacity (not ramp) of a product.

• During ramp shortages, Regulation and Operating Reserve requirements are relaxed to the amount of available MW’s that can clear given the available ramp. The market clearing prices are set to the marginal resource’s cost, NOT from the demand curve.
Objective

• FERC order 825 calls on markets to trigger scarcity pricing when there is ramp or capacity shortage and specifies that the duration of the shortage irrelevant

• SPP intends to fully comply with the order by May 2017
  ✔ Trigger scarcity pricing during capacity shortages of OR
  ✔ Trigger scarcity pricing during ramp shortages of OR
  ✔ Trigger scarcity pricing regardless of shortage duration
  ✔ Align settlement with dispatch intervals (5 minute settlements already complete)

• SPP Proposal
  • Remove the relaxation logic from the market clearing engine that currently takes place when Regulation or Operating Reserve are short due to ramp constraint
  • Re-evaluate the current Regulation and Operating Reserve demand curves
Regulation Demand Curve
Regulation Demand Curve Methodology

- Pricing the curve as a function of the cost to commit a resource to provide ramp or capacity to the market.
  - Set a base demand curve price based historical offered start up / No load and Energy at Minimum for any resource offered in the market with a 10-minute or less cold start up time
  - Will be evaluated on a monthly basis or as needed if offers are projected to drastically change.

- Historical usage as a ratio of clearing the product is used to specify regions that may be priced differently and at different magnitudes
  - Apply a factor that acts as a multiplier of the base demand curve price as scarcity enters regions where cleared MW’s of the product are likely to be deployed by AGC.
  - Regions will be evaluated bi-annually or if Regulation procurement methodology is modified.

- Demand curve will be triggered if scarcity is due to capacity or ramp
Calculating Regulation Base Demand Curve

1) Regulation Base Demand Curve

• Cost to Commit  = Cold Start Up Cost +
  \[ \text{No Load} + \int_{0}^{Eco \ Min} \text{Energy Offer} \times \text{Economic Minimum (MW)} \times \text{Min Run Time} \]

• Demand Curve Base = \( \frac{\text{Cost to Commit}}{\text{Economic Min}} \)

✓ SPP calculated a Base Demand Curve based on July offers

✓ Demand Curve Base = $99/MW
Regulation Scarcity Regions
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Effective Demand Curve
Proposed Regulation Effective Demand Curve

**Effective Curve = Demand Curve Base * \( \alpha \) Scarcity Region**

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<tr>
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* Scarcity Regions are subject to change annually or as needed
** Base Demand Curve is subject to change monthly or as needed
# Preserving current demand curves to allow resources with offers, within current offer caps, opportunity to clear as last resort.
Contingency Reserves
Demand Curve
Contingency Reserves Base Demand Curve

- Preserving the current set demand curve for CR of $1100

- The regions specified for Contingency Reserve scarcity are based on the excess CR SPP carries relative to the largest resource contingency, as required by NERC
  - Currently SPP carries Contingency Reserves protecting the largest resource contingency and half of the second largest in SPP

- The regions may be adjusted as system conditions change
  - Whenever the largest or next largest contingencies change
CR Base Demand Curve

- Demand Curve Base = $550/MW
- Current Requirements are set as follow
  - Largest Generator Online (1190MW) + 0.5 * Second Largest Generator Online (881MW) = 1631MW

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0.5 * Second Largest Gen Online (881MW)

* Scarcity Regions are subject to change as online generation mix changes
Summary

• SPP intends to fully comply with FERC order 825

• SPP re-evaluated current demand curves for Operating Reserves and proposes a change to current curves set in place

• Proposed demand curves are based on magnitude of scarcity for each product

• Regulation base demand curve is set based on cost to commit quick start offered resources while preserving the opportunity to clear resources with offers near the current OR offer caps

• Contingency Reserves base demand curve retains current demand curve modified to a lower value based on clearing the NERC required reserves

• Demand curves are subject to change monthly or as needed

• Demand curves will be triggered if shortage is due to capacity or ramp

• SPP intends to make the effective demand curves available to all Market Participants
Questions
&&
Feedback
Revision Request Form

SPP STAFF TO COMPLETE THIS SECTION

<table>
<thead>
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**RR Title:** Repricing Timelines and Requirements

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**Impact Analysis Required?**

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**SUBMITTER INFORMATION**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Jodi Woods</th>
</tr>
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<tbody>
<tr>
<td>Company:</td>
<td>SPP</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:jwoods@spp.org">jwoods@spp.org</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>501-614-3282</td>
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Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).

<table>
<thead>
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<tr>
<td>☑ SPP Market Participant</td>
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</tr>
<tr>
<td>☑ SPP Member</td>
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</tr>
<tr>
<td>☑ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”</td>
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<tr>
<td>☑ SPP Market Monitor</td>
<td></td>
</tr>
<tr>
<td>☑ Staff of government authority with jurisdiction over SPP/SPP member</td>
<td></td>
</tr>
<tr>
<td>☑ Rostered individual of SPP Committee, Task Force or Working Group</td>
<td></td>
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<tr>
<td>☑ Transmission Customers or other entities that are parties to transactions under the Tariff</td>
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**REVISION REQUEST DETAILS**

**Requested Resolution Timing:**

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**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

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<td>☑ Clarification</td>
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<td>☑ New Protocol, Business Practice, Criteria, Tariff</td>
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<td>☑ NERC Standard Impact (Specifically state if revision relates to/or impacts NERC Standards, list standard(s))</td>
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<td>☑ FERC Mandate (List order number(s))</td>
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**REVISION REQUEST RISK DRIVERS**

**Are there existing risks to one or more SPP Members or the BES driving the need for this RR?**

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If yes, provided details to explain the risk and timelines associated:

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**SPP Documents Requiring Revision:**

Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).

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<thead>
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<tr>
<td>Business Practice</td>
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Objectives of Revision Request:

Describe the problem/issue this revision request will resolve.

The current SPP Protocols and Tariff allow for the repricing of the DA Market at any time for any reason, regardless of error, impact, identification time, etc. The language is also unclear as to the full obligation of SPP in terms of when SPP is required to reprice. I.e. SPP believes the intent is that there should not be a requirement to reprice the DA and/or RT market for every data input/software error that exists. The cost of repricing for every error and manpower required often outweighs the financial impact of the error.

Describe the benefits that will be realized from this revision.

SPP Staff and Market Participants will have better clarification as to when SPP would perform a repricing of the DA and RT Markets.

REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

7.2 Procedures for Correcting LMPs and/or MCPs Resulting From Market Software and Data Input Errors

SPP shall monitor for possible market software and/or data errors in the DA Market and/or RTBM that do not accurately reflect the application of the Tariff, and data input errors in the DA Market and/or RTBM that and result in inaccurate LMPs and/or MCPs.

Events that may result in data input errors include, but are not limited to:

1. Bad or missing SCADA (RTBM);
2. Load Forecast Error (RTBM) due to bad or missing SCADA;
3. Missing Intervals (RTBM);

The occurrence of any of these events may warrant a revision to LMPs and/or MCPs and are flagged by SPP. SPP will investigate all such events and determine if a price revision is necessary.

7.2.1 Procedure for Evaluating and Correcting Market Software and Data Input Errors

In any instance in which SPP makes price corrections, it shall, as soon as possible practicable thereafter, correct the market software and/or data input errors that resulted in incorrect prices. SPP shall undertake this work in consultation and cooperation with Market Participants and jurisdictional agencies, as appropriate and as time permits.

7.2.2 Procedures for Revising Prices in Response to Market Software and Data Input Errors

SPP shall revise LMPs and MCPs when they deviate from what would be produced absent an identified market software and/or data input error.

In accordance with the process set forth in the Tariff at Attachment AE, Section 8.4, SPP, in its sole discretion, may perform LMP and MCP corrections. Price corrections may only be performed pursuant to Section 8.4(1) of
Attachment AE in the Tariff and only if the error results in a significant Day-Ahead or Real-Time Balancing Market impact. In the exercise of its discretion pursuant to Section 8.4(2) of Attachment AE in the Tariff, SPP may consider all relevant facts, including, but not limited to, the degree of the economic impact to the market results in terms of production cost or otherwise. For purposes of this section, "production cost" is defined as the settlement cost for the market and can be calculated as the sum of the cleared MW * LMP plus cleared OR * MCP plus Start-Up and No-Load costs for all Resources.

7.2.2.1 Notice to Market Participants and the Public

If SPP determines per Section 7.2.2 that a market software and data/or software data error has occurred during an Operating Day that requires a correction of one or more LMPs and/or MCPs, SPP must post on its OASIS and website a description of its proposed price correction and shall notify Market Participants as soon as reasonably practicable no later than 5:00 p.m. five (5) Calendar Days after the Operating Day in which the error occurred.

In any event, SPP must post a description of the proposed price correction no later than 5:00 p.m. five (5) Calendar Days after the Operating Day.

7.2.2.2 Price Corrections Identified After the End of the Notice Period

If SPP determines that a price correction is necessary after the time period specified in Section 7.2.2.1, SPP shall request Commission approval prior to making the price correction. SPP shall utilize the following repricing notification process prior to requesting Commission approval:

If SPP identifies a market software and/or data input error requiring a price correction subsequent to the issuance of the Final Settlement Statement, but does not (a) post a notice of price correction or (b) post a description of the proposed price correction within the required time periods, SPP shall request a Tariff waiver from FERC to perform the necessary price correction. SPP shall utilize the following process for requesting such Tariff waiver:

(1) First, SPP shall review with the appropriate SPP organizational group the need proposal for the price correction and the schedule for fixing-remediating the market software and/or data input-error causing the need for price correction;

(2) Second, SPP shall review the proposal with the SPP Markets and Operations Policy Committee seek approval of and the SPP Board of Directors; and for filing a price correction Tariff waiver request at FERC. Prior to seeking the Board’s approval, SPP shall submit its request proposal to the SPP Market Working Group and the SPP Markets and Operations Policy Committee for approval; and

(3) Third, after approval by the SPP Board of Directors, SPP shall file the request for Commission approval price correction Tariff waiver request at FERC as soon as reasonably practicable.

This process ensures that SPP stakeholders are prior notified prior to the implementation of any price correction that does not occur within the allotted time frame for such corrections.

7.2.2.3 Process for Recalculating DA Market Cleared Amounts and Prices

SPP shall recalculate LMPs, MCPs and DA Market cleared amounts in a manner that reflects, as closely as practicable, the DA Market results that would have resulted but for the market software and/or data input-error while maintaining the original DA Market unit commitment, and shall perform a resettlement using these
recalculated values, if required. Such recalculated DA Market results shall be provided to Market Participants in
the same manner as LMPs and MCPs determined in the ordinary course of business (i.e. in a programmatically
downloadable file).

SPP Tariff (OATT)

Attachment AE

8.4 Price Corrections

If LMP and MCP corrections are required due to software errors and/or data input errors, the Transmission
Provider shall impose corrective measures and take immediate action to remedy such errors and
recalculate LMPs and MCPs in accordance with the following procedures:

(1) There may be instances in which software errors and/or data errors affect the prices in a manner
that is inconsistent with economic efficiency. If such an instance occurs, price corrections in the Day-
Ahead and Real-Time Balancing Markets may be performed in accordance with paragraph (2) of this
Section 8.4.

(1) For purposes of this section, a "data error" shall be defined as:

(a) Data received by the Transmission Provider from an independent source, including data
produced by a system or submitted by a third party, that is inaccurately modified by the
Transmission Provider during the execution of a market function; or

(b) Anomalous data received by the Transmission Provider from an independent source, including
data produced by a system or submitted by a third party that is patently incorrect and is used
by the Transmission Provider during the execution of a market function; or

(c) Incorrect data produced and used by the Transmission Provider during the execution of a
market function.

For purposes of this section, a "software error" shall be defined as a software execution that is inconsistent
with this Attachment AE.

(2) The Transmission Provider, in its sole discretion, may LMP make LMP and MCP corrections,
and such corrections shall be required made in accordance with this Section 8.4 due to software
errors and/or data input errors, the Transmission Provider shall impose corrective measures and
take immediate action to remedy such errors and recalulate LMPs and MCPs in accordance with
the following procedures: Such price corrections may only be performed if the underlying causes
result in a significant Day-Ahead or Real-Time Balancing Market impact. In the exercise of its
discretion pursuant to this Section 8.4(2), the Transmission Provider may consider all relevant
facts, including, but not limited to, the degree of the economic impact to the market results in terms of production cost. For purposes of this section, "production cost" is defined as the settlement cost for the market and can be calculated as the sum of the cleared MW * LMP plus cleared OR * MCP plus Start-Up and No-Load costs for all Resources.

The Transmission Provider shall impose corrective measures and take immediate action to remedy such errors and recalculate LMPs and MCPs in accordance with the following procedures:

(a) Notice to Market Participants:

If the Transmission Provider determines that a software error or data input error requires correction of one or more LMPs and MCPs, the Transmission Provider shall make publicly available on its OASIS a description of its proposed price correction. In any event, the Transmission Provider shall post a description of the proposed price correction no later than 1700 hours five (5) calendar days following the day in which the LMPs and MCPs would be affected by the contemplated price correction.

(b) Price corrections identified after the end of the notice period:

If the Transmission Provider determines that a price correction is necessary after the time period specified in 8.4(a), the Transmission Provider shall request Commission approval prior to making the price correction.

(c) Process for recalculating prices and compensation for the Day-Ahead Market:

If the Transmission Provider performs price corrections for the Day-Ahead Market, it shall recalculate LMPs, MCPs, and Day-Ahead Market cleared amounts in a manner that reflects, as closely as practicable, the LMPs and MCPs that would have resulted but for the relevant software or data input error for the Day-Ahead Market while maintaining the original Day-Ahead Market unit commitment.

The Transmission Provider shall perform any necessary resettlement using the recalculated Day-Ahead Market results. Such recalculated Day-Ahead Market results shall be provided to Market Participants in the same manner as the original Day-Ahead Market results determined in the ordinary course of business.

(d) Process for recalculating prices and compensation for the RTBM:

If the Transmission Provider performs price corrections for the RTBM, it shall recalculate LMPs and MCPs for the RTBM in a manner that reflects, as closely as practicable,
the LMPs and MCPs that would have resulted but for the relevant software or data input error for the RTBM and shall perform any necessary resettlement using these recalculated values. Such recalculated LMPs and MCPs shall be provided to Market Participants in the same manner as LMPs and MCPs determined in the ordinary course of business.

(e) Compensation to Market Participants results from recalculated prices shall be as follows:

(i) (a) For instances where the recalculated RTBM LMP is less than a Resource’s Energy Offer Curve price, compensation shall be as described under Section 8.6.6(1);

(b) For instances where a Resource’s recalculated RTBM LMP is greater than the Day-Ahead Market LMP and the Market Participant is buying back its Day-Ahead Market position as a result of a Dispatch Instruction, compensation shall be as described under Section 8.6.6(2) except that, the MW amount eligible for compensation shall be equal to the difference between the Resource’s Day-Ahead Market MW position and the greater of (1) that Resource’s actual MW output in the Dispatch Interval or (2) the Resource’s average Setpoint Instruction in the Dispatch Interval;

(c) For instances where a Resource’s recalculated RTBM Operating Reserve product MCP is greater than the Day-Ahead Market Operating Reserve product MCP and the Market Participant is buying back its Day-Ahead Market Operating Reserve product position resulting from the Transmission Provider clearing all or a portion of that Operating Reserve product on a different Resource in the market solution, compensation shall be as described under Section 8.6.6(3).

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Revision Request Recommendation Report

RR #: 173
Date: 8/23/2016

RR Title: Instantaneous Peak Load

SUBMITTER INFORMATION
Submitter Name: Jared Greenwalt
Company: Southwest Power Pool
Email: jgreenwalt@spp.org
Phone: 501.688.8314

EXECUTIVE SUMMARY AND RECOMMENDATION FOR MOPC AND BOD ACTION

OBJECTIVE OF REVISION

Objectives of Revision Request:
Describe the problem/issue this revision request will resolve.
The current terms, “Head-room” and “floor-room” cause confusion due to existing industry standard terms. The definition and verbiage describing these terms mentions uncertainty of forecasts and Variable Energy Resources (VERs). Neither the uncertainty of a forecast nor the uncertainty of the output of a VER are used in the calculation. The current language has caused confusion regarding the purpose of these commitment requirements. This revision removes the current terms and replaces them with one aptly named term. This RR also brings the verbiage closer in line with the equation used to calculate the requirement. The calculation is not being changed with this revision; this revision only changes the term names and simplifies the description and verbiage surrounding the current terms.

Describe the benefits that will be realized from this revision.
This proposed revision will clarify the inputs to the calculation, and thus the purpose, of the terms currently known as “Head-room” and “Floor-room”.

SPP STAFF ASSESSMENT

IMPACT

Will the revision result in system changes ☒ No ☐ Yes
Summarize changes:

Will the revision result in process changes? ☒ No ☐ Yes
Summarize changes:

Is an Impact Assessment required? ☒ No ☐ Yes
If no, explain: Since there are no system or process changes, then no Impact Assessment is required.

Estimated Cost: $  
Estimated Duration: months
Primary Working Group Score/Priority:
## SPP DOCUMENTS IMPACTED

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### Tariff (OATT)

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### Business Practice

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## WORKING GROUP REVIEWS AND RECOMMENDATIONS

List Primary and any Secondary/Impacted WG Recommendations as appropriate

### Price Formation Task Force:

**Date:** 7/20/2016  
**Action Taken:** Endorsed the RR  
**Abstained:** BEPC  
**Opposed:** GSEC  

**Reason for Opposition:**

Head-room and Floor-room was brought forth to the SPP Price Formation Task Force (PFTF) as a price formation concern by some Market Participants. It was prioritized as one of the first concerns the PFTF would explore. One of the items associated with Head-room the PFTF began to explore was the possibility of having the Head-room commitment process be based on competitive offers similar to operating reserves given the Head-room provides excess rampable capacity for SPP to handle uncertainty in instantaneous load changes, hourly load forecast and variable resource output.

After some discussion at the PFTF the SPP Staff articulated that Head-room was not actually procured for hourly load forecast and variable resource output but only for instantaneous load changes. It was suggested that if the definition in the Tariff was not matching reality then the Tariff needed to be updated to match the formula and what was occurring by SPP Operations. So, as a result SPP staff has presented RR 173.

**GSEC Concerns with RR 173:**

1) SPP believes they still have the need to procure capacity based on the mid-term load forecast to handle load uncertainty and variable resource output. This process has been lost in the new definition. Therefore, it is not transparent if this lost piece of the definition is still being procured as additional excess capacity in the RUC process over and above what is currently classified as normal operating reserve.

2) Regardless, GSEC believes that if rampable capacity is committed for 1) instantaneous load changes or 2) hourly load forecast and variable resource output then the resource should be cleared based on competitive offers and clearings and not committed via the RUC process which creates uplift charges, diminishes value transparency for the actual services being provided while also diminishing long-term incentives for future resources and technology. GSEC will continue to advocate that rampable capacity needed for services that are being provided to SPP be cleared based on competitive offers either as part of existing operating reserve products or new products as opposed to using the RUC process to commit units for these services.

**MWG:**

**Date:** 8/23/2016  
**Action Taken:**  
**Abstained:**  
**Opposed:**  

**Reason for Opposition:**

GSEC is concerned that the practice of procuring rampable capacity for things such as instantaneous load change, hourly load forecast or variable resource output through RUC's masks shortage conditions in a manner inconsistent with the requirements of FERC's Shortage Pricing Rule. SPP Staff's RR 173 does nothing to address this problem.
| ORWG: | Date: 8/31/2016  
|       | Action Taken:  
|       | Abstained:  
|       | Opposed: |
| Reasons for Opposition: |
| RTWG: | Date: 9/19/2016  
|       | Action Taken:  
|       | Abstained:  
|       | Opposed: |
| Reasons for Opposition: |
| RCWG: | Date:  
|       | Action Taken:  
|       | Abstained:  
|       | Opposed: |
| Reasons for Opposition: |
| MOPC | Date:  
|       | Action Taken:  
|       | Abstained:  
|       | Opposed: |
| Reasons for Opposition: |
| BOD/Member Committee | Date:  
|       | Action Taken:  
|       | Abstained:  
|       | Opposed: |
| Reasons for Opposition: |
| **COMMENTS** |
| **Comment Author:** Matt Moore (GSEC) |
| **Date Comments Submitted:** 8/1/2016 |
Description of Comments:

Head-room and Floor-room was brought forth to the SPP Price Formation Task Force (PFTF) as a price formation concern by some Market Participants. It was prioritized as one of the first concerns the PFTF would explore. One of the items associated with Head-room the PFTF began to explore was the possibility of having the Head-room commitment process be based on competitive offers similar to operating reserves given the Head-room provides excess rampable capacity for SPP to handle uncertainty in instantaneous load changes, hourly load forecast and variable resource output.

After some discussion at the PFTF the SPP Staff articulated that Head-room was not actually procured for hourly load forecast and variable resource output but only for instantaneous load changes. It was suggested that if the definition in the Tariff was not matching reality then the Tariff needed to be updated to match the formula and what was occurring by SPP Operations. So, as a result SPP staff has presented RR 173.

GSEC Concerns with RR 173:

1) SPP believes they still have the need to procure capacity based on the mid-term load forecast to handle load uncertainty and variable resource output. This process has been lost in the new definition. Therefore, it is not transparent if this lost piece of the definition is still being procured as additional excess capacity in the RUC process over and above what is currently classified as normal operating reserve.

2) Regardless, GSEC believes that if rampable capacity is committed for 1) instantaneous load changes or 2) hourly load forecast and variable resource output then the resource should be cleared based on competitive offers and clearings and not committed via the RUC process which creates uplift charges, diminishes value transparency for the actual services being provided while also diminishing long-term incentives for future resources and technology. GSEC will continue to advocate that rampable capacity needed for services that are being provided to SPP be cleared based on competitive offers either as part of existing operating reserve products or new products as opposed to using the RUC process to commit units for these services.

GSEC is concerned that the practice of procuring rampable capacity for things such as instantaneous load change, hourly load forecast or variable resource output through RUCs masks shortage conditions in a manner inconsistent with the requirements of FERC’s Shortage Pricing Rule. SPP Staff's RR 173 does nothing to address this problem.

Status:

COMMENTS

Comment Author:

Date Comments Submitted:

Description of Comments:

Status:

PROPOSED REVISION(S) TO SPP DOCUMENTS

Market Protocols

1. Glossary

**Head-room**

As defined in the SPP Tariff.

**Floor-room**

As defined in the SPP Tariff.

Incremental Long-Term Congestion Right (ILTCR)
As defined in Attachment AE of the Tariff.

**Instantaneous Load Capacity**
As defined in the SPP Tariff.

**Instructed Regulation-Down Mileage**
As defined in the SPP Tariff.

### 4.1.3 Operating Reserve and Instantaneous Load Capacity Head-room and Floor-room Requirements

SPP calculates the amount of Operating Reserve required for the Operating Day, on both a system-wide basis and a Reserve Zone basis, to comply with the reliability requirements specified in the SPP Criteria. Additionally, SPP calculates the amount of **Instantaneous Load Capacity Head-room and Floor-room** required for the Operating Day to ensure that unit commitment is sufficient to reliably serve load in real-time while maintaining the Operating Reserve requirements. SPP calculates the hourly Regulation-Up, Regulation-Down, Contingency Reserve, **Instantaneous Load Capacity Head-room and Floor-room** requirements on an SPP BAA basis and calculates minimum Operating Reserve requirements and maximum Operating Reserve limitations for each Reserve Zone.

1. SPP BAA Contingency Reserve requirements are set consistent with SPP Criteria and may vary on an hourly basis.

2. SPP BAA Regulation-Up and Regulation-Down requirements are set to ensure compliance with NERC control performance requirements and are based upon a percentage of forecasted load, adjusted up or down to account for Resource output variability, and may vary on an hourly basis.

3. SPP BAA **Instantaneous Load Capacity Head-room and Floor-room** requirements are set to ensure that expected variations between real-time instantaneous peak load for the interval and the average load forecast for that interval and variations between real-time variable Resource output and projected variable Resource output cleared in the Day-Ahead Market and the projected average load used in the RUC unit commitment processes can be reliably served in real-time while simultaneously maintaining the SPP BAA Operating Reserve requirements.

4. The SPP BAA requirements, minimum Reserve Zone Operating Reserve requirements and maximum Reserve Zone Operating Reserve limitations are calculated and posted no later than 06:00 Day-Ahead. At this time, SPP will also communicate each Asset Owner’s estimated Operating Reserve obligations in each Reserve Zone using the BAA Mid-Term Load Forecast and the Asset Owner load forecasts developed by SPP under Section Error! Reference source not found.4.1.2.1.5.

5. These Operating Reserve requirements and limitations are used by SPP as inputs into the DA Market and RTBM clearing and RUC processes.
(a) SPP may increase Operating Reserve requirements for use in RTBM clearing and RUC processes above the requirements used in the DA Market clearing, including changes to Reserve Zone minimums and maximums, as required to meet increases in reliability requirements caused by changes in system conditions.

(6) Reserve Zone minimum Operating Reserve requirements and maximum Operating Reserve limitations are determined through reserve zone studies prior to the DA Market. Reserve zone studies are performed as described under Section Error! Reference source not found.4.1.3.1.

4.1.3.2 instantaneous Load Capacity Head-room and Floor-room Requirements

For Day-Ahead Market and RUC, which use hourly load granularity, instantaneous Load Capacity Head-room and Floor-room requirements represent the needed real-time online capacity to address load changes within the Operating Hour interval and variations between real-time variable Resource output and projected variable Resource output. For example, during morning load pickup, the end-of-hour capacity requirements may be much greater than the average hourly energy represented by the cleared demand in the Day Ahead Market or the load forecast used in the RUC processes. Additionally, the load forecast or generation forecast for a variable Resource can be off due to uncertainties inherent in these load and generation forecasts. If Resources were committed only for the average hourly load for the interval, the online capacity at the end of the morning load pickup hour may be insufficient to support reliable real-time operations. SPP calculates the required Instantaneous Load Capacity Head-room and Floor-room requirements for the interval for both the Day-Ahead Market and the RUC processes as follows using SPP’s Load Forecast and expected real-time instantaneous peak load for the interval. SPP may include up to 0% of the calculated Instantaneous Load Capacity Head-room and Floor-room requirements as an input into the Day-Ahead Market and may include 100% of the calculated Instantaneous Load Capacity Head-room and Floor-room requirements in all RUC processes.

4.1.3.2.1 Day-Ahead Market

SPP estimates the hourly Head-room and Floor-room requirements to be included in the Day-Ahead Market using SPP’s Mid-Term Load Forecast and expected real-time instantaneous load values for the Operating Day including a factor for load forecast and variable Resource output uncertainty. SPP’s Mid-Term Load Forecast represents the expected average load in an Operating Hour. For Head-room and Floor-room requirement calculations, the instantaneous load is assumed to be equal to the expected average load at the midpoint of the Operating Hour and ramp linearly from this point to the expected average load at the midpoint of the neighboring Operating Hours. Because this assumption will not always be accurate, especially in Operating Hours in which an instantaneous peak load or an instantaneous minimum load trough occurs, and due to load forecast and variable Resource output uncertainty, SPP requires an amount of Head-room and Floor-room requirements.

(1) The upper bound of the Head-room Instantaneous Load Capacity requirement for the current Operating Hour interval is set equal to the maximum of: (i) the difference between the expected
instantaneous load at the beginning of the Operating Hour interval and expected average load in the Operating Hour interval; (ii) the difference between the expected instantaneous load at the end of the Operating Hour interval and the expected average load in the Operating Hour interval; or (iii) the minimum upper bound of the Instantaneous Load Capacity Head-room requirement. SPP may reduce the Instantaneous Load Capacity Head-room requirement calculated above as operational experience dictates and/or to account for differences between offered Day-Ahead Market Resources and those available in the RUC processes.

The lower bound of the Instantaneous Load Capacity Floor-room requirement for the an current Operating Hour interval is set equal to the maximum of: (i) the difference between the expected average load in the Operating Hour interval and the expected instantaneous load at the beginning of the Operating Hour interval; (ii) the difference between the expected average load in the Operating Hour interval and the expected instantaneous load at the end of the Operating Hour interval; or (iii) the minimum lower bound of the Instantaneous Load Capacity Floor-room requirement. SPP may reduce the Instantaneous Load Capacity Floor-room requirement calculated above as operational experience dictates and/or to account for differences between offered Day-Ahead Market Resources and those available in the RUC processes.

The expected instantaneous load at the beginning of the Operating Hour is estimated as the load forecast value at the point at which a straight line drawn from the midpoint of the previous Operating Hour's expected average load to the midpoint of the current Operating Hour's expected average load crosses the beginning of the current Operating Hour.

The expected instantaneous load at the beginning of the interval is the midpoint between (i) the forecasted load for the previous interval and (ii) the forecasted load for the current interval. The expected instantaneous load at the end of the interval is the midpoint between (i) the forecasted load for the current interval and (ii) the forecasted load for the next interval.

The expected instantaneous load at the end of the Operating Hour is estimated as the load forecast value at the point at which a straight line drawn from the midpoint of the current Operating Hour's expected average load to the midpoint the next Operating Hour's expected average load crosses the end of the current Operating Hour.

The minimum Instantaneous Load Capacity Head-room and Floor-room requirements will be determined by SPP based upon operating experience. The Instantaneous Load Capacity Head-room and Floor-room requirements will be reviewed by the Market Working Group quarterly and may be refined over time based upon the relationship between SPP Mid-Term Load Forecast average loads and observed instantaneous load values.

4.1.3.2.2 RUC

For all RUC processes, SPP estimates the hourly Head-room and Floor-room requirements to be included in the RUC analyses using the most current Mid-Term Load Forecast and expected real-time
4.3.1 DA Market Inputs

Inputs to the DA Market algorithm consist of:

1. DA Market Offers and Bids as submitted by Market Participants prior to 1100 hours Day-Ahead;
   a. For Demand Bids, Virtual Energy Bids and/or Virtual Energy Offers submitted at a Load Settlement Location that contains more than one PNode, SPP distributes the Bid MW down to the associated PNodes using weighting factors for modeling purposes as described under Section Error! Reference source not found.4.1.2.2.1.
   b. For Virtual Energy Bids and/or Virtual Energy Offers submitted at a Trading Hub or Resource Hub Settlement Location and confirmed Interchange Transactions submitted at an External Interface, SPP uses a common set of weighting factors to distribute the Bid and/or Offer MWs down to PNodes included in the Trading Hub, Resource Hub, or External Interface for modeling purposes. These weighting factors are determined by SPP at the time the Trading Hub or External Interface is created and are not dependent upon historical injections/withdrawals. Resource Hub weighting factors are determined by SPP after coordinating with the requesting Market Participant.

2. Resource Offers for long lead time Resources selected by SPP for commitment during the Operating Day during the Multi-Day Reliability Assessment process;

3. Through Interchange Transactions as submitted by Market Participants and confirmed prior to the close of the DA Market;

4. SPP Operating Reserve requirements (system-wide and Reserve Zone min and max);

5. SPP Instantaneous Load Capacity Head-room and Floor-room requirements;

6. SPP Transmission System topology consistent with Network Model in place for current Operating Day, including adjustments to RCF firm flow entitlements if applicable;

7. Transmission System outages;

8. Parallel Flow forecasts; and


4.3.1.2 DA Market Execution

SPP clears the Day-Ahead Market for each hour of the upcoming Operating Day based on the inputs described above. A simultaneous co-optimization methodology, utilizing the SCUC and SCED algorithms is employed to simultaneously perform the following tasks:
Commit offered Resources, Import Interchange Transaction Offers and Virtual Energy Offers using the SCUC algorithm to meet the Demand Bids, Virtual Energy Bids, Export Interchange Transactions Bids, Instantaneous Load CapacityHead-room requirements, Floor-room requirements and Operating Reserve requirements at least cost throughout the projected upcoming Operating Day while respecting Resource operating constraints and transmission constraints;

(a) The DA Market SCUC algorithm will initially consider commitment of Resources with a Commit Status of Market and Self, including Resources committed in the Multi-Day Reliability Assessment process, only including capacity up to the Resources’ Maximum Economic Capacity Operating Limit (or Maximum Regulation Capacity Operating Limit if selected for Regulation-Up Service and/or Regulation-Down Service) and down to the Resources Minimum Economic Capacity Operating Limit (or Minimum Regulation Capacity Operating Limit if selected for Regulation-Down Service and/or Regulation-Up Service). In addition, MCRs that have registered under the option described under Section 6.1.7.1 are not eligible for regulation selection in any hour in which they are transitioning from one configuration to another.

(b) If this capacity is not sufficient to meet the fixed Demand Bids, fixed Export Interchange Transaction Bids, the upper bound of the Instantaneous Load CapacityHead-room requirements and Operating Reserve requirements on a system-wide basis, the DA Market SCUC algorithm will, in priority order: (1) curtail non-firm fixed Export Interchange Transaction Bids until the capacity shortage is eliminated; (2) incorporate capacity up to Resources’ Maximum Emergency Capacity Operating Limit and/or commit Resources’ with a Commit Status of Reliability on an economic basis until the capacity shortage is eliminated while attempting to maintain the Regulation-Up requirement to the extent possible.

(ii) If there is a capacity surplus on a system-wide basis calculated as the sum of Self-Committed capacity at minimum output, fixed Import Interchange Transaction Offers, the lower bound of the Instantaneous Load CapacityFloor-room requirement and the Regulation-Down requirement that is in excess of the sum of Fixed Demand Bids and fixed Export Interchange Transaction Bids, the DA Market SCUC algorithm will, in priority order (1) curtail non-firm fixed Import Interchange Transaction Offers until the capacity surplus is eliminated; (2) incorporate capacity down to Resources’ Minimum Emergency Capacity Operating Limit on an economic basis until the capacity surplus is eliminated while attempting to maintain the Regulation-Down requirement to the extent possible.
4.3.2.1 Day-Ahead RUC Inputs

Inputs to the RUC algorithm consist of:

1. RTBM Resource Offers, including Resources with a Commitment Status of Self submitted up to forty-five (45) minutes following the posting of the DA Market results;
   a. During all hours between the start and completion of the Day-Ahead RUC process, Market Participants may continue to update RTBM Offers during Day-Ahead RUC process. If the DA RUC offer being updated is for the DA RUC Study Period, SPP will notify the Market Participant that the offer will not be used in the ongoing DA RUC solution.

2. Confirmed cleared Export Interchange Transaction Bids from the DA Market;

3. Confirmed cleared Import Interchange Transaction Offers from the DA Market;

4. Confirmed cleared Through Interchange Transactions from the DA Market;

5. Confirmed Export Interchange Transactions specified for use in the RTBM only;

6. Confirmed Import Interchange Transactions specified for use in the RTBM only;

7. Confirmed Through Interchange Transactions specified for use in the RTBM only;

8. SPP Operating Reserve requirements (system-wide and Reserve Zone min and max);

9. SPP Instantaneous Load Capacity Head room and Floor room requirements;

10. SPP Mid-Term Load Forecast (MTLF) as described under Section Error! Reference source not found.4.1.2.1;

11. SPP Transmission System topology consistent with Network Model in place for the Operating Day, including adjustments to RCF firm flow entitlements if applicable;

12. Resource commitment schedules from the DA Market unless SPP Operators are informed of a Resource outage;

13. Commitment schedules for long lead time Resources selected in the Multi-Day Reliability Assessment process unless SPP Operators are informed of a Resource outage;

14. Wind Resource MWh output forecast as described under Section Error! Reference source not found.4.1.2.2;

15. Transmission System outages;

16. Parallel Flow forecasts; and

17. Resource outages; and
4.3.2.2 Day-Ahead RUC Execution

Using the inputs described above, SPP performs a capacity adequacy analysis for the upcoming Operating Day using the SCUC algorithm. The capacity adequacy analysis provides advisory information to the SPP Operators.

1. The objective of the SCUC is to commit Resources to meet the SPP Mid-Term Load Forecast, Export Interchange Transactions, Instantaneous Load Capacity Head-room requirements, Floor-room requirements and Operating Reserve requirements less Import Interchange Transactions over the Operating Day such that commitment costs are minimized while adhering to transmission system security constraints and the Resource operating parameter constraints submitted as part of the RTBM Offers;

2. Commitment costs are defined as Start-Up Offer, No-Load Offer and incremental cost to operate at minimum output as defined in the submitted Energy Offer Curve. Incremental Energy costs above minimum output and Operating Reserve Offers are not considered by the RUC SCUC in making commitment decisions;

3. The SCUC algorithm will initially consider commitment of Resources with a Commit Status of Market or Self only including capacity up to the Resources’ Maximum Economic Capacity Operating Limit (or Maximum Regulation Capacity Operating Limit if selected for Regulation-Up Service and/or Regulation-Down Service) and down to the Resources Minimum Economic Capacity Operating Limit (or Minimum Regulation Capacity Operating Limit if selected for Regulation-Down Service and/or Regulation-Up Service). In addition, MCRs that have registered under the option described under Section 6.1.7.1 are not eligible for regulation selection in any hour in which they are transitioning from one configuration to another.

(a) If this capacity plus Import Interchange Transactions is not sufficient to meet the system-wide SPP Mid-Term Load Forecast, Export Interchange Transactions, the upper bound of Instantaneous Load Capacity Head-room requirements and Operating Reserve requirements, the SCUC algorithm study will, in priority order: (1) curtail non-firm Export Interchange Transactions until the capacity shortage is eliminated; (2) incorporate capacity up to Resources’ Maximum Emergency Capacity Operating Limit and/or commit Resources with a Commit Status of Reliability on an economic basis until the capacity shortage is eliminated while attempting to maintain the Regulation-Up requirement to the extent possible.

(b) If the sum of Self-Committed capacity at minimum output, Import Interchange Transactions, the lower bound of Instantaneous Load Capacity Floor-room requirement and the system-wide Regulation-Down requirement is in excess of the sum of the SPP system-wide Mid-Term Load Forecast and Export Interchange Transactions, the RUC
SCUC algorithm study will, in priority order: (1) curtail non-firm fixed Import Interchange Transactions until the capacity surplus is eliminated; (2) incorporate capacity down to Resources’ Minimum Emergency Capacity Operating Limit on an economic basis until the capacity surplus is eliminated while attempting to maintain the Regulation-Down requirement to the extent possible; (3) de-commit Resources that were committed in the DA Market with a Commit Status of Market until the capacity surplus in eliminated; and (4) de-commit Self-Committed Resources until the capacity surplus in eliminated.

(i) If there is a transmission constraint within a Reserve Zone occurring simultaneously with a Reserve Zone excess capacity event, SCUC may commit additional Resources and/or de-commit Resources to relieve the constraints provided that any commitment changes do not aggravate the excess capacity situation.

***

4.4.1 Intra-Day RUC Inputs

Inputs to the RUC algorithm consist of:

1. RTBM Resource Offers;
2. Confirmed Export Interchange Transactions;
3. Confirmed Import Interchange Transactions;
4. Confirmed Through Interchange Transactions;
5. SPP Operating Reserve requirements (system-wide and Reserve Zone min and max);
6. SPP Instantaneous Load Capacity Head-room and Floor-room requirements;
7. SPP Load Forecast as described under Section Error! Reference source not found.4.1.2.1;
8. SPP Transmission System topology consistent with Network Model in place for the Operating Day, including adjustments to RCF firm flow entitlements if applicable;
9. Resource commitment and de-commitment schedules from the Day-Ahead RUC or previous Intra-Day RUCs;
10. Wind Resource output forecast as described under Section Error! Reference source not found.4.1.2.2;
11. Transmission System outages;
12. Parallel Flow forecasts; and
13. Resource outages; and
4.4.1.2 Intra-Day RUC Execution

Using the inputs described above, SPP performs a capacity adequacy analysis for the upcoming Operating Day and throughout the Operating Day using a SCUC algorithm. The capacity adequacy analysis provides advisory information to the SPP Operators.

1. The objective of the SCUC is to commit Resources to meet the SPP Load Forecast, Export Interchange Transactions, Instantaneous Load Capacity Head-room requirements, Floor-room requirements and Operating Reserve requirements less Import Interchange Transactions over the Operating Day such that commitment costs are minimized while adhering to transmission system security constraints and the Resource operating parameter constraints submitted as part of the RTBM Offers;

2. Commitment costs are defined as Start-Up Offer, No-Load Offer and incremental cost to operate at minimum output as defined on the submitted Energy Offer Curve. Incremental Energy costs above minimum output and Operating Reserve Offers are not considered by the RUC SCUC in making commitment decisions;

3. The SCUC algorithm will initially consider commitment of Resources with a Commit Status of Market or Self only including capacity up to the Resources’ Maximum Economic Capacity Operating Limit (or Maximum Regulation Capacity Operating Limit if selected for Regulation-Up Service and/or Regulation-Down Service) and down to the Resources Minimum Economic Capacity Operating Limit (or Minimum Regulation Capacity Operating Limit if selected for Regulation-Down Service and/or Regulation-Up Service). In addition, MCRs that have registered under the option described under Section 6.1.7.1 are not eligible for regulation selection in any hour in which they are transitioning from one configuration to another.

(a) If this capacity plus Import Interchange Transactions is not sufficient to meet the system-wide SPP Load Forecast, Export Interchange Transactions, the upper bound of Instantaneous Load Capacity Head-room requirements and Operating Reserve requirements, the SCUC algorithm study will, in priority order: (1) curtail non-firm Export Interchange Transactions until the capacity shortage is eliminated; (2) incorporate capacity up to Resources’ Maximum Emergency Capacity Operating Limit and/or commit Resources’ with a Commit Status of Reliability on an economic basis until the capacity shortage is eliminated while attempting to maintain the Regulation-Up requirement to the extent possible.

(b) If the sum of Self-Committed capacity at minimum output, Import Interchange Transactions, the lower bound of Instantaneous Load Capacity Floor-room requirements and the system-wide Regulation-Down requirement is in excess of the sum of the SPP...
system-wide Mid-Term Load Forecast and Export Interchange Transactions, the SCUC algorithm study will, in priority order: (1) curtail non-firm fixed Import Interchange Transactions until the capacity surplus is eliminated; (2) incorporate capacity down to Resources’ Minimum Emergency Capacity Operating Limit on an economic basis until the capacity surplus is eliminated while attempting to maintain the Regulation-Down requirement to the extent possible; (3) de-commit Resources that were committed in the DA Market with a Commit Status of Market until the capacity surplus is eliminated; and (4) de-commit Self-Committed Resources that were committed following the Day-Ahead RUC process until the capacity surplus is eliminated.

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ATTACHMENT AE
INTEGRATED MARKETPLACE

3. Transmission Provider Rights and Obligations
   3.1 Transmission Provider Scope of Services
      3.1.1 Trading Hub Establishment and Modification
      3.1.2 Forecasting
      3.1.3 Reserve Zone Establishment
      3.1.4 Operating Reserve, Head-room and Floor-room Instantaneous Load Capacity
      Requirements
      3.1.5 Outage Scheduling and Reporting
      3.1.6 Resource Hub Establishment

1.1 Definitions F

Floor-room
The reduction in committed capacity required below the average load for the hour due to the uncertainty of the real-time instantaneous load, hourly load forecast and Variable Energy Resource output.

1.1 Definitions H

Head-room
The additional committed capacity required above the average load for the hour due to the uncertainty of the real-time instantaneous load, hourly load forecast and Variable Energy Resource output.

1.1 Definitions I

Instantaneous Load Capacity
The achievable change in energy output required to account for differences between the average load and the projected instantaneous load.
3.1.4 Operating Reserve, and Instantaneous Load Capacity Head-room and Floor-room Requirements

The Transmission Provider shall calculate the amount of Operating Reserves required for the Operating Day, on both a system-wide and Reserve Zone basis, in order to comply with the reliability requirements specified in the SPP Criteria. In addition, the Transmission Provider shall calculate the amount of Instantaneous Load Capacity Head-room and Floor-room required for the Operating Day on a system-wide basis in order to ensure that load can be reliably serviced in real-time. The Transmission Provider shall, on a daily basis:

1. Calculate the hourly Regulation-Up, Regulation-Down and Contingency Reserve requirements on an SPP Balancing Authority Area basis and post such results by 0700 hours Day-Ahead for use in the Day-Ahead Market, Day-Ahead RUC, Intra-Day RUC and RTBM;

2. Calculate the total minimum and total maximum Operating Reserve requirement for Operating Reserve deployment in the up direction and for deployment of Operating Reserve in the down direction for each Reserve Zone. These minimum and maximum Operating Reserve requirements will be determined by conducting a simulated energy transfer study for each hour of the Operating Day on the transmission system, reflecting expected outages and economic energy flows, in order to determine the energy transfer limitations into or out of a Reserve Zone in any hour. If a Reserve Zone is unable to import enough Energy after a contingency and still maintain all necessary operating limits, a minimum amount of Operating Reserve may be required to be carried in that Zone. The minimum Operating Reserve requirement is the largest difference between the Resource MW lost in the simulated contingency and the resulting import capability of that Reserve Zone. Similarly, if a Reserve Zone is unable to export additional Energy after a contingency outside of that Reserve Zone, then a maximum amount of Operating Reserve that is deliverable from that Zone will be specified in order to ensure that deliverable reserves are carried in other Zones. The maximum Operating Reserve limitation is equal to the export capability of that Reserve Zone when replacing Energy lost due to a Resource contingency outside of that Reserve Zone. The Transmission Provider may, at its option, set specific Regulation-Up and/or Spinning Reserve minimum requirements for each Reserve Zone, as needed, to address reliability issues that can only be alleviated through carrying synchronized reserves. In such cases, the
Transmission Provider will include these minimum Regulation-Up and/or Spinning Reserve requirements when posting the Operating Reserve requirements by 0700 Day-Ahead;

(3) Estimate each Market Participant’s Operating Reserve obligation by Asset Owner in each Reserve Zone and provide such information to Market Participants by 0700 hours Day-Ahead. The Transmission Provider shall calculate such estimates by multiplying the system-wide Operating Reserve requirements calculated in (1) above by the Transmission Provider’s estimate of each Asset Owner’s load in each Reserve Zone divided by the Transmission Provider’s estimate of system-wide load;

(4) The Transmission Provider may increase Operating Reserve requirements for the Day-Ahead RUC, Intra-Day RUC and RTBM above the requirements used in the Day-Ahead Market, including changes to Reserve Zone minimums and maximums, as required to meet increases in reliability requirements caused by changes in system conditions; and

(5) Calculate the **Instantaneous Load Capacity hourly Head-room and Floor-room requirements** for an interval on an SPP Balancing Authority Area basis for use in the Day-Ahead Market, Day-Ahead RUC and Intra-Day RUC in accordance with the calculation procedures specified in the Market Protocols.

### 5.1.1 Day-Ahead Market Inputs

Inputs to the Day-Ahead Market will include the following:

(1) Day-Ahead Market Resource Offers, Virtual Energy Offers, Demand Bids and Virtual Energy Bids;

(2) Resource Offers for long lead time Resources selected by the Transmission Provider for commitment during the Multi-Day Reliability Assessment process;

(3) Through Interchange Transactions with confirmed Transmission Service reservations;

(4) Export Interchange Transaction Bids with confirmed Transmission Service reservations;

(5) Import Interchange Transaction Offers with confirmed Transmission Service reservations;

(6) Operating Reserve requirements (system-wide and Reserve Zone minimum and maximum);

(7) Transmission System topology consistent with the Network Model in place for the upcoming Operating Day;
Actual and approved scheduled Transmission System outages as documented in the Transmission Provider’s outage scheduler;

Actual and approved scheduled Resource outages as documented in the Transmission Provider’s outage scheduler;

The Transmission Provider’s estimate of Parallel Flows; and

**Instantaneous Load Capacity Head-room and Floor-room requirements.**

### 5.1.2 Day-Ahead Market Execution

The Transmission Provider will employ a simultaneous co-optimization methodology to perform the following tasks in order to clear the Day-Ahead Market for each hour of the upcoming Operating Day:

1. Commit Offered Resources, Import Interchange Transaction Offers and Virtual Energy Offers using the SCUC algorithm to meet the Demand Bids, Virtual Energy Bids, Export Interchange Transactions Bids, **Instantaneous Load Capacity Head-room and Floor-room requirements**, and Operating Reserve requirements on a least cost basis for each hour of the upcoming Operating Day.

   a. The Day-Ahead Market SCUC algorithm will initially consider commitment of Resources not specified for reliability only use as described in Section 4.1(10)(c) of this Attachment AE, including Resources committed in the Multi-Day Reliability Assessment, up to the Resources’ Maximum Economic Capacity Operating Limit or Maximum Regulation Capacity Operating Limit if selected for Regulation-Up Service and/or Regulation-Down Service, and down to the Resources’ Minimum Economic Capacity Operating Limit or Minimum Regulation Capacity Operating Limit if selected for Regulation-Down Service and/or Regulation-Up Service.

   i. If this capacity is not sufficient to meet the fixed Demand Bids and fixed Export Interchange Transaction Bids, the **upper bound of Instantaneous Load Capacity Head-room requirements**, and Operating Reserve requirements on a system-wide basis, the Day-Ahead Market SCUC algorithm will, in priority order: (1) curtail non-firm fixed Export Interchange Transaction Bids until the capacity shortage is eliminated; and (2) incorporate capacity up to Resources’ Maximum Emergency Capacity Operating Limits and/or commit Resources designated as reliability only
use, as described in Section 4.1(10)(c) of this Attachment AE, on an economic basis until the capacity shortage is eliminated while attempting to maintain the Regulation-Up requirement to the extent possible.

(ii) If there is a capacity surplus on a system-wide basis calculated as the sum of self-committed capacity at minimum output, fixed Import Interchange Transaction Offers, the lower bound of Instantaneous Load Capacity requirement, and the Regulation-Down requirement that is in excess of the sum of fixed Demand Bids and fixed Export Interchange Transaction Bids, the Day-Ahead Market SCUC algorithm will, in priority order: (1) curtail non-firm fixed Import Interchange Transaction Offers until the capacity surplus is eliminated; and (2) incorporate capacity down to Resources’ Minimum Emergency Capacity Operating Limits until the capacity surplus is eliminated while attempting to maintain the Regulation-Down requirement.

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5.2.1 Day-Ahead Reliability Unit Commitment Inputs

Inputs to the Day-Ahead RUC will include the following:

1. RTBM Resource Offers;
2. Confirmed cleared Export Interchange Transaction Bids from the Day-Ahead Market;
3. Confirmed cleared Import Interchange Transaction Offers from the Day-Ahead Market;
4. Confirmed cleared Through Interchange Transactions from the Day-Ahead Market;
5. Confirmed Export Interchange Transactions specified for use in the RTBM only;
6. Confirmed Import Interchange Transactions specified for use in the RTBM only;
7. Confirmed Through Interchange Transactions specified for use in the RTBM only;
8. Operating Reserve requirements (system-wide and Reserve Zone minimum and maximum);
9. Transmission Provider load forecast;
10. Transmission System topology consistent with Network Model in place for the upcoming Operating Day;
(11) Resource commitment schedules from the Day-Ahead Market unless the Transmission Provider is informed by the Market Participant that the Resource is unable to meet its Day-Ahead Market cleared Resource Offers;

(12) Commitment schedules for long lead time Resources selected in the Multi-Day Reliability Assessment unless the Transmission Provider is informed by the Market Participant that the Resource is unable to meet its commitment schedule;

(13) The Transmission Provider’s wind Resource MWh output forecast;

(14) Actual and approved scheduled Transmission System outages as documented in the Transmission Provider’s outage scheduler;

(15) Actual and approved scheduled Resource outages as documented in the Transmission Provider’s outage scheduler;

(16) The Transmission Provider’s estimate of Parallel Flows; and

(17) Instantaneous Load Capacity Head-room and Floor-room requirements; and

(18) Operator input due to uncertainty.

6.1.1 Intra-Day Reliability Unit Commitment Inputs

Inputs to the RUC will include the following:

(1) RTBM Resource Offers;

(2) Confirmed Export Interchange Transactions;

(3) Confirmed Import Interchange Transactions;

(4) Confirmed Through Interchange Transactions;

(5) Operating Reserve requirements (system-wide and Reserve Zone minimum and maximum);

(6) Transmission Provider load forecast;

(7) Transmission System topology consistent with Network Model;

(8) Resource commitment and de-commitment schedules from the Day-Ahead RUC or previous Intra-Day RUCs;

(9) The Transmission Provider’s wind Resource MWh output forecast;

(10) Actual and approved scheduled Transmission System outages as documented in the Transmission Provider’s outage scheduler;

(11) Actual and approved scheduled Resource outages as documented in the Transmission Provider’s outage scheduler;

(12) The Transmission Provider’s estimate of Parallel Flows; and
(13) Instantaneous Load Capacity, Head-room and Floor-room requirements; and
(14) Operator input due to uncertainty.

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A Proposed Change to Monthly ARR Allocations

By AEP on 8/16/2016
Issue with RR91

• The annual ARR allocation is a three-round process where in round 3 any source to sink path can be nominated.
• RR91 reduces the percentage of SPP Residual Transmission System Capability available for the annual ARR allocation from 100% to 90% for July through September, and 60% for Fall, Winter, and Spring.
• RR91 has resulted in various degrees of a loss in round 3 ARR awards for all ARR holders due to lower transmission system capabilities. Such a loss is not being compensated in any form at subsequent monthly ARR processes.
Issue with RR91 (cont-)

Prior to RR91

With RR91

100%

100%

60% (fall, winter, and spring)

○ : candidate ARR
△ or ▽ : any source to sink path
A Proposed Solution

• One additional round of allocation is added to each monthly ARR process: round 1 where only candidate ARRs are to be nominated remains the same; in round 2 any source to sink path can be nominated.

• Monthly TCR auctions for October through May are reduced to one round with 100% of Residual Transmission System Capability.
Multi-Month Auctions in the Integrated Marketplace

Jim Flucke
Kansas City Power & Light
SPP Market Working Group Meeting
August 23, 2016
Potential TCR Market Improvements

• Objectives include market funding and liquidity
  – First step was reducing ARR Allocation percentages in Annual Auction which took effect with the recent auction
  – Impacts will not start to be realized until July with most significant impacts in winter and spring periods

• Presentation by SPP on potential market changes to the Market Working Group in September 2015
  – Auction Schedule Modifications
  – Transmission Outage Coordination
Potential Auction Schedule Changes

• “Multi-Month Auctions” could be implemented to cover three* months at a time with no annual auction, only annual LTCR allocations

• For example, in August:
  – ARR Allocation for November
  – “Round 3” (Open source and sink selection) ARR Nominations for October (as proposed by AEP)
  – These two ARR Allocation processes would be completed simultaneously in one week

  – After ARR Allocations are complete
    • TCR Auction for September, October, and November monthly TCRs
    • These would also be completed simultaneously in one week

* Three months has been chosen to balance additional liquidity benefits and lead time for the impact of transmission outages. Two, four, or more months could be utilized if preferred.
Multi-Month Auction Logistics

• LTCR Allocations would still be done once a year (April/May timeframe) and that would still require an annual transmission service verification

• Annual ARR Allocations would be distributed throughout the year further decreasing the allocation of infeasible ARRs

• There would be no second round for any of the monthly auctions. MPs would have three auctions to participate in for each month and those would occur in the three preceding months.
# Existing TCR Market Schedule

## 2016 Annual Process

<table>
<thead>
<tr>
<th>February 2016</th>
<th>March 2016</th>
<th>April 2016</th>
<th>May 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Su</td>
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<td>1</td>
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<tr>
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</table>

## Process Legend

- **LCRR Verification**
- **Nomination Window**
- **Post ARR**
- **Bid Window**
- **Post TCR**
- **Post model**
- **TCR Run / cARR Verification**
- **1 Holiday & Weekend**
- **Annual Verification (LTCL & AARR)**
- **LTCR Allocation**
- **Deadline for outage submittal**
- **Bank Holiday (Non-SPP)**

## Holidays

- **Jan. 01 New Year's Day**
- **Jan. 18 MLK Day**
- **Feb. 15 Presidents Day**
- **Mar. 05 Memorial Day**
- **Jul. 04 Independence Day**
- **Sep. 12 Labor Day**
- **Oct. 10 Columbus Day**
- **Nov. 11 Veterans Day**
- **Nov. 24 Thanksgiving Day**
- **Nov. 25 Day After Thanksgiving**
- **Dec. 23 Christmas Eve Observed**
- **Dec. 24 Christmas Eve**
- **Dec. 25 Christmas Day**
- **Dec. 29 Christmas Day Observed**
- **Jan. 01 New Year's Day**
- **Jan. 02 New Year's Day Observed**
- **Feb. 16 MLK Day**
- **Feb. 20 Presidents Day**
# Multi-Month Auction TCR Market Schedule

## 2016 Annual Process

<table>
<thead>
<tr>
<th>February 2016</th>
<th>March 2016</th>
<th>April 2016</th>
<th>May 2016</th>
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<tbody>
<tr>
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<td>27 28 29 30 31</td>
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<table>
<thead>
<tr>
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<th>July 2016</th>
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<th>September 2016</th>
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<table>
<thead>
<tr>
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<th>January 2017</th>
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### Legend
- **LTCR Verification**
- **ARR Verification**
- **Nomination Window**
- **Post AAR**
- **Bid Window**
- **Post TCR**
- **Post model**
- **TCR Run / cARR Verification**
- **Holiday & Weekend**
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### Holidays
- Jan. 01: New Year's Day
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- Dec. 25: Christmas Day
- Dec. 26: Christmas Day Observed
- Jan. 01: New Year's Day
- Jan. 02: New Year's Day Observed
- Jan. 18: MLK Day
- Feb. 19: Presidents Day

---

Note: This calendar does not show the transition into the multi-month auction that would occur in March-May.

---

**Annual process April-May**

Able to delay the monthly process in Sept., and Nov. – April with the removal of the second round of the monthly auction.

---

**Note:** This calendar does not show the transition into the multi-month auction that would occur in March-May.
Summary of Benefits and Costs

• Benefits
  – Less transmission outage uncertainty leads to less TCR underfunding (5-month vs. up to 15-month lead time)
  – Greater liquidity with three auction opportunities for each month in closer proximity to the prompt month
  – Shortens auction schedule with only one round each month
  – Allows for multiple rounds of ARR Allocations spread over multiple months with no increase in the length of the allocation window each month
  – Allows for the shifting of the auction a week later in months with two auction rounds which would improve outage modeling and therefore underfunding
  – More beneficial than adding second round to annual auction because of greater certainty of transmission additions/outages, fuel prices, unit retirements/additions, etc.
  – Eliminates seasonal TCR/ARR periods
  – Lowers and reduces volatility in collateral requirements for TCR Market
  – More consistent workload for SPP Staff and TCR professionals
  – No anticipated changes to TCR/ARR Settlements

• Extensive software modification (Time and money)
SPP
75th Anniversary

75

SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
Congestion Hedging
MWG: TCR Protocol - System Capacity Clarification

August 23rd, 2016

Ty Mitchell
Congestion Hedging
Residual Transmission System Capability
Section 5.2.3(2)

The definition of Residual Transmission System Capability is referenced by the following protocol sections:

- LTCR: 5.2
- Annual:
  - Allocation: 5.3(1)
  - Auction: 5.3.3
- Monthly
  - Allocation: 5.5.3 (no reference, states 100%)
  - Auction:
    - Round 1, 5.6.2(1)
    - Round 2, 5.6.2(2)
Amend Protocols for Clarity

5.2.3(2)
Prior to assessing simultaneous feasibility, the normal and emergency ratings of all flowgates and monitored transmission system elements are adjusted as follows to arrive at an SPP Residual Transmission System Capability:


b) Adjusted Flowgate Rating (normal and Emergency) = (Flowgate Rating – Parallel Flow impact – \textit{previous award impact})
SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
Yearly VRL Analysis

Market Support/Forensics
OpsMktSupport@spp.org
Background

• 4.1.4.3.2 Annual Reporting
  - Each year by August 1st, SPP shall produce a report with supporting documentation that will analyze the effectiveness of VRLs and associated values on reliability and prices. The report shall include a sensitivity analysis of the existing VRL and associated values and examine impacts of raising or lowering the associated values. If changes are warranted, SPP shall recommend changes to the ORWG and the MWG for consideration.
Summary

- Recommending no change to:
  - Resource Capacity (not used since inception of Marketplace)
  - Power Balance (not used since inception of Marketplace)
  - Resource Ramp Constraint (18 times in Real Time, 0 in Day Ahead)
  - Spinning Reserve (12 Times in Real Time, 0 in Day Ahead)

- Recommending a change to:
  - First Block of the Operating Constraint Curve
    - Moving from $500 to $750
  - Acknowledging that further research/changes on the Operational Constraint Curve are needed
## Current Settings/Description

<table>
<thead>
<tr>
<th>Constraint Type</th>
<th>Description</th>
<th>VRL [$/MW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource Capacity</td>
<td>The minimum and maximum MW dispatchable output of a Resource as indicated in a Resource Offer.</td>
<td>100,000</td>
</tr>
<tr>
<td>Global Power Balance</td>
<td>Energy needed to balance Resources and load.</td>
<td>50,000</td>
</tr>
<tr>
<td>Resource Ramp</td>
<td>The ramp capability of a Resource as indicated in the Resource plan.</td>
<td>5,000</td>
</tr>
<tr>
<td>Operating Constraint</td>
<td>A MW limit that can be imposed on SPP related to MW flow across a market node, a manually-identified transmission constraint, a Watch List transmission constraint, a flowgate constraint, or a transmission constraint identified by SPP’s real-time contingency analysis.</td>
<td>$500 when the loading is greater than 100% and less than or equal to 101% at each network constraint at each Operating Constraint. $750 when &gt;101% and &lt;= 102% $1,000 when &gt;102% and &lt;= 103% $1,250 when &gt;103% and &lt;= 104% $1,500 when &gt;104%</td>
</tr>
<tr>
<td>Spinning Reserve Constraint</td>
<td>A MW value representing the Spinning Reserve requirement</td>
<td>200</td>
</tr>
</tbody>
</table>
Why the change to $750?

• Economic Breaches
  • Trend has been occurring since inception of Marketplace
  • We have relief available for the constraint, however, the violation amount is in the $500 block and it is too expensive to re-dispatch for the relief
  • Some reasons this is occurring:
    • More Wind
    • Gas Prices
    • Changes in commitment parameters

• NERC Reliability Standards addressing facility limits and maintaining System Operating Limits
  • More emphasis on maintaining flow below SOL than previous

• Automate manual actions by the RC
  • When we are in an economic breach situation and the RC needs relief, the Effective Limit of the constraint is adjusted such that the violation percentage will move the constraint into the next block
  • Effectively, the RC, in order to control the constraint, is doing what our analysis is suggesting
Top 20 Breached Constraints

Constraint Breakdown of Instances of "Economic" Breaches

- Red: Enough relief available to solve the constraint at shadow prices <$1,500
- Black: Not enough relief at shadow prices <$1,500
Sensitivity Analysis

Analysis shows decrease in Breached instances with a minimal increase to MEC and Operating Cost

Decrease in Breached Intervals

<table>
<thead>
<tr>
<th>First Penalty Value</th>
<th>Constraint-Intervals of Congestion</th>
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<tr>
<td>$1,000</td>
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<tr>
<td>$900</td>
<td>41911</td>
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<td>$800</td>
<td>41780</td>
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<tr>
<td>$700</td>
<td>41564</td>
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<td>$600</td>
<td>41028</td>
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<tr>
<td>$500 base</td>
<td>39910</td>
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</tbody>
</table>

- Binding
- Breached
Minimal Solution Cost Increase

RTBM averages, by scenario

- MEC
- Min LMP
- Max LMP
- Operating Cost

First VRL Penalty Value

Sensitivity Analysis (cont)
Other improvements being researched

- Implement a time function in the VRL blocks such that a constraint will use increasing higher VRL blocks the longer it has been breaching the limit, up until it reaches the maximum VRL block of $1,500/MWhr.

- Make VRL blocks configurable by flowgate, so with analysis, SPP could select flowgates to start at a higher base VRL block, when conditions and data show that binding is rarely possible except at shadow prices between $500 and $1,500.
Questions?
## Revision Request Form

**SPP STAFF TO COMPLETE THIS SECTION**

**RR #: 0183**

**Date: 8/11/2016**

**RR Title: VRL Annual Update 2016**

- System Changes: ☒ No ☐ Yes
- Process Changes?: ☒ No ☐ Yes
- Impact Analysis Required?: ☒ No ☐ Yes

### SUBMITTER INFORMATION

<table>
<thead>
<tr>
<th>Name:</th>
<th>Erin Cathey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company:</td>
<td>SPP</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:ecathey@spp.org">ecathey@spp.org</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>501-614-3239</td>
</tr>
</tbody>
</table>

*Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).*

- ☒ SPP Staff
- ☐ SPP Market Participant
- ☐ SPP Member
- ☐ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
- ☐ SPP Market Monitor
- ☐ Staff of government authority with jurisdiction over SPP/SPP member
- ☐ Rostered individual of SPP Committee, Task Force or Working Group
- ☐ Transmission Customers or other entities that are parties to transactions under the Tariff

### REVISION REQUEST DETAILS

**Requested Resolution Timing:** ☒ Normal ☐ Expedited ☐ Urgent Action

**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

- ☐ Correction
- ☐ Clarification
- ☒ Design Enhancement
- ☐ New Protocol, Business Practice, Criteria, Tariff
- ☐ NERC Standard Impact (Specifically state if revision relates to/or impacts NERC Standards, list standard(s))
- ☐ FERC Mandate (List order number(s))

### REVISION REQUEST RISK DRIVERS

**Are there existing risks to one or more SPP Members or the BES driving the need for this RR?** ☒ Yes ☐ No

If yes, provided details to explain the risk and timelines associated:

- ☐ Compliance (Tariff, NERC, Other)
- ☐ Reliability/Operations
- ☐ Financial

**SPP Documents Requiring Revision:**

*Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).*

- ☒ Market Protocols

<table>
<thead>
<tr>
<th>Section(s):</th>
<th>4.1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol Version:</td>
<td>39a</td>
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</table>
Objectives of Revision Request:
Describe the problem/issue this revision request will resolve.

Per Section 4.1.4.3 of the Marketplace Protocols, by August 1st each year, SPP will provide analysis as well as a set of proposed VRLs and associated values to the ORWG and MWG. ORWG and MWG will then recommend a set of proposed VRLs and associated values to the MOPC.

This RR proposes to update the operating constraint VRL values based on the analysis provided by SPP.

Once the clearing engine reaches the VRL, it stops redispersching and moves on, but issues a violation. By adjusting increasing the VRL to a higher value, the clearing engine will provide additional redispach to provide relief needed to solve the case with less violations.

Describe the benefits that will be realized from this revision.
There will be less violations and the prices will more accurately reflect the needed redispach.

REVISIONS TO SPP DOCUMENTS
In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

4.1.4 Violation Relaxation Limits

The DA Market, RUC processes and RTBM SCED enforce a number of operating constraints in developing the co-optimized market solution. In certain situations, attempting to enforce all constraints may result in a solution that is not feasible at a Shadow Price less than an appropriately priced Violation Relaxation Limit. In such cases, SPP must apply Violation Relaxation Limits (VRLs) in SCED.

There are five categories of constraints and associated VRLs: (1) Resource Capacity Constraints; (2) Resource Ramp Constraint; (3) Global Power Balance Constraint; (4) Operating Constraint (which include PNode, Manual, Watch List, flowgate and Real-Time Contingency Analysis (RTCA) Constraints) and (5) Spinning Reserve requirement constraint. A higher VRL value is an indication of the relative priority for enforcing the constraint type. For example, the VRL value assigned to a ramp rate limit exceeds that assigned to a flowgate limit indicating that the flowgate constraint should be relaxed before the ramp rate constraint. If the VRL with the lowest value will not allow SCED to balance the market’s energy obligations, a higher VRL will be applied. In the case of the Operating Constraint VRLs, the values limit the cost of the dispatch needed to balance
system injections and withdrawals by capping the Shadow Price depending upon the level of the violation. Similarly, the Spinning Reserve Constraint VRL limits the costs of redispatch need to meet the Spinning Reserve requirement by capping the Spinning Reserve Shadow Price. Exhibit 4-1 provides a summary of the current VRL values by constraint type.
<table>
<thead>
<tr>
<th>Constraint Type</th>
<th>Description</th>
<th>VRL [$/MW]</th>
</tr>
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<tbody>
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<td>Energy needed to balance Resources and load.</td>
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<td>(3) Resource Ramp</td>
<td>The ramp capability of a Resource as indicated in the Resource plan.</td>
<td>5,000</td>
</tr>
<tr>
<td>(4a) Operating Constraint not subject to Market-to-Market coordination</td>
<td>A MW limit that can be imposed on SPP related to MW flow across a market node, a manually-identified transmission constraint, a Watch List transmission constraint, a flowgate constraint, or a transmission constraint identified by SPP’s real-time contingency analysis.</td>
<td>$500 - $750 when the loading is greater than 100% and less than or equal to 101% at each network constraint.</td>
</tr>
<tr>
<td></td>
<td>$750 when the loading is greater than 101% and less than or equal to 102% at each network constraint.</td>
<td>$750</td>
</tr>
<tr>
<td></td>
<td>$1,000 when the loading is greater than 102% and less than or equal to 103% at each network constraint.</td>
<td>$1,000</td>
</tr>
<tr>
<td></td>
<td>$1,250 when the loading is greater than 103% and less than or equal to 104% at each network constraint.</td>
<td>$1,250</td>
</tr>
<tr>
<td></td>
<td>$1,500 when the loading is greater than 104% at each network constraint.</td>
<td>$1,500</td>
</tr>
<tr>
<td>(4b) Operating Constraint subject to Market-to-Market coordination</td>
<td>A MW limit that can be imposed on SPP related to MW flow across a market node, a manually-identified transmission constraint, a Watch List transmission constraint, a flowgate constraint, or a transmission constraint</td>
<td>MISO’s Shadow Price as further defined in Section 3.1 of the SPP-MISO JOA</td>
</tr>
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<td>Constraint Type</td>
<td>Description</td>
<td>VRL [$/MW]</td>
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</tr>
<tr>
<td></td>
<td>identified by SPP’s real-time contingency analysis.</td>
<td></td>
</tr>
<tr>
<td>(5) Spinning Reserve Constraint</td>
<td>A MW value representing the Spinning Reserve requirement</td>
<td>$200</td>
</tr>
</tbody>
</table>
VRLs and associated values are intended to achieve the following objectives: (1) Mitigate the occurrence of price excursions or other extreme prices; (2) Remove the portion of a loading violation attributed to market flow on a flowgate within 30 minutes of the start of a VRL violation; (3) Mitigate the regulation burden placed on the Resources providing regulation services; (4) Limit contribution to CPS violations; and (5) Minimize the need for OOMEs.

Addendum 1 to Attachment AE
Violation Relaxation Limit Values

This Addendum 1 to Attachment AE sets forth the VRL values to be used in conjunction with the operation of the SPP Energy and Operating Reserve Markets.

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<tr>
<td>(2) Global Power Balance</td>
<td>Energy needed to balance resources and load.</td>
<td>50,000</td>
</tr>
<tr>
<td>(3) Resource Ramp</td>
<td>The ramp capability of a resource as indicated in the resource plan.</td>
<td>5,000</td>
</tr>
<tr>
<td>(4a) Operating Constraint not subject to Market-to-Market coordination</td>
<td>A MW limit that can be imposed on SPP related to MW flow across a market node, a manually-identified transmission constraint, a Watch List transmission constraint, a flowgate constraint, or a transmission constraint identified by SPP’s Real-Time contingency analysis.</td>
<td>$500 when the loading is greater than 100% and less than or equal to 101% at each network constraint, $750 when the loading is greater than 101% and less than or equal to 102% at each network constraint, $1,000 when the loading is greater than 102% and less than or equal to 103% at each network constraint, $1,250 when the loading is greater than 103% and less than or equal</td>
</tr>
<tr>
<td>Constraint Type</td>
<td>Description</td>
<td>VRL [$/MW]</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>(4b) Operating Constraint subject to Market-to-Market coordination</td>
<td>A MW limit that can be imposed on SPP related to MW flow across a market node, a manually-identified transmission constraint, a Watch List transmission constraint, a flowgate constraint, or a transmission constraint identified by SPP’s Real-Time contingency analysis.</td>
<td>$1,500</td>
</tr>
<tr>
<td>(5) Regulation-up plus Spinning Reserve Constraint</td>
<td>A MW value representing the sum of the Regulation-Up requirement and Spinning Reserve requirement</td>
<td>$200</td>
</tr>
<tr>
<td>SPP Operating Criteria</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>SPP Planning Criteria</td>
<td>NA</td>
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<tr>
<td>SPP Business Practices</td>
<td>NA</td>
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</table>
**Revision Request Form**

**SPP STAFF TO COMPLETE THIS SECTION**

<table>
<thead>
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<th>RR #: 184</th>
<th>Date: 8/10/2016</th>
</tr>
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</table>

**RR Title:** Clarification to Outage Deviation

<table>
<thead>
<tr>
<th>System Changes</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Process Changes?</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Impact Analysis Required?</th>
<th>No</th>
<th>Yes – Impact Assessment included in RR106</th>
</tr>
</thead>
</table>

**SUBMITTER INFORMATION**

<table>
<thead>
<tr>
<th>Name: John Luallen</th>
<th>Company: Southwest Power Pool</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Email: <a href="mailto:jluallen@spp.org">jluallen@spp.org</a></th>
<th>Phone: 501.688.1655</th>
</tr>
</thead>
</table>

*Only Qualified Entities may submit Revision Requests.*

Please select at least one applicable option below, as it applies to the named submitter(s).

- ☑️ SPP Staff
- ☑️ SPP Market Participant
- ☑️ SPP Member
- ☑️ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
- ☑️ SPP Market Monitor
- ☑️ Staff of government authority with jurisdiction over SPP/SPP member
- ☑️ Rostered individual of SPP Committee, Task Force or Working Group
- ☑️ Transmission Customers or other entities that are parties to transactions under the Tariff

**REVISION REQUEST DETAILS**

**Requested Resolution Timing:**
- ☑️ Normal
- ☑️ Expedited
- ☑️ Urgent Action

*Reason for Expedited/Urgent Resolution:*

**Type of Revision (select all that apply):**

- ☑️ Correction
- ☑️ Clarification
- ☑️ Design Enhancement
- ☑️ New Protocol, Business Practice, Criteria, Tariff
- ☑️ NERC Standard Impact *(Specifically state if revision relates to or impacts NERC Standards, list standard(s))*
- ☑️ FERC Mandate *(List order number(s))*

**REVISION REQUEST RISK DRIVERS**

Are there existing risks to one or more SPP Members or the BES driving the need for this RR? ☑️ Yes ☑️ No

If yes, provided details to explain the risk and timelines associated:

- ☑️ Compliance (Tariff, NERC, Other)
- ☑️ Reliability/Operations
- ☑️ Financial

**SPP Documents Requiring Revision:**

*Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).*

<table>
<thead>
<tr>
<th>Document Type</th>
<th>Section(s)</th>
<th>Protocol Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Protocols</td>
<td>4.5.9.10</td>
<td>39a</td>
</tr>
<tr>
<td>Operating Criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning Criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tariff (OATT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Practice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 1 of 5
Objectives of Revision Request:
Describe the problem/issue this revision request will resolve.

The previously approved formula in RR106 would exempt all Resources that clear in the DAMKT that were following SPP’s Dispatch to zero from receiving the RtOutageDevHrlyQty in the RUC MWP distribution. However, the formula would also charge every Resource RtOutageDevHrlyQty that cleared in the DAMKT and submitted meter in Real-Time.

Describe the benefits that will be realized from this revision.

The changes below reflect the intent of RR106. If a Resource clears in the DAMKT and is off-line in RT (meters zero) then the amount of MWs cleared in the DAMKT will be included in the RUC MWP distribution via the RtOutageDevHrlyQty charge type. If a Resource clears in the DAMKT and meters zero in RT and that Resource was either decommitted by SPP or was following SPP’s Dispatch to zero, then the Resource will be exempted from RtOutageDevHrlyQty. The changes also add a check for the RtOom5minFlg to verify that the Resource was following SPP dispatch via OOME.

REVISIONS TO SPP DOCUMENTS
In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

4.5.9.10 RUC Make-Whole-Payment Distribution Amount

... (a.4) For Resources with DA Market cleared MW in an hour, if the Resource is off-line in the RTBM and it has not been de-committed or dispatched to zero by SPP the Resource DA Market cleared MW is included as a deviation. An Asset Owner’s outage deviation is calculated as follows.

\[ \text{RtOutageDevHrlyQty}_{a,k,h} = \sum_i \text{RtOutageDev5minQty}_{a,k,i} \]

\[ \text{IF } \text{DaCldHrlyQty}_{a,k,h} < 0 \text{ AND } \]
\[ \text{RtBillMtr5minQty}_{a,k,i} >= 0 \text{ AND } \]
\[ \text{ResDeCommit5minFlg}_{a,k,i} <> “1” \text{ AND } \]
\[ \text{[ RtAvgDispatch5minQttr}_{a,k,i} <> 0 \text{ OR } \]
\[ \text{ControlStatus5minFlg}_{a,k,i} <> “Regulating” \text{ AND } \]
\[ \text{ControlStatus5minFlg}_{a,k,i} <> “Follow Dispatch” \text{ AND } \]
\[ \text{RtOom5minFlg}_{a,k,i} <> “1” ] \]
\[ \text{THEN } \]
\[ \#\text{RtOutageDev5minQty}_{a,k,h} = \text{ABS (DaCldHrlyQty}_{a,k,h} ) / 12 \]
ELSE

RtOutageDev5minQty_{a, s, i} = 0

((RtAvgSetPoint5minQty_{a, s, i} = 0 AND
ControlStatus5minFlg_{a, s, i} = (“Regulating” OR “Follow Dispatch”))
OR
ResDeCommit5minFlg_{a, s, i} = “1”)
THEN
RtOutageDev5minQty_{a, s, i} = 0
ELSE

#RtOutageDev5minQty_{a, s, i} = ABS (DaClrdHrlyQty_{a, s, i}) / 12

*Commented [RR1612]: RR161 awaiting FERC and System Implementation*

*Commented [RR1063]: RR106 Awaiting FERC and System Implementation*
The above variables are defined as follows:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>Settlement Interval</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{RtAvgDispatch5minQty}_{a,s,i}</td>
<td>MW</td>
<td>Dispatch Interval</td>
<td>Real-Time Average Dispatch Instruction MW per AO per Settlement Location per Dispatch Interval – The average Dispatch Instruction as calculated as the average of the Dispatch Instruction in current Dispatch Interval (i) and the Dispatch Instruction for the previous Dispatch Interval (i) for AO (a)’s Resource at Settlement Location (s) in Dispatch Interval (i).</td>
</tr>
</tbody>
</table>
The Tariff changes in RR106 do not need to be updated. No additional Tariff changes needed.
Revision Request Form

SPP STAFF TO COMPLETE THIS SECTION

RR #: Date: 8/18/2016

RR Title: Solar Generation

System Changes ☒ No ☐ Yes
Process Changes? ☒ No ☐ Yes
Impact Analysis Required? ☒ No ☐ Yes

SUBMITTER INFORMATION

Name: Derek Hawkins
Company: SPP
Email: dhawkins@spp.org
Phone: 501.688.1662

Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).

☒ SPP Staff
☐ SPP Market Participant
☐ SPP Member
☐ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
☐ SPP Market Monitor
☐ Staff of government authority with jurisdiction over SPP/SPP member
☐ Rostered individual of SPP Committee, Task Force or Working Group
☐ Transmission Customers or other entities that are parties to transactions under the Tariff

REVISION REQUEST DETAILS

Requested Resolution Timing: ☐ Normal ☐ Expedited ☐ Urgent Action
Reason for Expedited/Urgent Resolution:

Type of Revision (select all that apply):

☐ Correction
☐ Clarification
☐ Design Enhancement
☒ New Protocol, Business Practice, Criteria, Tariff
☐ NERC Standard Impact (Specifically state if revision relates to/or impacts NERC Standards, list standard(s))
☐ FERC Mandate (List order number(s))

REVISION REQUEST RISK DRIVERS

Are there existing risks to one or more SPP Members or the BES driving the need for this RR? ☒ Yes ☐ No
If yes, provided details to explain the risk and timelines associated:
☐ Compliance (Tariff, NERC, Other)
☐ Reliability/Operations
☐ Financial

SPP Documents Requiring Revision:
Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).

☒ Market Protocols Section(s): New 4.1.2.5, New 4.1.2.6, 6.1.8, 6.1.9 Protocol Version: 39a
☐ Operating Criteria Section(s): Criteria Date:
☐ Planning Criteria Section(s): Criteria Date:
☒ Tariff (OATT) Section(s): Appendix G of Appendix 6 of Attachment V; Sections 2.2(10) and 5.4 of Attachment AE
**Objectives of Revision Request:**

The number of solar Resources in the SPP Balancing Authority generation fleet is increasing, with 175MW anticipated to be online by the end of 2016 according to SPP’s GI studies page. This Revision Request proposes necessary rules for solar Resources where existing Market Protocol and Tariff language does not include them. These revisions will further encourage solar generation through economic dispatch while maintaining the reliability of the Bulk Electric System. By being dispatchable, Solar Resources will have an increased ability to maximize their revenue by following Security Constrained Economic Dispatch (SCED) Setpoints. Also, the addition of a solar forecast will enhance the Security Constrained Unit Commitment (SCUC) and SCED, creating more consistent price profiling from which solar and all other MPs can benefit.

Specific changes include:

1. the addition of a description of a Solar-powered Generation Resource forecast for use in SPP forward studies,
2. Solar-specific requirements to increase accuracy of a Solar-powered Generation Resource forecast,
3. modification of the DVER registration requirement to include Solar Resources, and
4. Modification of the Generation Interconnection Agreement so certain current wind-specific requirements apply to all non-synchronous Resources.

**REVISIONS TO SPP DOCUMENTS**

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

### Market Protocols

#### 4.1.2.5 Solar-Powered Generation Resource Output Forecasts

SPP produces and updates an hourly Solar-powered Generation Resource (SGR) forecast that provides a rolling 48-hour hourly forecast of solar production potential from each SGR that is expected to exceed the SGR actual output 50% of the time (50% probability of exceedance forecast). The updated SGR forecasts for each hour are used as inputs into each RUC process.

SPP also produces and updates an hourly SPP Total Solar Power Forecast (TSPF) providing a probability distribution of the hourly production potential from all solar-powered Resources in SPP for each of the next 48 hours.

SPP produces the SGR forecast and TSPF using the information described in section Error! Reference source not found.

SPP shall make available the SGR forecasts to Market Participants and their designated agents for their specific SGRs, subject to any applicable confidentiality protections. In addition, SPP shall provide all Market Participants with the TSPF. Historical data shall be available for seven (7) calendar days.

#### 4.1.2.6 Solar-Powered Generation Resource Data Requirements

(A) A Generator Interconnection Customer for a Solar-powered Generation Resource (SGR) must provide applicable and accurate static information to SPP using a spreadsheet based template as defined by SPP. The Market Participant registering the Resource shall provide SPP with current contact information for the solar farm Owner and Operator through the Model Change Submission Tool (MCST). When the

<table>
<thead>
<tr>
<th>Business Practice</th>
<th>Business Practice Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives of Revision Request:</strong></td>
<td></td>
</tr>
<tr>
<td>The number of solar Resources in the SPP Balancing Authority generation fleet is increasing, with 175MW anticipated to be online by the end of 2016 according to SPP’s GI studies page. This Revision Request proposes necessary rules for solar Resources where existing Market Protocol and Tariff language does not include them. These revisions will further encourage solar generation through economic dispatch while maintaining the reliability of the Bulk Electric System. By being dispatchable, Solar Resources will have an increased ability to maximize their revenue by following Security Constrained Economic Dispatch (SCED) Setpoints. Also, the addition of a solar forecast will enhance the Security Constrained Unit Commitment (SCUC) and SCED, creating more consistent price profiling from which solar and all other MPs can benefit. Specific changes include:</td>
<td></td>
</tr>
<tr>
<td>1. the addition of a description of a Solar-powered Generation Resource forecast for use in SPP forward studies,</td>
<td></td>
</tr>
<tr>
<td>2. Solar-specific requirements to increase accuracy of a Solar-powered Generation Resource forecast,</td>
<td></td>
</tr>
<tr>
<td>3. modification of the DVER registration requirement to include Solar Resources, and</td>
<td></td>
</tr>
<tr>
<td>4. Modification of the Generation Interconnection Agreement so certain current wind-specific requirements apply to all non-synchronous Resources.</td>
<td></td>
</tr>
<tr>
<td><strong>REVISIONS TO SPP DOCUMENTS</strong></td>
<td></td>
</tr>
<tr>
<td>In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.</td>
<td></td>
</tr>
<tr>
<td><strong>Market Protocols</strong></td>
<td></td>
</tr>
<tr>
<td><strong>4.1.2.5 Solar-Powered Generation Resource Output Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>SPP produces and updates an hourly Solar-powered Generation Resource (SGR) forecast that provides a rolling 48-hour hourly forecast of solar production potential from each SGR that is expected to exceed the SGR actual output 50% of the time (50% probability of exceedance forecast). The updated SGR forecasts for each hour are used as inputs into each RUC process. SPP also produces and updates an hourly SPP Total Solar Power Forecast (TSPF) providing a probability distribution of the hourly production potential from all solar-powered Resources in SPP for each of the next 48 hours. SPP produces the SGR forecast and TSPF using the information described in section Error! Reference source not found. SPP shall make available the SGR forecasts to Market Participants and their designated agents for their specific SGRs, subject to any applicable confidentiality protections. In addition, SPP shall provide all Market Participants with the TSPF. Historical data shall be available for seven (7) calendar days. <strong>4.1.2.6 Solar-Powered Generation Resource Data Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>(A) A Generator Interconnection Customer for a Solar-powered Generation Resource (SGR) must provide applicable and accurate static information to SPP using a spreadsheet based template as defined by SPP. The Market Participant registering the Resource shall provide SPP with current contact information for the solar farm Owner and Operator through the Model Change Submission Tool (MCST). When the</td>
<td></td>
</tr>
</tbody>
</table>
parties agree, the Market Participant may submit the data on the Generator Interconnection Customer’s behalf. SGR static data must be updated at least once every five (5) years or as needed.

(1) **Geographical Data** – One set of coordinates is required for the solar farm site and the meteorological collection device tower. The placement of the met tower should be within 10 miles from the solar farm site. If more than one set of coordinates will be provided for the solar farm and its met tower, an email can be sent to OPSEMSEng@spp.org.

(a) **Solar Farm**

(i) **Latitude** – Latitude of the Resource location. The value should be entered in the decimal form of degrees. The value should be between 30 and 50 degrees and rounded to four digits. The value should represent the latitude at the mid-point of the solar farm.

(ii) **Longitude** – Longitude of the Resource location. The value should be entered in the decimal form of degrees. The value should be between -85 and -110 degrees and rounded to four digits. The value should represent the longitude at the mid-point of the solar farm.

(b) **Met Tower**

(i) **Latitude** – Latitude of the met tower. The value should be entered in the decimal form of degrees. The value should be between 30 and 50 degrees and rounded to four digits.

(ii) **Longitude** – Longitude of the met tower. The value should be entered in the decimal form of degrees. The value should be between -85 and -110 degrees and rounded to four digits.

(iii) **Height** – Elevation of the met tower. The value should be entered in meters (m) above ground level.

(2) **Panel Data** – Data related to the solar generation technology employed at the solar farm. If there is more than one type, model, etc., provide the most dominant data among the solar farm site.

(a) **Manufacturer** – Manufacturer of the solar panels.

(b) **Model** – Model of the solar panels. Provide any prefixes and suffixes if available.

(c) **Panels** – The number of panels at the wind farm

(d) **Capacity** – The nameplate capacity of each panel

(e) **Tilt** – Altitude angle or angle range for panels

(f) **Azimuth Angle** – Azimuth angle or angle range for panels

(g) **Height** – Elevation of panels above ground level

(3) **Tracking Data** – Details related to the tracking system if equipped.
(a) **Type** – Single or dual-axis tracking

(b) **Manufacturer** – Manufacturer of the tracker

(c) **Model** – Model of the tracker

(4) **ICCP Object ID** – The ICCP object IDs that the Generator Interconnection Customer will use to send ICCP data for a SGR

(a) Wind Speed

(b) Wind Direction

(c) Air Temperature

(d) Pressure

(e) Relative Humidity

(f) Back Panel Temperature

(g) Irradiance

   (i) Direct Irradiance

   (ii) Global Horizontal Irradiance

   (iii) Plane of Array/Global Irradiance

(5) **Contact Information** – 24x7 contact information

(a) Solar Farm Owner

(b) Solar Farm Operator

(B) A Generator Interconnection Customer for a SGR must provide Real-Time data through ICCP. When the parties agree, the Market Participant may submit the data on the Generator Interconnection Customer’s behalf.

(1) **Weather Data** – A snapshot of the instantaneous value at the SGR site is requested at a periodicity of every 60 seconds or faster.

(a) **Wind Speed** – Telemetered wind speed measured in meters per second (m/s) taken directly from the specified met tower.

(b) **Wind Direction** – Telemetered wind direction measured in compass heading degrees (1 – 360) taken directly from the specified met tower.

(c) **Air Temperature** – Telemetered air temperature measured in degrees Celsius (C) taken directly from the specified met tower.

(d) **Pressure** – Telemetered barometric pressure measured in kilopascals (kPa) taken directly from the specified met tower/nacelle anemometer.
(e) **Relative Humidity** – Telemetered relative humidity measured in percent (%) taken directly from the specified met tower/nacelle anemometer.

(f) **Back Panel Temperature** – Telemetered temperature measured in degrees Celsius (C) taken from a probe attached to the back of a panel.

(g) **Irradiance** – Telemetered irradiance measured in watt per square meter (W/m²) required for the type of solar generating technology that the SGR employs. Irradiance requirements may be a combination of direct irradiance, global horizontal irradiance, or plane of array/global irradiance.

(2) **Real-Time Availability** – Percentage of installed nameplate capacity of the SGR that is able to generate power. A snapshot of the instantaneous availability at the SGR site is requested at a periodicity of every 60 seconds or faster.

(C) A Generator Interconnection Customer for a SGR must provide Planned and Forced Outage and Availability data though the Control Room Operations Window (CROW). When the parties agree, the Market Participant may submit the data on the Generator Interconnection Customer’s behalf.

(1) **Outage** – Any planned or forced outage, where the solar farm is out of service or not operational, shall be added to CROW as an outage with the best approximation of the in-service date.

(2) **Availability** – Provide the planned hourly solar farm MW capability due to maintenance and any known power curve de-rate for the next 7 days. The threshold to submit, or update, availability reduction from nameplate capacity is 10% or 10MW whichever is smaller.

### 6.1.8 Dispatchable Variable Energy Resource

All Wind-Variable Energy Resources must register as a Dispatchable Variable Energy Resource except for (i) Wind-powered Variable Energy Resources with an interconnection agreement executed on or prior to May 21, 2011 and that commenced Commercial Operation before October 15, 2012 or (ii) a Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility. VERs included in (i) above may register as Dispatchable Variable Energy Resources if they are capable of being incrementally dispatched by the Transmission Provider. A Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility may register as a Dispatchable Variable Energy Resource if it is capable of being incrementally dispatched by the Transmission Provider and will be subject to the DVER market rules including Uninstructed Resource Deviation Charges. **Non-wind** (e.g. solar, run-of-the-river hydro, biomass) Variable Energy Resources shall not be required to register as a Dispatchable Variable Energy Resource unless they choose to register as such. Any Resource that has previously registered as a Dispatchable Variable Energy Resource shall not subsequently register as a Non-Dispatchable Variable Energy Resources.

(1) A Dispatchable Variable Energy Resource is eligible to submit Offers for Regulation-Down if that Resource qualifies to provide Regulation-Down by passing the test described under Section Error! Reference source not found.Error! Reference source not found.6.1.11.3.
A Dispatchable Variable Energy Resource is not eligible to submit Offers for Regulation-Up, Spinning Reserve or Supplemental Reserve;

Dispatchable Variable Energy Resources are committed and dispatched the same as any other Resource in the Day-Ahead Market.

For the RUC and RTBM, special commitment and dispatch rules apply as defined under Section Error! Reference source not found.Error! Reference source not found.4.2.2.5.5.

Dispatchable Variable Energy Resource data submittal requirements are defined in the SPP Criteria.

---

**SPP Tariff (OATT)**

### 2.2 Application and Asset Registration

... (10) All Variable Energy Resources must register as a Dispatchable Variable Energy Resource except for (i) Wind-powered Variable Energy Resources with an interconnection agreement executed on or prior to May 21, 2011 and that commenced Commercial Operation before October 15, 2012 or (ii) a Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility. VERs included in (i) above may register as Dispatchable Variable Energy Resources if they are capable of being incrementally dispatched by the Transmission Provider. A Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility may register as a Dispatchable Variable Energy Resource if it is capable of being incrementally dispatched by the Transmission Provider and will be subject to the DVER market rules including Uninstructed Resource Deviation Charges. Any Resource that has previously registered as a Dispatchable Variable Energy Resource shall not subsequently register as a Non-Dispatchable Variable Energy Resources. A wind-powered Variable Energy Resource with (1) an interconnection agreement executed after May 21, 2011 or (2) an interconnection agreement executed on or prior to May 21, 2011 and that commenced Commercial Operation on or after October 15, 2012 must register as a Dispatchable Variable Energy Resource. A wind-powered Variable Energy Resource with an interconnection agreement executed on or prior to May 21, 2011 may register as a Dispatchable Variable Energy Resource if it is capable of being incrementally dispatched by the Transmission Provider. Variable Energy Resources with fuel sources other than wind may optionally register as a Dispatchable Variable Energy Resource. Otherwise, Variable Energy Resources must register...
as Non-Dispatchable Variable Energy Resources. A Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility may register as a Non-Dispatchable Variable Energy Resource or a Dispatchable Variable Energy Resource as described in the Market Protocols. Any Resource that has previously registered as a Dispatchable Variable Energy Resource shall not subsequently register as a Non-Dispatchable Variable Energy Resource.

…

Article 5. Interconnection Facilities Engineering, Procurement, and Construction

5.4 Power System Stabilizers.

The Interconnection Customer shall procure, install, maintain and operate Power System Stabilizers in accordance with the guidelines and procedures established by the Applicable Reliability Council. Transmission Provider reserves the right to reasonably establish minimum acceptable settings for any installed Power System Stabilizers, subject to the design and operating limitations of the Generating Facility. If the Generating Facility's Power System Stabilizers are removed from service or not capable of automatic operation, Interconnection Customer shall immediately notify Transmission Owner’s system operator, or its designated representative. The requirements of this paragraph shall not apply to wind-non-synchronous generators.

Tariff Language Not Complete – More revisions will be added.
### Revision Request Form

**RR #: 0178**  
**Date: 8/11/2016**

**RR Title: Validation of Mitigated Resource Offer Parameters**

**System Changes** ☒ No ☐ Yes  
**Process Changes?** ☒ No ☐ Yes  
**Impact Analysis Required?** ☒ No ☐ Yes

---

**SPP STAFF TO COMPLETE THIS SECTION**

---

**SUBMITTER INFORMATION**

**Name:** Erin Cathey  
**Company:** Southwest Power Pool  
**Email:** ecathey@spp.org  
**Phone:** 501-590-8298

*Only Qualified Entities may submit Revision Requests.*  
*Please select at least one applicable option below, as it applies to the named submitter(s).*

- ☒ SPP Staff  
- ☐ SPP Market Participant  
- ☐ SPP Member  
- ☐ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”

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- ☐ Staff of government authority with jurisdiction over SPP/SPP member  
- ☐ Rostered individual of SPP Committee, Task Force or Working Group  
- ☐ Transmission Customers or other entities that are parties to transactions under the Tariff

---

**REVISION REQUEST DETAILS**

**Requested Resolution Timing:** ☒ Normal  
☐ Expedited  
☐ Urgent Action

**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

- ☐ Correction  
- ☒ Clarification  
- ☐ Design Enhancement  
- ☐ New Protocol, Business Practice, Criteria, Tariff  
- ☐ NERC Standard Impact  
- ☐ FERC Mandate

---

**REVISION REQUEST RISK DRIVERS**

**Are there existing risks to one or more SPP Members or the BES driving the need for this RR?** ☒ Yes ☐ No

If yes, provided details to explain the risk and timelines associated:

- ☐ Compliance (Tariff, NERC, Other)  
- ☐ Reliability/Operations  
- ☐ Financial

**SPP Documents Requiring Revision:**

*Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).*

- ☒ Market Protocols  
  **Section(s):** 8.2.2.9, G.1.5  
  **Protocol Version:** 38a

- ☐ Operating Criteria  
  **Section(s):**

- ☐ Planning Criteria  
  **Section(s):**

- ☒ Tariff (OATT)  
  **Section(s):** Section 3.5 of Attachment AF

- ☐ Business Practice  
  **Business Practice Number:**
Objectives of Revision Request:
The SPP Market Protocols and SPP Tariff did not clearly explain when the SPP MMU will review the costs included in each mitigated Resource offer. This Revision Request will specify that this review is performed on an ex-post basis and thus providing the clarity needed.

REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

8.2.2.9 Mitigated Offer Development Guidelines

A Mitigated Offer Development Subgroup of the Market Working Group, in coordination with the Market Monitor and the Transmission Provider, shall develop and maintain Mitigated Offer Development Guidelines in Appendix G, describing the standards for determining cost components for products and services provided to the SPP market that are subject to mitigation. The Mitigated Resource Offer Parameters, as defined in Sections 8.2.2.3, 8.2.2.4, and 8.2.2.5, are intended to capture the short-run marginal cost, including the appropriate application of opportunity costs, of providing each service to the SPP Energy and Operating Reserve Markets. The Mitigated Offer Development Guidelines shall describe all relevant cost components for defining Mitigated Start-Up Offers, Mitigated No-Load Offers, Mitigated Energy Offer Curves, and Mitigated Operating Reserve Offers, by Resource-type.

Exceptions to the Mitigated Offer Development Guidelines may be submitted to the Market Monitor. The Market Monitor shall respond with a resolution to such a request within 15 calendar days of receipt.

The Market Monitor shall review the costs included in the mitigated Resource Offer Parameters on an ex-post basis (relative to the relevant Operating Day) in order to ensure that the Market Participant has correctly applied the formulas and definitions in Sections 8.2.2.3, 8.2.2.4, and 8.2.2.5, and the Mitigated Offer Development Guidelines, and in Attachment AF of the SPP Tariff and that the level of the mitigated offer is otherwise acceptable. If the mitigated offer determined by the Market Monitor and the Market Participant differ, the Market Participant shall use the mitigated offer calculated by the Market Monitor going forward.

If a Market Participant submits a dispute over its mitigated offer, the previously approved mitigated offer shall be used from the time the dispute is submitted until the dispute is resolved. SPP shall remedy mitigated offer disputes resolved in favor of the Market Participant by providing Make Whole Payments, as necessary, to the Market Participant whose mitigated offer was improperly determined by the Market Monitor.

The Market Monitor shall gather and keep confidential detailed data on the costs of generation of electric power transmitted in the SPP Region in order to assist the performance of its duties under the SPP Tariff. To achieve this objective, the Market Monitoring Unit shall maintain on its website a mechanism that allows Market Participants to conveniently and confidentially submit such data. In addition the Market Monitoring Unit shall develop a manual in consultation with stakeholders that describes the nature of and procedure for data collection.
Market Participants registering a Resource or otherwise subject to a commitment to provide service to SPP shall provide data to the Market Monitoring Unit.

G.1.5  Mitigated Offer Methodology Approval Process

Market Participants shall submit their initial cost data and supporting documentation at least three months prior to launch of SPP’s Integrated Marketplace, unless otherwise directed by the SPP MMU. The SPP MMU shall provide initial feedback no longer than two months after submittal, or 15 calendar days prior to the start of the Integrated Marketplace, or by another mutually agreed date. For all subsequent new Resources, Market Participants shall submit the initial cost data and supporting documentation thirty days prior to submitting their first offer to the market, and the SPP MMU shall respond within fifteen calendar days.

The SPP MMU shall maintain on its website a mechanism that allows Market Participants to conveniently and confidentially submit and update such data as required or as needed. The website shall also contain instructions and examples of required documentation.

A Market Participant who seeks to obtain an exemption, exception or change to any time frame, process, methodology, calculation or policy set forth in these guidelines, or the approval of any mitigated offer that is not specifically permitted by these guidelines, shall submit a request to the SPP MMU for consideration and determination, except as otherwise specified herein.

The SPP MMU shall approve or disapprove such a request based on the following criteria:

- The cost components included in all mitigated offers should reflect the short-run marginal cost of generation;
- The formulas used to calculate mitigated offers and the components of cost included in mitigated offers do not deviate from those specified in the SPP Tariff; and
- The documentation and data validation provided by the Market Participant are sufficient for the SPP MMU to verify mitigated offers on an ongoing basis.

After receipt of such a request, the SPP MMU shall notify the Market Participant of its decision regarding the request no later than fifteen (15) calendar days after the submission of the request. If the Market Participant agrees with the SPP MMU’s decision, the request shall be deemed to be approved. In the event that the Market Participant disagrees with the SPP MMU’s decision and submits a dispute following the procedures described in section 12 of the SPP Tariff, the previously approved time frame, process, methodology, calculation or policy shall remain in place until the resolution of the dispute.

SPP Tariff (OATT)

(Attachment AF)

3.5 Validation of Mitigated Resource Offer Parameters
The Market Monitor shall review the costs included in each mitigated Resource Offer on an ex-post basis (relative to the relevant Operating Day) in order to ensure that the Market Participant has correctly applied the formulas and definitions in Sections 3.2, 3.3, and 3.4 of this Attachment AF and in the Market Protocols and that the level of the mitigated offer is otherwise acceptable. If the mitigated offer determined by the Market Monitor and the Market Participant differ, the Market Participant shall use the mitigated offer calculated by the Market Monitor and the Market Participant shall be used going forward. If a Market Participant submits a dispute over its mitigated offer, the previously approved mitigated offer shall be used from the time the dispute is submitted until the dispute is resolved. The procedures for submitting and processing disputes related to mitigated offers shall be those specified in the Market Protocols. The Transmission Provider shall remedy mitigated offer disputes resolved in favor of the Market Participant by providing make whole payments, as necessary, to the Market Participant whose mitigated offer was improperly determined by the Market Monitor.

Each Market Participant is obligated to provide to the Market Monitor any cost data necessary to allow the Market Monitor to validate its mitigated Resource Offer.

The Market Monitor shall keep such data confidential, and all cost data submitted under this Section 3.5, including any opportunity cost data, shall be subject to the confidentiality provisions set forth in Section 11 of Attachment AE of this Tariff. The Market Monitor shall develop and maintain on the Transmission Provider’s website the mechanism and procedures to allow Market Participants to submit such cost data.

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<th>SPP Business Practices</th>
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**Revision Request Form**

**SPP STAFF TO COMPLETE THIS SECTION**

**RR #: 0177**

**RR Title:** Remove Reference to NERC Standards

**Date:** 8/11/2016

**System and/or Process Changes?** ☒ No ☐ Yes

**Impact Analysis Required?** ☒ No ☐ Yes

**SUBMITTER INFORMATION**

**Name:** Erin Cathey  
**Company:** Southwest Power Pool  
**Email:** ecathey@spp.org  
**Phone:** 501-590-8298

*Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).*

- ☒ SPP Staff
- ☐ SPP Market Participant
- ☐ SPP Member
- ☐ An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
- ☐ SPP Market Monitor
- ☐ Staff of government authority with jurisdiction over SPP/SPP member
- ☐ Rostered individual of SPP Committee, Task Force or Working Group
- ☐ Transmission Customers or other entities that are parties to transactions under the Tariff

**REVISION REQUEST DETAILS**

**Requested Resolution Timing:** ☒ Normal ☐ Expedited ☐ Urgent Action

**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

- ☐ Correction
- ☒ Clarification
- ☐ Design Enhancement
- ☐ New Protocol, Business Practice, Criteria, Tariff
- ☐ NERC Standard Impact *(Specifically state if revision relates to/or impacts NERC Standards, list standard(s))*
- ☐ FERC Mandate *(List order number(s))*

**REVISION REQUEST RISK DRIVERS**

Are there existing risks to one or more SPP Members or the BES driving the need for this RR? ☐ Yes ☒ No

If yes, provided details to explain the risk and timelines associated:

- ☐ Compliance (Tariff, NERC, Other)
- ☐ Reliability/Operations
- ☐ Financial

**SPP Documents Requiring Revision:**

*Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).*

- ☒ Market Protocols  
  **Section(s):** Glossary, 4.1.3, 4.1.6, 4.2.2.5.7, 4.4.2.6, 4.4.3.5, 4.4.5, 4.4.5.1  
  **Protocol Version:** 35b
- ☐ Operating Criteria  
  **Section(s):**  
  **Criteria Date:**
- ☐ Planning Criteria  
  **Section(s):**  
  **Criteria Date:**
Objectives of Revision Request:

SPP staff received feedback from Market Participants that, in some cases, referencing NERC Standards in the Market Protocols and Tariff creates confusion regarding whether or not entities are performing obligations for Market reasons or NERC standard reasons. Other changes were due to a periodic review of the documents and staff determination that some of the references are either unnecessary or duplicative of a standing NERC requirement. This revision request eliminates the confusion noted and all unnecessary redundant references.

REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

Glossary

Operating Reserve

Resource capacity held in reserve for Resource contingencies and NERC control performance compliance which includes the following products: Regulation-Up, Regulation-Down, Spinning Reserve and Supplemental Reserve. As defined in the SPP Tariff.

Regulation Deployment

The utilization of Regulation-Up Service and/or Regulation-Down Service through Automatic Generation Control (AGC) equipment to automatically and continuously adjust Resource output to balance the SPP Balancing Authority Area in accordance with NERC control performance criteria. As defined in the SPP Tariff.

Transmission Loading Relief (TLR)

The prescribed method for relieving congestion on Coordinated Flowgates and Reciprocal Coordinated Flowgates through reductions in tagged flow and Market Flow associated with these flowgates.

4.1.3 Operating Reserve, Head-room and Floor-room Requirements

SPP calculates the amount of Operating Reserve required for the Operating Day, on both a system-wide basis and a Reserve Zone basis, to comply with the reliability requirements specified in the SPP Criteria. Additionally, SPP calculates the amount of Head-room and Floor-room required for the Operating Day to ensure that unit commitment is sufficient to reliably serve load in real-time while maintaining the Operating Reserve requirements. SPP calculates the hourly Regulation-Up,
Regulation-Down, Contingency Reserve, Head-room and Floor-room requirements on an SPP BAA basis and calculates minimum Operating Reserve requirements and maximum Operating Reserve limitations for each Reserve Zone.

1. SPP BAA Contingency Reserve requirements are set consistent with SPP Criteria and may vary on an hourly basis.

2. SPP BAA Regulation-Up and Regulation-Down requirements are set to ensure compliance with NERC control performance requirements and are based upon a percentage of forecasted load, adjusted up or down to account for Resource output variability, and may vary on an hourly basis.

4.1.6 Ramp Sharing
To reduce instances when ramping deficiencies across Hours in the DA Market or Dispatch Intervals in the RTBM initiate unjustified Scarcity Pricing (i.e. Scarcity Pricing should only be initiated when there is a capacity shortage) ramp sharing may be applied to clear sufficient amounts of Energy, Regulation-Up Service, Regulation-Down Service and Spinning Reserve to meet the requirements. This is accomplished through the use of tuning parameters within the SCED model that will allow sharing of ramp ranging from no sharing of ramp to 100% sharing of ramp between Energy and Regulation-Up Service, Regulation-Down Service and/or Energy and Spinning Reserve. SPP will update these tuning parameters from time to time based upon historical system performance. If ramp sharing is applied, it shall remain effective for all hours in the Day-Ahead Market, Reliability Unit Commitment, and Real-Time Balancing Market. SPP will not implement ramp sharing in the RTBM that will result in the inability to meet applicable NERC reliability standards and control performance requirements.

For example, if SPP institutes 20% ramp sharing between Energy and Spinning Reserve, this means that the effective remaining Ramp Rate available for Spinning Reserve clearing is divided by (1 – 20%) which may result in Spinning Reserve being cleared that is not 100% deployable.

Example:

Energy Ramp Rate = 10MW/min
Contingency Reserve Ramp Rate = 10 MW/Min

20 % Ramp sharing
As shown above the Energy Ramp Rate is 10 MW/min. Assuming Energy clears at 30 MW, Energy occupies 30MW/5min or 6MW/min of the 10MW/min ramp rate available for Spinning Reserve clearing. The remaining effective Ramp Rate available for Spinning Reserve clearing is 10 MW/min – 6 MW/min = 4 MW/min which means 40 MWs of Spinning Reserve could be cleared (4MW/min * 10 min = 40 MW) with no ramp sharing. With 20% ramp sharing, the amount
of Spinning Reserve that could be cleared is increased by dividing 40 MW by (1 - 20%). This means based on 20% ramp sharing, we can actually clear up to \( \frac{40 \text{ MW}}{0.8} \) or 50 MW of Spin.

**Exhibit 0-1: Ramp Sharing Example**

### 4.2.2.5.7 External Dynamic Resource

Any external Resource, not pseudo-tied, or external fleet of Resources that will be participating in the Energy and Operating Reserve Markets will be modeled and registered as an External Dynamic Resource (“EDR”). EDRs in the Eastern Interconnection are not permitted to offer Energy but may elect to fix their Energy output through the use of a Dynamic Schedule. EDRs associated with DC Ties may only be modeled and registered as an EDR if the DC tie is continuously dispatchable across zero. Dead bands are not supported. The following specific rules pertain to EDRs:

1. An EDR may represent an external entity’s Resource or fleet of Resources:
   
   (a) Within the Eastern Interconnect for the offering of Operating Reserve only or;
   
   (b) Offer Energy and/or Operating Reserve sourcing from other Interconnections using a DC tie;

2. The EDR will be assigned to the Reserve Zone within SPP, that is represented by the PNode or APNode associated with the EDR;

3. For Market Participants with EDRs offering Energy, Regulation-Up Service and/or Contingency Reserve into the SPP Integrated Marketplace from sources external to the SPP BA, a Firm Transmission Service Reservation is required from source BA to the SPP BA, which must be used for scheduling a Dynamic Schedule representing the services provided by the EDR.

   For Market Participants with EDRs offering Regulation-Down Service into the SPP Integrated Marketplace from sources external to the SPP BA, a Firm Transmission Service Reservation is required from the SPP BA to the sink BA which must be used for scheduling a Dynamic Schedule representing the Regulation-Down Service provided by the EDR unless the EDR has an associated Dynamic Schedule for Energy in an amount greater than or equal to the amount of Regulation-Down Service provided as described under (5) below. The linkage of the EDR to the associated Dynamic Schedule must be specified during market registration as described under Section Error! Reference source not found.;

4. A Market Participant must use the following Commitment Status for a EDR:
   
   (a) For the DA Market, a Market Participant may select “Self”, “Not Participating” or “Outage” or;
(b) For the RTBM, a Market Participant must select “Self”, if available, otherwise “Outage”

(5) A Market Participant must offer an EDR that is not associated with a DC tie with an energy dispatch status of “Not-Qualified”;

(a) An EDR not associated with a DC Tie may fix an energy clearing amount utilizing a Dynamic Schedule. Below are the following rules that apply:

(i) The MW profile amount submitted via the dynamic schedule will be treated like a fixed interchange schedule by the DA Market and RTBM.

(ii) The maximum amount of Regulation-Down Service allowed for the EDR to offer will be limited to the fixed energy amount associated with the dynamic schedule.

(6) The following Resource Offer parameters as described under Section Error! Reference source not found. are not valid for an EDR that is not associated with a DC Tie: (a) all offer parameters labeled as Daily Unit Commitment Parameter or Hourly Unit Commitment Parameter; (b) Energy Offer Curve, Ramp-Rate-Up and Ramp-Rate-Down. For an EDR associated with a DC tie, the same restrictions apply except that if this EDR is available for Energy dispatch, it must submit an Energy Offer Curve, Ramp-Rate-Up and Ramp Rate Down;

(7) Market Participants must submit an Eco Min and Eco Max for the EDRs. These limits will be used for the Normal Min and Normal Max, Emergency Min and Emergency Max and Regulation Min and Regulation Max;

(a) If the Dynamic Schedule associated with the EDR with a fixed energy amount is curtailed, the MP must update the Eco Max for the EDR.

(8) If the EDR offers with a minimum less than zero, then a Dynamic Schedule must be created sourcing from the SPP BA to the Sink BA. Similarly, if the EDR offers with a maximum greater than zero, then a Dynamic Schedule must be created from the Source BA to the SPP BA.

(9) The TSR profile on the Dynamic Schedule must be greater than or equal to the maximum operating limits of the EDR.

(i) If the EDR minimum is less than zero, then the TSR profile must be equal to or greater than to the absolute value of the minimum. (The EDR is cleared for Regulation Down Service in the direction of the external BA).
(ii) If the EDR maximum is greater than zero, then the TSR profile must be equal to or greater than the maximum. (The EDR is cleared for Regulation-Up Service and/or Regulation-Down Service in the direction of the SPP BA).

(10) The EDR Dynamic Schedule will be excluded for settlement purposes. The host Market Participant is responsible for updating the profile on the Dynamic Schedule to comply with NERC standard INT-004-2;

4.4.2.6 SPP Congestion Management

Except as provided for Emergency conditions as described under Section Error! Reference source not found., when a constraint is observed in real-time, an SPP Congestion Management Event (CME) may be initiated and the constraint may be activated in RTBM. The CME can be initiated through declaration of a TLR and/or through an activation of a constraint in RTBM if an overload situation has been identified internal to the SPP Balancing Authority Area that does not require a TLR. SPP will declare a TLR if curtailable schedules exist in IDC above the curtailment threshold. A curtailable schedule is defined as a tagged SPP Interchange Transaction, external Market Flows and/or external non-market Balancing Authority flows.

The CME will cause RTBM to produce a Security Constrained Economic Dispatch using all available dispatchable Resources to provide appropriate reduction in flows to relieve the constraint. An analysis will be performed to determine if curtailable schedules exist in IDC above the curtailment threshold for the current Operating Hour and the next hour. SPP will use RTBM to reliably manage and economically maximize the flow of power on flowgates to within the applicable operating limits as prescribed by NERC for CME events initiated either by IDC via a TLR or initiated through constraint activation for internal SPP constraints not requiring a TLR.

4.4.3.5 Reserve Sharing Group Scheduling Procedures

NERC Reliability Standards and applicable SPP Criteria will continue to dictate Contingency Reserve deployment between Reserve Sharing Group (RSG) members. Whereas SPP administers the reserve sharing program, the energy schedules implemented through the reserve sharing Contingency Reserve deployment, as created automatically by the Reserve Sharing System (RSS) are settled through the RTBM as either a fixed export schedule at the applicable External Interface Settlement Location LMP (SPP BA is providing assistance to a RSG member) or a fixed import schedule (SPP BA is receiving assistance from an RSG member) at the applicable External Interface Settlement Location LMP. Any additional compensation over and above the External
Interface Settlement Location LMP as specified in the contractual arrangements between RSG members is also settled as part of the RTBM.

Deployment of Contingency Reserve by the SPP BA to provide assistance to an RSG member shall be in accordance with the deployment procedures specified under Section Error! Reference source not found..

### 4.4.5 Inadvertent Management

SPP shall maintain inadvertent accounts and administer inadvertent payback for the SPP Balancing Authority Area. In doing so, SPP shall adhere to the following principles:

1. Inadvertent payback shall be administered in accordance with applicable regulatory requirements, NERC criteria, applicable Joint Operating Agreements, and Good Utility Practice;

2. Inadvertent payback decisions shall be made without regard to possible profits or losses resulting from changes in energy costs over time.

#### 4.4.5.1 Inadvertent Payback Reporting

The SPP BA will report its Inadvertent Interchange balance with the applicable interconnection. SPP reporting will be consistent with the applicable regulatory requirements and timelines for Balancing Authorities outlined in NERC Reliability Standard BAL-006-0.

The SPP BA will manage and pay back its net Inadvertent Interchange balance following NAESB WEQBPS-005-000 Inadvertent Interchange payback. Inadvertent payback will be initiated based on an objective and publicly available process that is triggered on balances exceeding statistical norms. Inadvertent payback will be done during periods and in amounts such that payback will not burden others or interfere with time corrections. Financial gain will not factor into the decision to payback or recover inadvertent interchange.

---

**SPP Tariff (OATT)**

**Attachment AE:**

**Section 1.1 Definitions O**

**Operating Reserve**

Resource capacity held in reserve for Resource contingencies and Balancing Authority control performance and NERC control performance compliance that includes the following products: Regulation-Up Service, Regulation-Down Service, Spinning Reserve and Supplemental Reserve.

**Section 1.1 Definitions R**
Regulation Deployment

The utilization of Regulation-Up Service and/or Regulation-Down Service through automatic generation control equipment to automatically and continuously adjust Resource output to balance the real power requirements of the SPP Balancing Authority Area in accordance with NERC control performance criteria.

5.1.2.1 Clearing During Capacity Shortage

(1) In the event of an Operating Reserve shortage in any hour that is not due to ramp limitations, Scarcity Pricing shall be implemented.

(2) In the event of a capacity shortage to meet the fixed Demand Bids and fixed firm Export Interchange Transactions in any hour, the fixed Demand Bids and fixed firm Export Interchange Transactions will be reduced on a pro-rata reduction basis based on the fixed MW amounts to match the available capacity and Scarcity Pricing shall be implemented.

(3) The Transmission Provider may implement sharing of ramping capability between Energy and Operating Reserve product clearing to ensure, to the extent possible, that short-term ramping deficiencies from hour to hour do not initiate Scarcity Pricing as described in Section 8.3.4.2(2) of this Attachment AE. To the extent that ramp sharing is implemented, it shall remain in effect in all hours of the Day-Ahead Market, in order to clear sufficient amounts of Energy, Regulation-Up Service, Regulation-Down Service and Spinning Reserve to meet the requirements. The Transmission Provider will not implement ramp sharing that will result in the inability to meet applicable NERC reliability standards and control performance requirements.

(4) If a transmission constraint cannot be relieved due to a shortage of capacity in any hour, the SCED algorithm will clear the bid-in demands on a pro-rata basis based upon the impact on relieving the constraint.
NERC Reliability Standards and applicable SPP Criteria will dictate Contingency Reserve deployment between Reserve Sharing Group members. The Energy schedules implemented through the reserve sharing Contingency Reserve deployment, are created automatically by the Reserve Sharing System and are settled through the RTBM as either a fixed Export Interchange schedule or a fixed Import Interchange schedule in accordance with Attachment AK to the Tariff and Sections 8.6.17 and 8.6.18 of this Attachment AE. Except as provided in Attachment AK and in Sections 8.6.17 and 8.6.18 of this Attachment AE, the Integrated Marketplace rules and practices are not applicable to Reserve Sharing Group members.

Deployment of Contingency Reserve by the SPP Balancing Authority to provide assistance to a Reserve Sharing Group member will be in accordance with the deployment procedures specified in Section 6.3.2 of this Attachment AE.
6.5 Inadvertent Management

The Transmission Provider will maintain inadvertent accounts and administer inadvertent payback for the SPP Balancing Authority Area. In doing so, the Transmission Provider will adhere to the following principles:

(1) Inadvertent payback will be administered in accordance with NERC criteria, applicable regulatory requirements, applicable joint operating agreements, and Good Utility Practice; and

(2) Inadvertent payback decisions will be made without regard to possible profits or losses resulting from changes in Energy costs over time.
6.5.1 Inadvertent Payback Reporting

The SPP Balancing Authority will report its Inadvertent Interchange balance with the applicable NERC interconnection. The Transmission Provider reporting will be consistent with the applicable regulatory requirements and timelines for Balancing Authorities outlined in NERC Reliability Standard BAL-006-0.

The SPP Balancing Authority will manage and pay back its net Inadvertent Interchange balance following NAESB WEQBPS-005-000 –Inadvertent Interchange payback. Inadvertent payback will be initiated based on an objective and publicly available process that is triggered on balances exceeding statistical norms. Inadvertent payback will be done during periods and in amounts such that payback will not burden others or interfere with time corrections. Settlement impact will not factor into the decision to payback or recover inadvertent interchange.

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# Revision Request Comment Form

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**RR Title:** Remove Reference to Control Area

## SUBMITTER INFORMATION

<table>
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<th>Name: Ron Gunderson</th>
<th>Company: NPPD</th>
</tr>
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<tbody>
<tr>
<td>Email: <a href="mailto:rogunde@nppd.com">rogunde@nppd.com</a></td>
<td>Phone: 402-845-5252</td>
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## COMMENTS

I fully support removal of old and obsolete language. However, I believe it may be more appropriate to use the term Meter Agent for the first two changes.

I recommend cleaning up the term regional reliability councils as noted below and changing “and” to “and/or” to eliminate the requirement that to release confidential information the reliability of both the SPP region and its neighbors has to be enhanced or maintained. The proposed change cleans this up as well.

Red-lined suggestions are included below.

## PROPOSED REVISION

Provide proposed modifications (redlined) to the revision request for which you are providing comments. Use language from the revision request and redline with your additional edits.

### Market Protocols

---

## Appendix C  Meter Technical Protocols

### C.7.4.4 Verification Records and Retention

The **Control Area Operator and/or Wires Facilities owner(s)** **Meter Agent** shall maintain sufficient documentation to verify the integrity and accuracy of a Settlement Location. All meter records and associated documentation must be retained by the **Market Participant Meter Agent** for a period of seven years for independent auditing purposes by the SPP. This documentation shall include but is not limited to the following:

1. Schematic drawings (both detailed and one-line) of the Settlement Location. Such drawings shall be dated, bear the current drawing revision number, and show all wiring, connections, and devices in the circuit.

2. The results of all accuracy testing listed in Section Error! Reference source not found. through Error! Reference source not found. of this Appendix. The accuracy values shall be calculated based on Method 1 of ANSI C12.1.

### C.7.5.4.6 Verification Records and Retention

The **Control Area Operator and/or Wires Facilities owner(s)** **Meter Agent** shall maintain sufficient documentation to verify the integrity and accuracy of a Settlement Location. This documentation shall include but is not limited to the following:
(1) Schematic drawings (both detailed and one-line) of the Settlement Location. Such drawings shall be dated, bear the current drawing revision number, and show all wiring, connections, and devices in the circuit.

(2) The transducer manufacturer’s original test specifications shall be sufficient to verify the accuracy of this device.

Appendix E Network and Commercial Model Update Timing

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<th>In 1st Tier Entity</th>
<th>45 Days / 4 months</th>
<th>45 Days for limited scope changes. 4 Months for Moderate to large scope changes. (Include in periodic Update)</th>
<th>30 - 45 Days/ 1 month / 105 days (If applicable)</th>
<th>Monthly Auction - 30 to 45 days (limited scope) / 1 month (moderate to large scope); Annual Auction - 75 – 105 days prior to June 1st. The indicated durations include the time for implementing changes in the Market and/or Reliability Models as well as implementing and publishing these changes in the TCR Models during the applicable scheduled Model updates.</th>
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SPP Tariff (OATT)

Attachment AE

11.1.4 Market Participant Access and Transmission Provider Use of Confidential Information

(1) No Market Participant shall have a right hereunder to receive or review any documents, data, or other information of another Market Participant, including documents, data, or other information provided to the Transmission Provider, to the extent such documents, data, or information have been designated as Confidential Information under this Section 11; provided, however, a Market Participant may receive and review any composite documents, data, and other information that may be developed based on such Confidential Information if the composite does not, directly or by its nature, disclose any individual Market Participant's Confidential Information.
(2) The Transmission Provider shall collect and use Confidential Information only in connection with its authority under this Tariff and the retention of such information shall be in accordance with the Transmission Provider's retention policies. Except as otherwise provided in Sections 11.1.2, 11.1.5, 11.2 and 11.3, the Transmission Provider shall not disclose to a Market Participant or to any third party, any Confidential Information of a Market Participant or a Market Participant Applicant; provided that nothing contained herein shall prohibit the Transmission Provider from providing a Market Participant’s Confidential Information to NERC or any of its regional reliability councilsRegional Entities to the extent that: (i) the Transmission Provider determines, in its reasonable discretion, that the exchange of such information is required to enhance and/or maintain reliability within the SPP Region and/or its neighboring Regional Entities; (ii) such receiving entity is bound by a written agreement to maintain such confidentiality; and (iii) the Transmission Provider has notified the affected Market Participant of its intention to release such information no less than five (5) business days prior to the release.

(3) Nothing contained herein shall prevent the Transmission Provider from releasing a Market Participant's Confidential Information to a third party provided that the Market Participant has delivered to the Transmission Provider specific, written authorization for such release setting forth the data or information to be released, to whom such release is authorized, and the period of time for which such release shall be authorized. The Transmission Provider shall limit the release of a Market Participant's Confidential Information to that specific authorization received from the Market Participant. Nothing herein shall prohibit a Market Participant from withdrawing such authorization upon written notice to the Transmission Provider who shall cease such release as soon as practicable after receipt of such withdrawal notice.

(4) Nothing contained herein shall prevent the Transmission Provider from releasing a Market Participant's Confidential Information to a Transmission Owner for purposes of transmission operations provided that: (i) the Transmission Provider determines, in its reasonable discretion, that the exchange of such information is required to enhance and/or maintain reliability within the SPP Region and/or its neighboring Regional Entities; (ii) such receiving entity is bound by a written agreement to maintain such confidentiality; and (iii) the Transmission Provider has notified the affected Market Participant of its intention to release such information no less than five (5) business days prior to the release.
<table>
<thead>
<tr>
<th><strong>SPP Tariff (OATT)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPP Operating Criteria</strong></td>
</tr>
<tr>
<td><strong>SPP Planning Criteria</strong></td>
</tr>
<tr>
<td><strong>SPP Business Practices</strong></td>
</tr>
</tbody>
</table>
## Revision Request Form

### SPP STAFF TO COMPLETE THIS SECTION

**RR #: 0185**

**RR Title:** Clarify SPP Operating Criteria

<table>
<thead>
<tr>
<th>System Changes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Changes?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Impact Analysis Required?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### SUBMITTER INFORMATION

**Name:** Erin Cathey

**Company:** SPP

**Email:** 501-590-8298

**Phone:** 501-614-3239

Only Qualified Entities may submit Revision Requests. Please select at least one applicable option below, as it applies to the named submitter(s).

- [ ] SPP Staff
- [ ] SPP Market Participant
- [ ] SPP Member
- [ ] An entity designated by a Qualified Entity to submit a Revision Request “on their behalf”
- [ ] SPP Market Monitor
- [ ] Staff of government authority with jurisdiction over SPP/SPP member
- [ ] Rostered individual of SPP Committee, Task Force or Working Group
- [ ] Transmission Customers or other entities that are parties to transactions under the Tariff

### REVISION REQUEST DETAILS

**Requested Resolution Timing:** [ ] Normal  [ ] Expedited  [ ] Urgent Action

**Reason for Expedited/Urgent Resolution:**

**Type of Revision (select all that apply):**

- [ ] Correction
- [ ] Clarification
- [ ] Design Enhancement
- [ ] New Protocol, Business Practice, Criteria, Tariff
- [ ] NERC Standard Impact *(Specifically state if revision relates to/or impacts NERC Standards, list standard(s))*
- [ ] FERC Mandate *(List order number(s))*

### REVISION REQUEST RISK DRIVERS

**Are there existing risks to one or more SPP Members or the BES driving the need for this RR?** [ ] Yes [X] No

If yes, provided details to explain the risk and timelines associated:

- [ ] Compliance (Tariff, NERC, Other)
- [ ] Reliability/Operations
- [ ] Financial

**SPP Documents Requiring Revision:**

Please select your primary intended document(s) as well as all others known that could be impacted by the requested revision (e.g. a change to a protocol that would necessitate a criteria or business practice revision).

<table>
<thead>
<tr>
<th>Market Protocols</th>
<th>Section(s): 4.1.3, 4.1.7, 4.4.3.5, 4.4.3.6, 6.1.8, 6.1.9, Appendix D.12</th>
<th>Protocol Version: 39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Criteria</td>
<td>Section(s):</td>
<td>Criteria Date:</td>
</tr>
<tr>
<td>Planning Criteria</td>
<td>Section(s):</td>
<td>Criteria Date:</td>
</tr>
<tr>
<td>Tariff (OATT)</td>
<td>Section(s): Attachment AE: Table of Contents, Sections 2.1.3, 3.1.4, 3.1.5, 6.3.3, and 6.3.4.</td>
<td></td>
</tr>
<tr>
<td>Business Practice</td>
<td>Business Practice Number:</td>
<td></td>
</tr>
</tbody>
</table>
Objectives of Revision Request:
The SPP Criteria has been split into two separate documents; SPP Planning Criteria and SPP Operating Criteria. References to SPP Criteria should be revised to correctly direct users to the specific criteria document being referenced in the Market Protocols. This revision will provide clarity as to which criteria document is referenced within the Protocols and Tariff, where appropriate.

REVISIONS TO SPP DOCUMENTS

In the appropriate sections below, please provide the language from the current document(s) for which you are requesting revision(s), with all edits redlined.

Market Protocols

2. Introduction

SPP Market Protocols complement the Governing Documents, as defined in Exhibit 2-1, through documentation of detailed procedures that implement their provisions. Exhibit 2-1 shows how the Market Protocols interact with the Governing Documents and business practices related to the transmission markets.

Exhibit Error! No text of specified style in document.-1: Document Relationships
4.1.3 Operating Reserve, Head-room and Floor-room Requirements

SPP calculates the amount of Operating Reserve required for the Operating Day, on both a system-wide basis and a Reserve Zone basis, to comply with the reliability requirements specified in the SPP Operating Criteria. Additionally, SPP calculates the amount of Head-room and Floor-room required for the Operating Day to ensure that unit commitment is sufficient to reliably serve load in real-time while maintaining the Operating Reserve requirements. SPP calculates the hourly Regulation-Up, Regulation-Down, Contingency Reserve, Head-room and Floor-room requirements on an SPP BAA basis and calculates minimum Operating Reserve requirements and maximum Operating Reserve limitations for each Reserve Zone.

1. SPP BAA Contingency Reserve requirements are set consistent with SPP Operating Criteria and may vary on an hourly basis.

2. SPP BAA Regulation-Up and Regulation-Down requirements are set to ensure compliance with NERC control performance requirements and are based upon a percentage of forecasted load, adjusted up or down to account for Resource output variability, and may vary on an hourly basis.

3. SPP BAA Head-room and Floor-room requirements are set to ensure that expected variations between real-time instantaneous load and the average load and variations between real-time variable Resource output and projected variable Resource output cleared in the Day-Ahead Market and the projected average load used in the RUC unit commitment processes can be reliably served in real-time while simultaneously maintaining the SPP BAA Operating Reserve requirements.

4. The SPP BAA requirements, minimum Reserve Zone Operating Reserve requirements and maximum Reserve Zone Operating Reserve limitations are calculated and posted no later than 7:00 AM Day-Ahead. At this time, SPP will also communicate each Asset Owner’s estimated Operating Reserve obligations in each Reserve Zone using the BAA Mid-Term Load Forecast and the Asset Owner load forecasts developed by SPP under Section Error! Reference source not found.4.1.2.1.5.

5. These Operating Reserve requirements and limitations are used by SPP as inputs into the DA Market and RTBM clearing and RUC processes.
   
   (a) SPP may increase Operating Reserve requirements for use in RTBM clearing and RUC processes above the requirements used in the DA Market clearing, including changes to Reserve Zone minimums and maximums, as required to meet increases in reliability requirements caused by changes in system conditions.

6. Reserve Zone minimum Operating Reserve requirements and maximum Operating Reserve limitations are determined through reserve zone studies prior to the DA Market. Reserve zone studies are performed as described under Section Error! Reference source not found.4.1.3.1.
4.1.7 Outage Scheduling and Reporting

SPP is responsible for approving the scheduling of maintenance on all transmission facilities making up the Transmission System and for coordinating with Resource Asset Owners, as appropriate, to schedule maintenance on generation facilities.

The roles and responsibilities of SPP and Market Participants regarding submittal of requested transmission and generation outages through the outage scheduler tool, evaluation and approval of requests and reporting of generator forced outages through the outage scheduler tool is described in the SPP Operating Criteria. Additionally, as described under Section Error! Reference source not found., an outage must be recorded using the outage scheduler tool in order to select an “Outage” Commitment Status. Outages approved and recorded using the outage scheduler tool will override any other commitment status submitted by the Market Participant.

4.4.3.5 Reserve Sharing Group Scheduling Procedures

NERC Reliability Standards and applicable SPP Operating Criteria will continue to dictate Contingency Reserve deployment between Reserve Sharing Group (RSG) members. Whereas SPP administers the reserve sharing program, the energy schedules implemented through the reserve sharing Contingency Reserve deployment, as created automatically by the Reserve Sharing System (RSS) are settled through the RTBM as either a fixed export schedule at the applicable External Interface Settlement Location LMP (SPP BA is providing assistance to a RSG member) or a fixed import schedule (SPP BA is receiving assistance from an RSG member) at the applicable External Interface Settlement Location LMP. Any additional compensation over and above the External Interface Settlement Location LMP as specified in the contractual arrangements between RSG members is also settled as part of the RTBM.

Deployment of Contingency Reserve by the SPP BA to provide assistance to an RSG member shall be in accordance with the deployment procedures specified under Section Error! Reference source not found.

4.4.3.6 Contingency Reserve Recovery

Following an Operating Reserve contingency, the SPP Balancing Authority will restore its Contingency Reserve to its pre-disturbance Contingency Reserve requirement by the end of the Assistance Period, which is defined in the SPP Operating Criteria. During the Assistance Period, the Real-Time Balancing Market will clear Contingency Reserve up to the pre-disturbance Contingency Reserve requirement or to the level of available capacity, whichever is less, and Scarcity Pricing will not apply.

6.1.8 Dispatchable Variable Energy Resource

All Wind-powered Variable Energy Resources must register as a Dispatchable Variable Energy Resource except for (i) Variable Energy Resources with an interconnection agreement executed on or prior to May 21, 2011 and that commenced Commercial Operation before October 15, 2012 or (ii) a Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility. VERs included in (i) above may register as Dispatchable Variable Energy Resources if they are capable of being incrementally dispatched by the Transmission Provider.
A Qualifying Facility exercising its rights under PURPA to deliver its net output to its host utility may register as a Dispatchable Variable Energy Resource if it is capable of being incrementally dispatched by the Transmission Provider and will be subject to the DVER market rules including Uninstructed Resource Deviation Charges. Non-wind (e.g. solar, run-of-the-river hydro, biomass) Variable Energy Resources shall not be required to register as a Dispatchable Variable Energy Resources unless they choose to register as such. Any Resource that has previously registered as a Dispatchable Variable Energy Resource shall not subsequently register as a Non-Dispatchable Variable Energy Resources.

1. A Dispatchable Variable Energy Resource is eligible to submit Offers for Regulation-Down if that Resource qualifies to provide Regulation-Down by passing the test described under Section Error! Reference source not found.6.1.11.3.

2. A Dispatchable Variable Energy Resource is not eligible to submit Offers for Regulation-Up, Spinning Reserve or Supplemental Reserve;

3. Dispatchable Variable Energy Resources are committed and dispatched the same as any other Resource in the Day-Ahead Market.

4. For the RUC and RTBM, special commitment and dispatch rules apply as defined under Section Error! Reference source not found.4.2.2.5.5.

5. Dispatchable Variable Energy Resource data submittal requirements are defined in the SPP Operating Criteria.

6.1.9 Non-Dispatchable Variable Energy Resource

Variable Energy Resources that qualify may register as a Non-Dispatchable Variable Energy Resource. The Market Participant registering a Non-Dispatchable Variable Energy Resource must provide documentation to SPP verifying that it meets one or more of the exceptions in Section 76.1.8. Otherwise, the Resource must be registered as a Dispatchable Variable Energy Resource. NDVERs are committed and dispatched the same as any other Resource in the Day-Ahead Market. For the RUC and RTBM, special commitment and dispatch rules apply as defined under Section Error! Reference source not found.4.2.2.5.6. Non-Dispatchable Variable Energy Resource data submittal requirements are defined in the SPP Operating Criteria.

D.12 Real-Time Data Reporting to SPP Balancing Authority

In addition to the data reporting requirements specified under in the SPP Operating Criteria 7, all Resources, other than Demand Response Resources, are to submit the following data via ICCP to SPP.

1. Unit power output (MW);

2. Unit MVar output;

3. Current on/off line status;

2.13 Market Protocols and SPP Operating Criteria

Market Participants must comply with the requirements and procedures described in the Transmission Provider’s Tariff, the Market Protocols and the SPP Operating Criteria.

3.1.4 Operating Reserve, Head-room and Floor-room Requirements

The Transmission Provider shall calculate the amount of Operating Reserves required for the Operating Day, on both a system-wide and Reserve Zone basis, in order to comply with the reliability requirements specified in the SPP Operating Criteria. In addition, the Transmission Provider shall calculate the amount of Head-room and Floor-room required for the Operating Day on a system-wide basis in order to ensure that load can be reliably serviced in real-time. The Transmission Provider shall, on a daily basis:

1. Calculate the hourly Regulation-Up, Regulation-Down and Contingency Reserve requirements on an SPP Balancing Authority Area basis and post such results by 0600 hours Day-Ahead for use in the Day-Ahead Market, Day-Ahead RUC, Intra-Day RUC and RTBM;

2. Calculate the total minimum and total maximum Operating Reserve requirement for Operating Reserve deployment in the up direction and for deployment of Operating Reserve in the down direction for each Reserve Zone. These minimum and maximum Operating Reserve requirements will be determined by conducting a simulated energy transfer study for each hour of the Operating Day on the transmission system, reflecting expected outages and economic energy flows, in order to determine the energy transfer limitations into or out of a Reserve Zone in any hour. If a Reserve Zone is unable to import enough Energy after a contingency and still maintain all necessary operating limits, a minimum amount of Operating Reserve may be required to be carried in that Zone. The minimum Operating Reserve requirement is the largest difference between the Resource MW lost in the simulated contingency and the resulting import capability of that Reserve Zone. Similarly, if a Reserve Zone is unable to export additional Energy after a contingency outside of that Reserve Zone, then a maximum amount of Operating Reserve that is deliverable from that Zone will be specified in order to ensure that deliverable reserves are carried in other
Zones. The maximum Operating Reserve limitation is equal to the export capability of that Reserve Zone when replacing Energy lost due to a Resource contingency outside of that Reserve Zone. The Transmission Provider may, at its option, set specific Regulation-Up and/or Spinning Reserve minimum requirements for each Reserve Zone, as needed, to address reliability issues that can only be alleviated through carrying synchronized reserves. In such cases, the Transmission Provider will include these minimum Regulation-Up and/or Spinning Reserve requirements when posting the Operating Reserve requirements by 0600 Day-Ahead;

(3) Estimate each Market Participant’s Operating Reserve obligation by Asset Owner in each Reserve Zone and provide such information to Market Participants by 0600 hours Day-Ahead. The Transmission Provider shall calculate such estimates by multiplying the system-wide Operating Reserve requirements calculated in (1) above by the Transmission Provider’s estimate of each Asset Owner’s load in each Reserve Zone divided by the Transmission Provider’s estimate of system-wide load;

(4) The Transmission Provider may increase Operating Reserve requirements for the Day-Ahead RUC, Intra-Day RUC and RTBM above the requirements used in the Day-Ahead Market, including changes to Reserve Zone minimums and maximums, as required to meet increases in reliability requirements caused by changes in system conditions; and

(5) Calculate the hourly Head-room and Floor-room requirements on an SPP Balancing Authority Area basis for use in the Day-Ahead Market, Day-Ahead RUC and Intra-Day RUC in accordance with the calculation procedures specified in the Market Protocols.

3.1.5 Outage Scheduling and Reporting

The Transmission Provider is responsible for coordinating and approving the scheduling of outages on all transmission and generation facilities in the Transmission System. Procedures regarding submittal of requested transmission and generation outages and reporting of unplanned outages through the Transmission Provider’s outage scheduler are described in the SPP Operating Criteria. The Transmission Provider shall approve all requested outages to the extent that such outage requests can be accommodated reliably. To the extent that granting a requested outage would cause a reliability issue on the Transmission System, the Transmission Provider may deny the request. When the Transmission Provider denies an outage request, the Transmission Provider shall recommend an alternative timeframe within which the outage can be accommodated reliably.
6.3.3 Reserve Sharing Group Scheduling Procedures

NERC Reliability Standards and applicable SPP Operating Criteria will dictate Contingency Reserve deployment between Reserve Sharing Group members. The Energy schedules implemented through the reserve sharing Contingency Reserve deployment, are created automatically by the Reserve Sharing System and are settled through the RTBM as either a fixed Export Interchange schedule or a fixed Import Interchange schedule in accordance with Attachment AK to the Tariff and Sections 8.6.17 and 8.6.18 of this Attachment AE. Except as provided in Attachment AK and in Sections 8.6.17 and 8.6.18 of this Attachment AE, the Integrated Marketplace rules and practices are not applicable to Reserve Sharing Group members.

Deployment of Contingency Reserve by the SPP Balancing Authority to provide assistance to a Reserve Sharing Group member will be in accordance with the deployment procedures specified in Section 6.3.2 of this Attachment AE.

6.3.4 Contingency Reserve Recovery

Following an Operating Reserve contingency, the SPP Balancing Authority will restore its Contingency Reserve to its pre-disturbance Contingency Reserve requirement by the end of the assistance period, as defined in the SPP Operating Criteria. During the assistance period, the RTBM will clear Contingency Reserve up to the pre-disturbance Contingency Reserve requirement or to the level of available capacity, whichever is less, and Scarcity Pricing will not apply.

SPP Operating Criteria

Not applicable for this RR.

SPP Planning Criteria

Not applicable for this RR.
SPP Business Practices

Not applicable for this RR.
SPP Revision Request Process

October 13, 2015
August 18, 2016

Market Operations and Policy Committee
## Revision History

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<thead>
<tr>
<th>Version Number</th>
<th>Author</th>
<th>Change Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Market Design, Erin Cathey</td>
<td>Initial Draft</td>
</tr>
<tr>
<td>2.0</td>
<td>Erin Cathey</td>
<td>Process updates for clarity, grammatical updates, removal of BOD as required approver for changes to RR Process, additions to Qualified Entity definition, removal of timing to appeal MOPC decision to BOD</td>
</tr>
<tr>
<td>3.0</td>
<td>Erin Cathey</td>
<td>Updating to include Criteria split to Operating and Planning Protocols</td>
</tr>
<tr>
<td>4.0</td>
<td>Erin Cathey</td>
<td><strong>Grammatical revisions, clarifying revisions, updates to actions allowed by Primary Working Groups, Secondary Working Groups, MOPC and BOD, added RR submission timeline, added comment submission timeline, added language to more clearly prescribe hand-offs and responsibilities, added section to define table/postpone</strong></td>
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SPP Revision Request Process

A request to make additions, edits, deletions, revisions, or clarifications to the SPP Business Practices, SPP Operating Criteria, SPP Planning Criteria, SPP Market Protocols, and SPP Tariff including any attachments and exhibits to these identified documents, except for Appendix F of the Market Protocols, is called a “Revision Request” (RR). Appendix F contains Settlement examples and will be updated by SPP as necessary. Unless specifically provided in other sections of these identified documents, all changes to the Business Practices, Operating Criteria, Planning Criteria, Market Protocols and SPP Tariff shall follow the SPP Revision Request Process. The Primary Working Groups, Business Practice Working Group, Market Working Group, Operating Reliability Working Group, Regional Tariff Working Group, and the Transmission Working Group will review and approve all changes to the SPP Revision Request Process prior to the Markets and Operations Policy Committee (MOPC) approval of the changes.

Submission of a Revision Request

The following Qualified Entities may submit an RR:

- Any Market Participant;
- Transmission Customers or other entities that are parties to transactions under the Tariff;
- Any Entity that is an SPP Member;
- Any staff member of a governmental authority having jurisdiction over the SPP or any member company;
- SPP Staff;
- SPP Market Monitor;
- Any rostered individual of an official SPP Committee, Task Force or Working Group;
- Any entity designated by a Qualified Entity to submit a Revision Request “on their behalf”.

Revision Request Procedure

A description of the process is provided in the following subsections.

Review and Posting of Revision Requests

Revision Requests (RRs) shall be submitted to SPP by completing a Revision Request Submission Form, provided at the SPP website (RR Request/Comment Forms). All RRs, except those submitted by SPP staff, are to be submitted to the SPP Request Management System (RMS). Any RRs not submitted appropriately will not be processed.

The RR shall include at least the following information:

1. Identification of the Submitter;
(2) Primary SPP document requiring revision with a list of affected sections numbers and an indication of affected documents and section numbers, e.g., SPP Business Practices, SPP Operating Criteria, SPP Planning Criteria, SPP Market Protocols or SPP Open Access Transmission Tariff;

(3) Complete and sufficient objective of the suggested change. State the problem the proposed change will address, and describe how the proposed change will address the problem. Summary of the problem(s), proposed solution(s), and benefit(s) expected to be realized by the RR;

(4) Proposed language changes (redlined).

SPP shall evaluate the RR for completeness and shall notify the submitter, within three (3) business days of receipt if the RR is incomplete, including the reasons for such status. SPP may provide information and assistance to the submitter to ensure it is complete. A submitter must submit a complete version of the RR with all deficiencies corrected in order for the revision to be considered. An incomplete RR will not be processed.

Revision Requests must be submitted no less than eighteen (18) business days prior to the Primary Working Group’s initial review. Upon receipt of a complete RR, SPP shall post the complete RR to the SPP website and distribute the RR to the Primary Working Group SPP Revision Request email exploder and the Primary Working Group email exploder within three (3) business days. The RR will be reviewed at the next regularly scheduled meeting of the Primary Working Group following the official comment period of the RR. The “next regularly scheduled meeting” shall mean the next regularly scheduled meeting for which required notice may be given regarding the revision(s) to be addressed, as specified in the appropriate BOD, committee, or working group procedures.

The “Primary Working Group” shall mean the SPP working group responsible for the primary document being revised.

Primary Working Group governing document responsibility is as follows:

- The Market Working Group is responsible for approving and rejecting any proposed changes to the Market Protocols.
- The Operations and Reliability Working Group is responsible for approving and rejecting any proposed changes to the SPP Operating Criteria.
- The Transmission Working Group is responsible for approving and rejecting any proposed changes to the SPP Planning Criteria.
- The Regional Tariff Working Group is responsible for approving and rejecting any proposed changes to the SPP Tariff.
- The Business Practices Working Group is responsible for approving and rejecting any proposed changes to the SPP Business Practices.

The “Secondary Working Group” shall mean the SPP Working Group(s) responsible for documents or sections therein that may be impacted by the RR. Secondary Working Groups have a secondary approval
responsibility, however any changes made by a Secondary Working Group must be accepted by the Primary Working Group prior to the MOPC and, where appropriate, the BOD review and approval.

Routing Criteria for a Revision Request

Revision Requests upon submission to the RMS shall be routed to the appropriate internal SPP department based on the document type identified, e.g., SPP Business Practices, SPP Operating Criteria, SPP Planning Criteria, SPP Market Protocols or SPP Open Access Transmission Tariff. The Primary Staff Secretary will assign an RR number and route the RR to the appropriate Primary and Secondary Working Group(s) according to the RR Routing Criteria and internal SPP review working group schedules.
Written Comments on an RR

Any interested entity may submit official comments on an RR in writing. If an entity proposes language changes to the RR, the entity shall submit an RR Comment Form with the proposed revisions to the original RR language. All RR comments must be submitted using the Revision Request Comment Form provided on the SPP website. Comments on RRs, except those submitted by SPP staff, should be submitted to the SPP Request Management System (RMS), using the Revision Request Comment Form provided on the SPP website. Comments may be submitted at any time prior to the MOPC review. However, comments for initial Primary Working Group review must be submitted no later than ten five (105) calendar-business days from the date of posting/distribution of the RR prior to the initial Primary Working Group’s scheduled review. SPP shall evaluate the RR Comment Form for completeness and shall notify the submitter, within three (3) business days of receipt if the RR Comment Form is incomplete, including the reasons for such status. SPP may provide assistance to the submitter to ensure it is complete. Comments submitted after the due date of the ten (10) day comment period may be considered at the discretion of the Primary Working Group.

All complete comments received in the proper format will be posted to the SPP website within three (3) business days of receipt and distributed to the Primary Working Group SPP Revision Request Email Exploder and the Primary Working Group Email Exploder. The comments shall include identification of the commenting entity. Any comments not submitted appropriately will not be processed.

The Primary Working Group may review the RR at its next regularly scheduled meeting after the end of the ten (10) calendar day comment period unless the ten (10) calendar day comment period ends less than two (2) calendar days prior to the next regularly scheduled Primary Working Group meeting. In that case, the RR may be reviewed at the subsequent regularly scheduled Primary Working Group meeting.

Impact Analysis

SPP shall perform an Impact Analysis (IA) or indicate one is not necessary. The results of the evaluation will be documented on an IA form and posted in the applicable RR folder for review.

A Revision Request IA should assess the impact of the proposed RR on SPP systems, processes, and SPP staffing needs, and shall contain the following information:

1. An estimate of any cost and budgetary impacts to SPP for both implementation and on-going operations;

2. The estimated amount of time required to implement the revised language;

3. The identification of alternatives to the original proposed language that may result in more efficient implementation; and

4. The identification of any manual workarounds that may be used as an interim solution and estimated costs of the workaround;
(5) Primary Working Group seescore–rank for any RRs requiring a system, process and/or staffing change; and

(6) A list of possible SPP and Member systems impacted.

It will be at the discretion of the Primary Working Group to review and/or take action on an RR contingent upon review of a completed IA. Upon completion of the IA, the Primary Working Group may review or modify actions taken on an RR prior to the completion of the IA and take additional action if necessary. An RR will not be submitted for review to the Secondary Working Groups or the MOPC before the completion of the IA except in the case of expedited review request or urgent action Revision Requests. In the case of expedited or urgent Revision Requests, the Revision Request will be submitted for review by Secondary Working Groups while the IA is completed.

If the Primary Working Group approves an RR contingent upon review of an IA, SPP shall prepare an IA based on the RR Recommendation Report. Unless a longer review period is warranted due to the complexity of the proposed RR Recommendation Report or the quantity of approved RRs, SPP shall issue the IA for the recommended RR within thirty (30) calendar days after the Primary Working Group approval of the RR. SPP shall post the results of the completed IA on the SPP website. If a longer review period is required for SPP staff to complete a full IA, SPP staff shall submit a schedule for completion of the IA to the Primary Working Group chair.

**Primary Working Group Review and Action**

The Primary Working Group may review the RR at its next regularly scheduled meeting after the end of the fifteen (15) business day comment period. In the event an RR is posted for less than fifteen (15) business days prior to the Primary Working Group’s review, the RR may be expedited following the guidelines for expediting RRs or reviewed at the next regularly scheduled Primary Working Group meeting.

The Primary Working Group will review and recommend action to the MOPC on RRs. The Primary Working Group staff secretary will submit RRs to the Secondary Working Group staff secretaries, prior to the Primary Working Group recommendation to the MOPC. The MOPC and, where appropriate, the BOD will consider all decisions of the Primary and Secondary Working Group(s) and any comments provided.

The “next regularly scheduled meeting” shall mean the next regularly scheduled meeting for which required notice may be given regarding the revision(s) to be addressed, as specified in the appropriate BOD, committee, or working group procedures.

Primary Working Group approved RRs will be routed through the appropriate Secondary Working Group(s), the MOPC and, when required, the BOD for review. The Primary Working Group reserves the right to recommend action to the MOPC at any time subsequent to its initial action on an RR.
The Primary Working Group may take action on the RR to:

1. Approve as submitted or modified. Approval may be subject to review of a IA or updated IA if such review is determined by the Primary Working Group to be necessary;

2. Reject. An RR shall be considered rejected if a majority of the Primary Working Group members fail to reject or approve the RR, either as submitted or modified;

3. Table/Postpone. To table or postpone an RR is to defer action on the RR, pending some follow-up action. Approved RRs may not be tabled/postponed; or

4. Withdraw. A Primary Working Group may vote to withdraw a previously approved RR at any time prior to the MOPC’s review and approval; or

4)(5) Refer the RR to another working group, committee, or task force as it deems appropriate. The RR may be referred to a task force created by the Primary Working Group and/or to one or more existing working groups or task forces of the MOPC for review and comment on the RR. Suggested modifications to an RR should be submitted as comments by the chair, or the chair’s designee, on behalf of the working group, committee, or task force for consideration by the Primary Working Group. The Primary Working Group shall retain ultimate responsibility for processing RRs related to its respective document.

Within three (3) business days after the Primary Working Group takes action to approve, approve with modifications, or reject the RR, SPP shall post an RR Recommendation Report to the SPP website reflecting the Primary Working Group’s action. The Primary Working Group staff secretary shall notify Secondary Working Group staff secretaries of the posting of RR Recommendation Reports and applicable IAs. An RR Recommendation Report shall contain at least the following items:

1. Identification of submitter;


3. Estimated system cost and duration if applicable;

4. Comments submitted;

5. Voting record for the Primary Working Group, Secondary Working Groups, MOPC, BOD and RSC if applicable;

6. Primary Working Group rank for any RRs requiring a system, process and/or SPP staff change; and

7. Recommended action for the MOPC from the Primary Working Group.

The Primary Working Group Chair shall notify the MOPC of RRs postponed, tabled, withdrawn, or rejected by the Primary Working Group. Should any Qualified Entity disagree with an action taken or
recommended by the Primary Working Group, such Qualified Entity may, in writing, appeal and submit an alternate recommendation to the MOPC. If the Primary Working Group rejects a RR, the submitter may file an appeal with the MOPC. The appealing Qualified Entity shall send an email detailing the appeal to both the Primary Working Group and the MOPC staff secretaries.

Secondary Working Group Review and Action

A final version of the RR Recommendation Report will be submitted for posting in the background materials seven (7) calendar days prior to the Secondary Working Group(s) next meeting. However, at the discretion of the Secondary Working Group, a waiver may be granted of the seven (7) calendar day rule. The Secondary Working Group(s) shall review the recommended changes to determine if the proposed changes conflict with requirements outlined in the Business Practices, Operating Criteria, Planning Criteria, Market Protocols, or SPP Tariff. In the event the Secondary Working Group(s) identifies conflicts, which have not previously been identified by the Primary Working Group, or issues regarding the proposed changes, the Secondary Working Group(s) will submit comments, using the RR Comment Form, to be considered by the Primary Working Group at its next regularly scheduled meeting, or by the MOPC and, where appropriate, the BOD. All submitted comments will be recorded in the RR Recommendation Report for working group, MOPC and, where appropriate, BOD consideration.

The Secondary Working Group may take action on the RR to:

(1) Approve as submitted or modified. If modified the Secondary Working Group must submit comments with the modified language to the Primary Working Group within 3 business days;

(2) Reject. An RR shall be considered rejected if a majority of the Secondary Working Group members fail to reject or approve the RR as submitted or modified. The RR will move forward with the Secondary Working Group’s rejection noted in the RR Recommendation Report; or

(2) Defer action on the RR pending some follow-up action needed for the Secondary Working Group to take action.

The Primary Working Group must review and approve changes made by Secondary Working Groups. It is the responsibility of the Primary Working Group staff secretary to ensure RRs are appropriately routed through necessary Secondary Working Groups and to recommend action to the MOPC. Where an RR impacts multiple primary documents, the Primary Working Group shall be assigned based on which document has the most material impact or at the discretion of the impacted working group chairs.

All decisions of the Primary Working Group, the Secondary Working Group(s), the MOPC and the BOD with respect to any RR shall be posted to the SPP website within three (3) business days of the date of the decision. All such postings shall be maintained on the SPP website in the Open Revision Request folder until the RR is closed. An RR is considered closed if it has been implemented in the SPP Business Practices, SPP Operating Criteria, SPP Planning Criteria, SPP Market Protocols, or SPP Tariff, rejected, or withdrawn, or any system or process changes are complete. Closed Revision Requests shall be maintained on the SPP website in the Closed Revision Request folder.
Should any Qualified Entity disagree on an action taken or recommended by the Secondary Working Group, such Qualified Entity may submit an alternate recommendation to the RMS using the RR Comment Form.

**Market and Operations Policy Committee Action**

The MOPC shall consider RRs submitted by the Primary Working Group, for which a final RR Recommendation Report has been posted on the SPP website for at least six (6) days, or those accepted for urgent treatment by the MOPC. The following information must be included for each RR considered by the MOPC:

(1) The RR Recommendation Report and IA, if any; and

(2) Any comments timely received in response to the RR Recommendation Report.

The MOPC shall take one of the following actions regarding the RR Recommendation Report:

(1) Approve as recommended in the RR Recommendation Report or as modified by the MOPC;

(2) Reject if the MOPC members fail to reject or approve the RR as submitted or modified;

(3) Table/Postpone. To table or postpone an RR is to defer action pending some follow-up action needed;

(2)(4) Withdraw. The MOPC may vote to withdraw a previously approved RR; or

(3)(5) Remand the RR to the Primary Working Group with instructions.

The MOPC’s decision regarding approval or rejection of an RR shall be posted on the SPP website within three (3) business days after the MOPC’s minutes and in the recommendation to the Board of Directors decision. If the MOPC rejects a RR, the submitter may file an appeal with the SPP BOD. Should any Qualified Entity disagree with an action taken or recommended by the MOPC, such Qualified Entity may, in writing, appeal and submit comments within three (3) business days to the MOPC staff secretary for inclusion in the BOD recommendation.

If the MOPC approves a change or changes to the Business Practices, Operating Criteria, Planning Criteria, Market Protocols, or SPP Tariff, such change(s) shall be incorporated into the appropriate document and posted on the SPP website as soon as practicable, but no later than one (1) day before the effective date of the changes.

**SPP Board of Directors Review and Action**

If the RR requires SPP Operating Criteria, SPP Planning Criteria or SPP Tariff revisions, after an RR has been approved by the MOPC, it must be submitted to the SPP Board of Directors (BOD) for review and action. The BOD will review the RR at the next regularly scheduled meeting and take one of the following actions:
(1) Approve the RR as recommended in the RR Recommendation Report or as modified by the SPP BOD;

(2) Reject if the SPP BOD fail to reject or approve the RR as submitted or modified;

(3) Table/Postpone. To table or postpone an RR is to defer action pending some follow-up action needed;

(2)(4) Withdraw. The BOD may vote to withdraw a previously approved RR; or

(3)(5) Remand the RR to the MOPC with instructions.

Tabling or Postponing a Revision Request

To table or postpone an RR is to defer action pending some follow-up action by a Primary Working Group. If the deferral period for a tabled or postponed RR will extend beyond the RR’s scheduled MOPC review, the Primary Working Group chair shall provide notice of the deferral to the MOPC at their next regularly scheduled meeting. Revision Requests shall not be postponed or tabled for more than six (6) months. The Primary Working Group shall review and take action to reject, withdraw, or defer for a longer period that may not exceed six months, during its next regularly scheduled meeting after the sixth deferral month. The Primary Working Group chair shall notify the MOPC of RRs that have been tabled/postponed.

Withdrawal of an Revision Request

Submitter Withdrawal

Upon notice to the Primary Working Group, the RR submitter of a RR may withdraw the RR at any time prior to approval of the RR by the Primary Working Group. SPP The Primary Staff Secretary shall create a RR Recommendation Report recording the submitter’s withdrawal of a RR and post on the SPP website within three (3) business days of the submitter’s notice to the Primary Working Group.

If an RR is approved by the Primary Working Group it cannot be withdrawn except with approval of the Primary Working Group.

Primary Working Group Withdrawal

Upon notice to the RR submitter and any Secondary Working Group having taken a prior action on an RR, a Primary Working Group may vote to withdraw a previously approved RR at any time prior to the MOPC’s review and approval.

The Primary Working Group chair shall notify the MOPC of RRs that have been withdrawn.

Expedited Review Requests

The party submitting an RR may request that the RR be considered for expedited review when the submitter is requesting action from the Primary Working Group on an RR that has not met the minimum comment period.
A valid motion in a regularly scheduled meeting of the Primary Working Group is required to waive the minimum comment period and treat an RR with expedited review status. If approved for expedited review by the Primary Working Group, the RR will be treated the same as one that has met the minimum comment period. If the request for expedited review is rejected, the RR will be considered by the Primary Working Group after the minimum period; in most cases at the next regularly scheduled Primary Working Group meeting.

**Urgent Action Requests**

The party submitting an RR may request that the RR be considered for urgent action. Urgent action requests should be reserved for instances when existing Business Practices, Operating Criteria, Planning Criteria, Market Protocols, or SPP Tariff language is impairing or could imminently impair SPP system reliability or wholesale or retail market operations, or is causing or could imminently cause a discrepancy between any of SPP’s governing documents.

The Primary Working Group shall consider the urgent action RR at its earliest regularly scheduled meeting or at a special meeting called by the Primary Working Group chair. In some cases, an Urgent Action Request will occur concurrently with an expedited review request. A valid motion and vote of the Primary Working Group are required to designate the RR for urgent action. After approval, Urgent Action RRs shall be given priority high enough to ensure implementation within the timeline necessary to mitigate concerns about SPP system reliability or market operations under the unmodified language, or any other significant issues identified in the RR.

If approved, SPP shall submit an urgent action RR Recommendation Report to the chair and staff secretary of the MOPC and the appropriate Secondary Working Groups within two (2) business days to address the urgency of the RR. The MOPC and Secondary Working Groups chairs may request action from the working groups to address the urgency of the RR.

**Appeal of Decision**

If the Primary Working Group rejects the RR, any Qualified Entity eligible to submit an RR may appeal directly to the MOPC. Notice of the appeal must be submitted to SPP within ten (10) business days after the date of the relevant decision. Appeals to the MOPC shall be posted on the SPP website within three (3) business days of receipt and placed on the agenda of the next available regularly scheduled MOPC meeting, provided that the appeal is received in time to meet the MOPC meeting material posting deadline of seven (7) days prior to the meeting, provided that the appeal is provided to SPP at least eleven (11) days in advance of the MOPC meeting; otherwise the appeal will be heard by the MOPC at the next regularly scheduled MOPC meeting.

If MOPC rejects the RR, any Qualified Entity may appeal directly to the SPP BOD, per the Appeal process outlined in the SPP Bylaws.
FERC Filings

In the event the FERC rejects the SPP Tariff modifications associated with an RR, the RR will be deemed rejected by the FERC action. In the event the FERC conditionally accepts with compliance requirements the SPP Tariff modifications associated with an RR, SPP staff will prepare a new RR to conform the appropriate document(s) to the FERC order.
SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
Agenda

- STSER Proposed Design – Operations
  - Phased Implementation
  - Market Clearing
  - AGC Deployment
  - Losses

- STSER Proposed Design – Settlements
  - Settlements Design Review
  - Variety of feedback from individual SUG participants
  - SPP Recommendation
STSER – Proposed Design

August 23rd, 2016
Objectives

- Utilize STSERSs for Regulation service
- Reduction of system Regulation deployment due to fast responding Regulation dedicated Resources
- Enhance ability to respond to sudden ACE deviations
- Potential reduction in Regulation requirement
- Incorporating a design with minimal software changes
Implement In Phases

- **Market Design Phase I – Current proposal**
  - Regulation Only Qualified
  - SPP manages state of charge

- **Market Design Phase II**
  - Energy Qualified (?)
  - Optimize the charge and discharge periods (?)
  - Regulation vs. Energy Optimization (?)
Short-Term Stored Energy

• Short-term storage devices that time shift energy
  • Store energy to be provided at a later time
    • Compressed Air
    • Battery
    • Pump Storage
    • Flywheel

• Must be able to sustain output at registered limits for at least 15-minutes
  • Maximum Withdrawal
  • Maximum Injection

• Regulation Qualified Only
  • Regulation-Up
  • Regulation-Down
Market Clearing
Day-Ahead Studies

- If participating, are available for Regulation-Up and Down @ 50% charge level
- Economically committed in DAMKT for Regulation
- Subject to MWP distribution based on deviations
- If marginal, MCP for Regulation-Up or Down will not have Energy Loss of Opportunity Component
- A maximum clearable STSER capacity as percentage of Regulation requirement will be in place
- May have different Reg-Up/ Reg-Dn Service MCP than other Resources
Regulation Selection and Priority

- It is expected that STSER’s will always be selected, if available, for Regulation due to the lack of lost opportunity for Energy

- Regulation Priority groups assignment will be based on both:
  - Ramp Rates:
    - Faster ramping Resources are preferred to be first for deployment
  - Historical Performance:
    - Performance scores of regulating resources may impact the submitted Ramp Rates such that an effective ramp rate is calculated and used for priority group assignment
  - Ramp Rate performance based adjustment would only affect deployment prioritization, not clearing or deployments quantities
Real Time Balancing Market

• Initial charge level is observed and adjusted based on projected charge level
  • The projected charge level may be set to 50% at all times or calculated depending on operational needs and AGC management

• Regulation-Up and Regulation-Down clearable capacity for the interval is driven by the projected charge level.

<table>
<thead>
<tr>
<th>Projected Charge Level</th>
<th>0%</th>
<th>50%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulation Up Capacity</strong></td>
<td>0MW</td>
<td>½ Maximum Discharge MW</td>
<td>Maximum Discharge MW</td>
</tr>
<tr>
<td><strong>Regulation Down Capacity</strong></td>
<td>Maximum Charge MW</td>
<td>½ Maximum Charge MW</td>
<td>0MW</td>
</tr>
</tbody>
</table>

* Assumes a 15-minutes capability battery

• A maximum clearable STSER capacity as percentage of Regulation requirement will be in place
  • This quantity has not been identified, as it would be based on system characteristics

• Regulation Priority groups will be based on performance and ramp rates
Short-Term Stored Energy Resources Example

Let’s take an example of a battery with the following characteristics:

- Maximum Energy Storage Level = 20MW – 30 minutes (battery can maintain 20MW for 15-minutes also, restricted by equipment)
- Maximum Energy Charge Rate = 20MW
- Maximum Energy Discharge Rate = 20MW

Case 1:
- STSER at 50% Charge
- * Estimated Future Charge level @ 50%
- Reg-Up capability = 20MW
- Reg-Dn capability = 20MW

* The Estimated Future Charge is an option that SPP may not use, instead 50% charge level will be assumed at all times for clearing purposes.
Proposed Design – Definition of Conventions

Case 2:
- STSER at 25% Charge
- Estimated Future Charge level @ 12.5%
- Reg-Up capability = 5MW
- Reg-Dn capability = 20MW

Case 3:
- STSER at 75% Charge
- * Estimated Future Charge level @ 87.5%
- Reg-Up capability = 20MW
- Reg-Dn capability = 5MW

* The Estimated Future Charge is an option that SPP may not use, instead 50% charge level will be assumed at all times for clearing purposes.
AGC / RTGEN Deployment
AGC Operation

• Addition of software module to manage the STSER state of charge

• Will deploy STSER’s according to priority groups assignment

• Will manage the state of charge of the STSER’s to maintain 50% charge level

• Opportunistic charging may take place outside of Regulation events to achieve 50% charge level target
  • If charging/discharging the STSER does not cause additional Regulation deployment
  • STSERs will be charged/discharged pro-rata and in the reverse order of the priority groups assigned

• STSERs owners are responsible for biasing the state of charge on the Resource if anything other than 50% charge level is desired
Example of AGC STSER Management
STSER Losses Calculation
Losses Calculation

- SPP intends to charge STSERs for losses associated with the Resources

- SPP proposes the following methodology to calculate losses on STSER:
  - Shadow Losses Calculation for a STSER based on the Net difference between MWh charge state and calculated MWh injected or withdrawn
    - MWh_Level_Start: Realtime Charge level in MWh at the start of a interval
    - MWh_Level_End: Realtime charge level in MWh at the end of a interval
    - iMWh: MWH total for an interval from MWh meter or integration of MW meter

- SPP requests this calculation be performed by the Resource owner and submitted to Settlements
  - SPP may shadow calculate the quantity
Losses Calculation Example

Interval length = 5 minutes
MWh Level Start = 20 MWh
MWh Level End = 17.83 MWh
MWh Consumed = 20 MWh – 17.83 MWh = 2.17 MWh

Integrated Real-time MW Injected

\[ i\text{MWH}_{\text{Injected}} = \frac{20 \text{ MW}}{12} = 1.67 \text{ MWh} \]

Losses

\[ \text{Losses} = 2.17 \text{ MWh} - 1.67 \text{ MWh} = 0.5 \text{ MWh} \]
Proposed Settlement Design
STSER Settlements Summary

**Credits**
- MCP Reg Up Service * Reg Up Cleared MW
- MCP Reg Dn Service * Reg Dn Cleared MW
- MCP Reg Up Mileage * Reg Up MWMilesExcess
- MCP Reg Dn Mileage * Reg Dn MWMilesExcess

**Charges**
- MCP Reg Up Mileage * Reg Up MWMilesUnused
- MCP Reg Dn Mileage * Reg Dn MWMilesUnused
- Aux Load MWh * LMP
- Losses MWh * LMP
  
  *Note: Losses may include station power if Station Power is not modeled as Aux Load*
Short-Term Stored Energy

Review:
• Phase I
  • Prevents Short-Term Stored Energy Resources from receiving withdrawal based distribution charges
  • Impacts Shadow Settlements for Short-Term Stored Energy Resources
  • Changes calculations for withdrawal based distribution charges
Short-Term Stored Energy

Review:
• Phase II
  • Removes Asset Energy Settlement from Regulation Deployment
  • Modifies Regulation Deployment Adjustment to reflect the total energy cost for Regulation Deployment
  • Changes calculations for Energy Settlement
Short-Term Stored Energy

Settlement User Group Feedback:
• Concerns Around NOT Settling Energy
  • LMP delta between charge and discharge
  • Unsettled Energy being distributed through RNU
Short-Term Stored Energy

Settlement User Group Feedback:
• NOT Settling Energy
  • LMP delta between charge and discharge
  • LMP delta represents difference between cost of fuel and the revenue settlement for energy
  • Regulation Deployment Adjustment is equal to the difference between the energy offer curve and the revenue settlement for energy
• Unsettled Energy being distributed through RNU
• Regulation Deployment Adjustment is distributed through RNU
Short-Term Stored Energy

Settlement User Group Feedback:
• Concerns around NOT being able to shadowing Regulation Mileage
  • Difference between
    • Regulation Deployment
    • Opportunistic Charging / Discharging
    • Self-Directed Charging / Discharging
Short-Term Stored Energy

Settlement User Group Feedback:
• Shadowing Regulation Mileage
  • Difference between
    • Regulation Deployment
      • Control Mode 2 (Regulating)
    • Opportunistic Charging / Discharging
      • Regulating with “Charge” flag
    • Self-Directed Charging / Discharging
      • Not Regulating
Short-Term Stored Energy

Settlement User Group Feedback:
- Concerns Around Settlement Changes Being Required for ALL MP(s) with Regulation Qualified Resources
  - Requested SPP look for a less intrusive solution
Short-Term Stored Energy

Settlement User Group Feedback:
• Settlement Changes Required for ALL Regulation Qualified Resources
  • Requested SPP look for a less intrusive solution
    • Phase II requires changes to shadow settle all Regulation Qualified Resources
  • Phase I requires calculation changes in 17 charge types
    • Billable Meter is used in withdrawal based distributions
  • SPP recommends keeping shadow settlement systems consistent with protocols
Short-Term Stored Energy

Settlement User Group Feedback:
• Requested SPP implement phase I and phase II at the same time
Short-Term Stored Energy

Settlement User Group Feedback:

- Implementing phase I and phase II at the same time
- Combined implementation will save testing time for SPP and MP(s)
- While Short-Term Stored Energy does not currently have a proposed implementation date, it will likely be late 2017 or early 2018 and can be implemented with other revisions
Short-Term Stored Energy

SPP Settlements Recommendation:
• Market Participants keep shadow settlement systems current with current protocols
• Phase I and Phase II be implemented together
• Short-Term Stored Energy implementation occur concurrently with other revisions
Questions & Feedback
SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
Integrated Marketplace Protocols Redesign
Market Design
08/18/2016
Background

• Protocol document is growing larger (v39 ~900 pages)
  • Management is becoming burdensome

• Reviewed other RTO/ISO document structures

• Proposing 2 options for discussion
Options

1. Settlements Breakout
   • Breakout only the Settlements sections/appendices as a single separate document

2. Protocols Breakout
   • Breakout every section/appendix of the Protocols as individual documents
Option 1 – Settlements Breakout

Settlements Breakout (~480 pages)

- Removed the following:
  - Section 4.5
  - Appendices C, D, F

---

Post-Operating Day and Settlement Activities

SPP Integrated Marketplace
Option 2 – Protocols Breakout

Protocols Breakout

- Breakout each section/appendix as individual documents

- Appendix F-Settlement Examples-Integrated Marketplace Protocols 39.docx
- Section 1-Glossary-Integrated Marketplace Protocols 39.docx
- Section 2-Introduction-Integrated Marketplace Protocols 39.docx
- Section 3-Overview-Integrated Marketplace Protocols 39.docx
- Section 4-Energy and Operating Reserve Markets Processes-Integrated Marketplace Protocols 39.docx
- Section 6-Market Registration-Integrated Marketplace Protocols 39.docx
- Section 7-Market System Outage and Error Handling-Integrated Marketplace Protocols 39.docx
- Section 8-Market Monitoring and Mitigation-Integrated Marketplace Protocols 39.docx
Discussion
SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
August MWG – Marketplace Update

- Regulation Performance
- Congestion Overview
- RUC Update
- Pricing
- Load Forecast accuracy
- Wind forecast accuracy
- DAMKT Update
- Flowgate Appendix
Regulation Performance

Section 1
July 2016 Regulation Up Performance

![Bar chart showing resource count compared to score percentage for Regulation Up. The x-axis represents score percentage ranging from 5% to 100%, and the y-axis represents resource count. The bar chart shows a distribution with a peak at the higher score ranges.]
July 2016 Regulation Down Performance

![Bar chart showing resource count against score percentage for Regulation Down performance.]
Congestion Overview

Section 2
### DA vs RT Constraints

- Top 10 Congested Constraints in DA

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Intervals Binding/Breached</th>
<th>Average Shadow Price</th>
</tr>
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<tbody>
<tr>
<td>TEXAS_CO_TXPS_TXCO_PSHFT_PS</td>
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Top 10 Congested Constraints in DA for June

-TEXAS_CO_TXPS_PSHFTE_PS
-OSGCANBUSDEA
-WDFPLTATNOW
-TMP129_21713
-LUBXFMJONHOL
-STAINDTUCCAR
-TEMP13_21818
-OSGCANBUSDEA
-WDFPLTATNOW
-TMP203_21931

States: Wyoming, Colorado, New Mexico, Texas, Iowa, Arkansas, Missouri, Kansas, Oklahoma, California, Oregon, Alaska, Hawaii.
# DA vs RT Constraints

- Top 10 Congested Constraints in RTBM

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Intervals Binding/Breached</th>
<th>Average Shadow Price</th>
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<td>SHAHAYPOSKNO</td>
<td>633</td>
<td>13.19</td>
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Top 10 Congested Constraints in RTBM for June
RUC Update

Section 3
Commitment Breakdown by MW– July 2016

- The commitment breakdown for the month of July is shown to the right of total commitments by MW made by DAMKT, RUC, SELF, and MANUAL.

- About 95% (27,325,658 MW) of the commitments came from DAMKT, while 1% were considered manual.

- Of that 1% (358,186 MW) of manual commitments, roughly 295 of those (102,787 MW) were actual new commitments.

<table>
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<tr>
<th></th>
<th>May</th>
<th>June</th>
<th>July</th>
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<td>DAMKT</td>
<td>19,236,150.20</td>
<td>24,387,733.10</td>
<td>27,325,657.80</td>
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<tr>
<td>DA_RUC</td>
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<tr>
<td>ID_RUC</td>
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<tr>
<td>MANUAL</td>
<td>287,515.00</td>
<td>388,758.00</td>
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<tr>
<td>SELF</td>
<td>213,449.20</td>
<td>293,776.50</td>
<td>302,010.30</td>
</tr>
</tbody>
</table>

*SELF commits are post DAMKT
July Pricing

Section 4
Hourly Avg LMP

* = more info for anomalies included on next slide
RT LMP Outliers

**Highest LMPs (hourly avg)**

- **7/8/2016 10:00** $134.88
  - Reg shortages for 3 intervals due to a high load, a drop in wind and a unit trip caused an increase in prices.

- **7/10/2016 11:00** $145.70
  - Congestion, increasing load and a lost unit during this hour caused RegUP and RegSpin shortages and high MECs.

- **7/18/2016 12:00** $127.85
  - Spin shortage caused high prices during this hour.
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</thead>
<tbody>
<tr>
<td>DA MLC</td>
<td>$(0.07)</td>
<td>$(0.07)</td>
<td>$(0.08)</td>
<td>$(0.11)</td>
<td>$(0.09)</td>
<td>$(0.06)</td>
<td>$(0.07)</td>
<td>$(0.06)</td>
<td>$(0.06)</td>
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<td>DA MCC</td>
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<td>$(0.13)</td>
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<tr>
<td>DA LMP</td>
<td>$27.97</td>
<td>$25.68</td>
<td>$22.45</td>
<td>$20.17</td>
<td>$18.96</td>
<td>$17.43</td>
<td>$19.74</td>
<td>$16.93</td>
<td>$14.05</td>
<td>$17.43</td>
<td>$17.30</td>
<td>$24.60</td>
<td>$26.13</td>
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<tr>
<td>RT MEC</td>
<td>$25.81</td>
<td>$23.42</td>
<td>$21.78</td>
<td>$18.43</td>
<td>$17.79</td>
<td>$16.84</td>
<td>$19.32</td>
<td>$15.34</td>
<td>$14.95</td>
<td>$17.40</td>
<td>$16.65</td>
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<td>$(0.07)</td>
<td>$(0.08)</td>
<td>$(0.11)</td>
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<tr>
<td>RT MCC</td>
<td>$0.15</td>
<td>$0.36</td>
<td>$0.41</td>
<td>$0.61</td>
<td>$1.00</td>
<td>$0.32</td>
<td>$0.49</td>
<td>$0.10</td>
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<td>$0.28</td>
<td>$0.11</td>
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<td>$25.89</td>
<td>$23.70</td>
<td>$22.10</td>
<td>$18.91</td>
<td>$18.71</td>
<td>$17.09</td>
<td>$19.72</td>
<td>$15.36</td>
<td>$14.95</td>
<td>$17.57</td>
<td>$16.66</td>
<td>$22.50</td>
<td>$24.40</td>
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</table>
Load Forecast

Section 5
Mid Term Load Forecast

Error Percent

GW

Daily AVG MTLF
Daily AVG Actual
Error Threshold %
Forecast Error %
MTLF by Hour of the Day for July

AVG MTLF by Hour  AVG Actual by Hour  AVG Error %  Error Threshold %

* Load forecast data used from DA-RUC cases
Short Term Load Forecast

- **Error Percent**
- **GW**
- **Daily AVG STLF**
- **Daily AVG Actual**
- **Error Threshold %**
- **Forecast Error %**
Wind Forecast

Section 6
Wind forecast data used from DA-RUC cases
25. Wind forecast data used from DA-RUC cases.
DAMKT Update

Section 7
DA Obligations vs RUC Obligations - June

- DA (Cleared Load + NSI – Virtual Offers – Wind Offers)
- RUC (Load Forecast + NSI – Wind Forecast)
DA Obligations vs RUC Obligations - June

- All May days averaged into one “average” day
- Peak 3076 MW (RUC over DA)
- Peak 1820 MW (RUC over DA)
- Differences
  - Virtual Bids
  - Wind offered in DA vs Wind forecast in RUC
DA Obligations vs RUC Obligations - June

Average MW Difference by Hour

Average Diff
DA Fixed and PS Bid (with losses) vs MTLF
Appendix

Section 8
<table>
<thead>
<tr>
<th>Constraint</th>
<th>Elements</th>
<th>Reason</th>
</tr>
</thead>
</table>
| WATXFRWATXFR                | Mon: Watford 230/1kV XFR  
Con: Watford 230/1kV XFR                                                   | High loading in the area.                                               |
| TMP129_21713                | Mon: Laramie XF                                                           | Driven by outages.                                                     |
| OSGCANBUSDEA                | Mon: Osage –Canyon 115kV  
Con: Bushland – Deafsmith 230kV                                          | Wind impacts.                                                          |
| TEMP13_21818                | Mon: PANTEX_S - HIGHL_TP 115 kV  
Con: MARTIN - HUTCH 115 kV                                               | Wind Impacts.                                                          |
| TMP203_21931                | Mon: Cimarron 345/138kV XFR  
Con: Cimarron 345/138kV XFR                                                 | Unit tripped in the area and had to wait on the market to help control this flowgate. |
| LUBXFMJONHOL                | Mon: Southeast 230/69kV XFR  
Con: Jones Sub – Holly 230kV                                                  | High loading in the area. Similar issue as the STAINDTUCCAR flowgate.   |
| STAINDTUCCAR                | Mon: Stanton – Indiana 115kV  
Con: Tuco – Carlisle 230kV                                                   | High load in the area forced this FG to breach when INC units were at their max. Also outages, unit derates and fail to starts made it hard to control this flowgate. |
| TMP193_21919                | Mon: Verdigras – Terra Nitrogen Tap 138kV  
Con: NE_GAS – Owasso 138kV                                                  | High loading in the area. Plenty of generation to move to help control this FG. |
| TEMP65_21162                | Mon: Arcadia – Edmond Garber Lake 138kV  
Con: Arcadia – Northwest 345kV                                             | Outage in the area.                                                     |
<table>
<thead>
<tr>
<th><strong>TEXAS_CO_TXPS_TXCO_PSHFT_PS</strong></th>
<th>This has always been “activated”, but it is just now showing up in the MDB solution constraint tables since the 1.12 release.</th>
</tr>
</thead>
</table>
| **WDWFPLTATNOW**              | Mon: Woodward – FPL Switch 138kV  
Con: Tatonga – Northwest 345kV  
High wind and west -> east flow |
| **SHAHAYKNOXFR**              | Mon: South Hays – Hays 115kV  
Con: Knoll XFR 230/115kV  
Increasing wind and nearby DVERs had already been curtailed to zero. |
| **SHAHAYPOSKNO**              | Mon: South Hays – Hays 115kV  
Con: Post Rock – Knoll 230kV  
Increasing wind and nearby DVERs had already been curtailed to zero. |
SEVENTY-FIVE YEARS OF RELIABILITY THROUGH RELATIONSHIPS
Market’s Update: Contingency Reserve Deployment (CRD)

Presented By:
Garrett Crowson
Quick Event Statistics – July 2016

- There were 38 Events that occurred
- Largest Capacity Lost during an event: 712 MWs (7/6/2016)
- Average Capacity Lost during an event: ~ 365 MWs
- Largest MWs Deployed for an event: 641 MWs
- Average MWs Deployed for an event: ~ 296 MWs
- Market Intervals with multiple events: 25 intervals
- This is not a “July” month trend as the past two July’s only recorded 7 (2014) and 17 (2015) CRD events
Event Deployment Compliance

• Compliance was failed a total of 256 times during the month.

• The worst compliance event included 22 resources failing compliance. This was nearly 27% of resources deployed during the event.

• On average there were a little over 7 resources failing compliance per event.

• The largest shortfall MWs for a single event equaled 228 MWs, with the largest single resource shortfall MW being 92.4 MWs.

• There were 113 instances of a Cap MW of less than 1 MW being applied on a resource.
In Summary: System Response/System Operation

- Even with the high number of events and the high number of compliance failures the system response and operation of the system both went well.
- Pricing was not abnormally high or low.
- There were only 5 events that caused a market interval to have a MEC greater than $50 with the average MEC during the events being ~ $37.
- One of the three months since the beginning of the year with no OR shortages.
- ACE recovered within expected guideline for every event
- No offline Supplemental Reserve needed during any event
Example of System/Operation of System response

Deployed in < 2.5 minutes, recovers in < 7 minutes.
Example of System/Operation of System response (Cont.)

Highest MEC = $25.84
Example of System/Operation of System response (Cont.)

8 High MEC spikes vs. 38 CRD events for the month
QUESTIONS?

Garrett Crowson
Market Forensics & Analysis Engineer
gcrowson@spp.org
SPP Marketplace Update
July 2016

Jason Bulloch-SPP MMU
August 23, 2016
Overview

• LMPs and MCPs
• Summary of Scarcity Events
• DA Market Participation
• Make Whole Payments, OCL, M2M and RNU
• Congestion
• TCR Funding
• Day Ahead vs. Real Time Wind
• Mitigation
July Highlights

• Spot Gas Prices are up again this month pushing up prices and Real-Time Make Whole Payments.

• TCR Funding was 89%.
Monthly Average LMPs

SPP NORTH HUB

SPP SOUTH HUB

$/MMBTU

$/MWH

DA LMP

RT LMP

Panhandle

Jul-15

Aug-15

Sep-15

Oct-15

Nov-15

Dec-15

Jan-16

Feb-16

Mar-16

Apr-16

May-16

Jun-16

Jul-16

Jul-15

Aug-15

Sep-15

Oct-15

Nov-15

Dec-15

Jan-16

Feb-16

Mar-16

Apr-16

May-16

Jun-16

Jul-16
Daily Average SPP Hub Energy Prices
July 2016

Locational Marginal Price ($/MWh)

SPPNORTH_HUB - DAMKT
SPPNORTH_HUB - RTBM
SPPSOUTH_HUB - DAMKT
SPPSOUTH_HUB - RTBM
Monthly Average RTBM Regulation Prices

**Regulation Up**

- **Reg Up RT**
- **Reg Up DA**
- **Reg Up Milage RT**

**Regulation Down**

- **Reg Down RT**
- **Reg Down DA**
- **Reg Down Milage RT**
Regulation Mileage MWPs

Regulation-Down Mileage MWPs

<table>
<thead>
<tr>
<th>Month</th>
<th>DaRegDnUnusedMileMwp5minAmt</th>
<th>RtRegDnUnusedMileMwp5minAmt</th>
<th>RtRegDnMile5minFct</th>
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</thead>
<tbody>
<tr>
<td>JULY</td>
<td>$120</td>
<td>0.25</td>
<td>0.05</td>
</tr>
<tr>
<td>AUGUST</td>
<td>$100</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>$80</td>
<td>0.15</td>
<td>0.1</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>$60</td>
<td>0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>$40</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>$20</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Regulation Up Mileage MWPs

<table>
<thead>
<tr>
<th>Month</th>
<th>DaRegUpUnusedMileMwp5minAmt</th>
<th>RtRegUpUnusedMileMwp5minAmt</th>
<th>RtRegUpMile5minFct</th>
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</thead>
<tbody>
<tr>
<td>JULY</td>
<td>$120</td>
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</tr>
<tr>
<td>DECEMBER</td>
<td>$20</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Daily Average SPP Regulation Up MCPs
July 2016
Daily Average SPP Regulation Down MCPs
July 2016
Monthly Average RTBM OR Prices

**Spinning Reserves**

- **Spin DA**
- **Spin RT**

**Supplemental Reserves**

- **Supp DA**
- **Supp RT**
Daily Average SPP Spinning Reserve MCPs
July 2016
Daily Average SPP Supplemental Reserve MCPs
July 2016
RTBM Scarcity and Ramp Events
July 2016

Note: Where both capacity and ramp scarcity exist in the same interval, only the capacity scarcity is shown.
Average Load Participation in DA Market vs. RTBM
Virtual Participation in Marketplace

Cleared Virtual Bids as Percent of Report Load
Cleared Virtual Offers as Percent of Report Load

% of RT Load


0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0%
Virtual Participation – Hourly Volume

![Graph showing average hourly volume (MWh) from July 15 to July 16, with separate bars for uncleared and cleared virtual bids and offers.]
Virtual Activity by Settlement Location Type

Virtual's Net Profit/Loss by Location Type (negative is profit)

Cleared Virtuals MWS by Location Type (sum of bids and offers)
*Only fuel types that have had MWPs will be present on the legends*
# Revenue Neutrality Uplift

<table>
<thead>
<tr>
<th></th>
<th>Feb-16</th>
<th>Mar-16</th>
<th>Apr-16</th>
<th>May-16</th>
<th>Jun-16</th>
<th>Jul-16</th>
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<tbody>
<tr>
<td>DA Revenue Inadequacy</td>
<td>$ (70)</td>
<td>$ (129)</td>
<td>$ 33</td>
<td>$ 35</td>
<td>$ (48)</td>
<td>$ 68</td>
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<tr>
<td>RT Revenue Inadequacy</td>
<td>$ (4,720)</td>
<td>$ (19,546)</td>
<td>$ (35,118)</td>
<td>$ (22,961)</td>
<td>$ (71,446)</td>
<td>$ (118,874)</td>
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<td>OOME MWP</td>
<td>$ (40,437)</td>
<td>$ (16,089)</td>
<td>$ (145,460)</td>
<td>$ (292,672)</td>
<td>$ (488,852)</td>
<td>$ (171,490)</td>
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<tr>
<td>RT Regulation Deployment Adj.</td>
<td>$ 1,291</td>
<td>$ 45,844</td>
<td>$ 20,789</td>
<td>$ 15,546</td>
<td>$ (154,735)</td>
<td>$ (231,256)</td>
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<td>RT JOA</td>
<td>$ 1,058,452</td>
<td>$ 575,620</td>
<td>$ (186,725)</td>
<td>$ 386,950</td>
<td>$ 321,645</td>
<td>$ (272,819)</td>
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<tr>
<td>RT Congestion</td>
<td>$ (1,600,109)</td>
<td>$ (1,079,203)</td>
<td>$ (2,955,021)</td>
<td>$ (2,218,641)</td>
<td>$ (6,768,347)</td>
<td>$ (3,945,619)</td>
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<tr>
<td>Sub-Total</td>
<td>$ (585,593)</td>
<td>$ (493,503)</td>
<td>$ (3,301,502)</td>
<td>$ (2,131,743)</td>
<td>$ (7,161,783)</td>
<td>$ (4,739,990)</td>
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<tr>
<td>Less RT Net Inadvertent</td>
<td>$ (858,512)</td>
<td>$ 565,058</td>
<td>$ 391,812</td>
<td>$ (353,416)</td>
<td>$ (2,017,095)</td>
<td>$ (482,608)</td>
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<tr>
<td>RNU *</td>
<td>$ (272,919)</td>
<td>$ 1,058,561</td>
<td>$ 3,693,314</td>
<td>$ 1,778,327</td>
<td>$ 5,144,688</td>
<td>$ 4,257,382</td>
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*This table is based on the latest available settlements data and is subject to change due to resettlement

- **Green** cell denotes payments to RNU recipients and clear cells represent cost
Real Time OCL Payments by Settlement Location Type

* Payment/Charges to FSE And GFA transactions have been excluded.
Market to Market Payments for July 2016

Daily Net
+ MISO to SPP / - SPP to MISO

$-272,819

$161,760.09

NASXFRNASHAW

SARMINE LD MOL / MOB MOB TH H SAL

$(269,622.16)
M2M by Constraint for July 2016
(Negative Payments to MISO, Positive to SPP)
FGs with payments/charges between $5K and -$5K removed
July Off-Peak LMPs
July On-Peak LMPs
Flowgate Descriptions

Flowgate information can be found at

https://www.oasis.oati.com/SWPP/index.html

(look under “Transmission” Folder> “Flowgates”>Permanent Flowgates /Temporary Flowgates )
July 2016
Top 10 RT Breached/Bound Flowgates by Shadow Price
July TCR Summary

89% Funding in July

DA_REVENUE
TCR_FUNDING
SURPLUS_SHORTFALL

Millions

$3.00
$2.75
$2.50
$2.25
$2.00
$1.75
$1.50
$1.25
$1.00
$0.75
$0.50
$0.25
$0.00

7/1/2016
7/2/2016
7/3/2016
7/4/2016
7/5/2016
7/6/2016
7/7/2016
7/8/2016
7/9/2016
7/10/2016
7/11/2016
7/12/2016
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7/18/2016
7/19/2016
7/20/2016
7/21/2016
7/22/2016
7/23/2016
7/24/2016
7/25/2016
7/26/2016
7/27/2016
7/28/2016
7/29/2016
7/30/2016
7/31/2016
TCR Summary by Month

93% Cumulative Funding
ARR Summary by Month

- TCR_REVENUE
- ARR_FUNDING
- SURPLUS_SHORTFALL
- FUNDING_PERCENT
- CUMULATIVE_PERCENT

Millions

- July
- August
- September
- October
- November
- December
- January
- February
- March
- April
- May
- June
- July
Wind by Month

Thousands of MWhrs

Wind MWhrs

Daily Averages of % of Wind/LOAD
Percent Mitigated Resource Starts by Commit Reason

% of Resource STARTS that are Mitigated

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<th>Month</th>
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<td>1</td>
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<tr>
<td>Jul</td>
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Legend:
- DA
- MANUAL
- RUC
Questions?

SPPMarketMonitoring@spp.org
### Working Group Action Items

<table>
<thead>
<tr>
<th>Action Item</th>
<th>Org Group</th>
<th>Date Originated</th>
<th>Action Item</th>
<th>Update Summary</th>
<th>Status (Not Started, In Progress, Closure Pending, On Hold, Closed)</th>
<th>Owner</th>
<th>Comments</th>
<th>Date Closed</th>
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<tbody>
<tr>
<td>230</td>
<td>MWG</td>
<td>07/22/14</td>
<td>In light of the MISO and Potomac Economics data security issue: SPP Staff will provide documentation and security analysis to the MWG on the SFP data connections and interactions with Marketing Analytics and other third party vendors.</td>
<td>3/31/2015: SPP staff will provide an update to the MWG during the second quarter of 2015. 1/2/2015: SPP Staff will provide information related to this by the end of 2015. 11/13/2016: Staff is discussing this action item 2/9/2016: Market Design met with SPP MMU to discuss action item 4/1/2016: Market Design and SPP MMU are still evaluating 7/7/2016: Market Design and SPP MMU are still evaluating.</td>
<td>In Progress</td>
<td>SPP MMU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>255</td>
<td>MWG - MOPC 225</td>
<td>11/03/13</td>
<td>Per MOPC AI 0225: MWG to determine if Market Protocol changes are needed to clarify Reserve Shutdown and Firm Purchase/Sales and/or examine the need for DNRs in DA Market Must Offer. SPP staff to provide the results of the 12 month analysis on Must Offer, per the 9/20/2013 FERC Marketplace Order, to the MWG in June 2015.</td>
<td>The following update was presented by MWG during the April 15-16 2014 MOPC: MWG voted to: 1) Postpone implementation and filing of MPRR130; 2) Table MPRR169 until after MWG can consider market operations up to October 1, 2014, and then make further recommendations to MOPC. 10/15/2014: The evaluation of Must Offer data since 3/1/14 is on the MWG agenda for 10/21-22/14. 02/06/2015: An update was presented to MOPC on January 15, 2015 stating the MWG voted that MOPC take no action on DA Must Offer until after the FERC reporting deadline. (see MWG Report to MOPC Jan 2015 for more details) Update 3/31/2015: Market Design will provide an update during the June 2015 MWG Meeting 2/11/2015: Pending number 10 below. Jared updated the MWG members on 6/17/2015. Power point presentation is included in the background materials. 7/7/2016: AEP appealed the MWG vote at the July MOPC 8/18/2016: MMU plans to resubmit a Physical Withholding Revision Request pending impact simulations. RR125(Removal of DAMKT Limited Must Offer) was tabled at the July 2016 MOPC until 7/17/2016 or until MMU resubmits a Physical Withholding RR. If not discussed earlier, the issue will be added to the MOPC agenda for 2017.</td>
<td>In Progress</td>
<td>Jared Greenwalt</td>
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<tr>
<td>289</td>
<td>MWG - MOPC 259</td>
<td>11/20/15</td>
<td>MWG review underfunding in 6 months on ARR/TCR’s.</td>
<td>7/7/2016: MWG updated MOPC that the evaluation period will be expanded to a year. 8/18/2016:</td>
<td>In Progress</td>
<td>Charles Cates</td>
<td>AEP submitted RR125 on October 2, 2015 which proposes to remove the Day-Ahead Limited Must Offer as recommended by the MMU in the 2014 ASSOM report. This RR is scheduled for a vote at the November 17-18, 2015 MOPC meeting. MWG approved RR125 on 11/17/2015, and postponed moving it forward to MOPC on 12/15/2015 until the group had further discussion on Physical Withholding Rules.</td>
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<td></td>
<td>MWG</td>
<td>01/15/15</td>
<td>Gas/Electric FERC Order ER15-2377 Annual Reporting Requirements</td>
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<td>7/7/2016: MWG will need to approve the annual report to FERC before December 17, 2016 - 2018.</td>
<td>In Progress</td>
<td>Debbie James</td>
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<td></td>
<td>8/18/2016: No Change</td>
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<td>7/7/2016: Richard Ross updated the MOPC on the progress of this action item at the July MOPC.</td>
<td>In Progress</td>
<td>Micha Bailey</td>
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<td></td>
<td>8/18/2016: Reviewed remaining open items with MWG at July’s meeting. Working on RRs and Impact Assessment for September’s MWG meeting</td>
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<td>8/18/2016: Working on design. Will be submitting to SPQM when complete.</td>
<td>In Progress</td>
<td>Gary Cate</td>
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<td></td>
<td>8/18/2016: Drafting RR for Report to the MWG for September.</td>
<td>In Progress</td>
<td>Micha Bailey</td>
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<td></td>
<td>8/18/2016: Drafting RR for Report to the MWG for September.</td>
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<td>Micha Bailey</td>
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<td>8/18/2016: Settlements discussed the STSER with the SUG on 8/18/2016. SUG gave feedback to SPP. Settlements will present SUG feedback to MWG on 8/23/2016.</td>
<td>In Progress</td>
<td>John Luallan</td>
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<td>8/18/2016: MMU plans to resubmit a Physical Withholding Revision Request pending impact simulations. RR125(Removal of DAMKT Limited Must Offer) was tabled at the July 2016 MOPC until July 2017 or until MMU resubmits a Physical Withholding RR. If not discussed earlier, the issue will be added to the MOPC agenda for discussion in July 2017.</td>
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<td>8/18/2016: RR154 is on the August MWG agenda for discussion.</td>
<td>In Progress</td>
<td>Jodi Woods / Gary Cate</td>
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<td>Event Description</td>
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<td>MWG RR Submission Deadline for Non-Expedited</td>
<td>10/4/2016</td>
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<td>MWG RR Posting Deadline for Non-Expedited</td>
<td>10/6/2016</td>
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<td>MWG Meeting before MOPC for RRs</td>
<td>10/18/2016</td>
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<td>ORWG Meeting before MOPC for RRs</td>
<td>11/3/2016</td>
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<td>RTWG Meeting before MOPC for RRs</td>
<td>11/17/2016</td>
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<td>BPWG Meeting before MOPC for RRs</td>
<td>11/17/2016</td>
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<tr>
<td>TWG Meeting before MOPC for RRs</td>
<td>12/7/2016</td>
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<td>MOPC Meeting Materials due date</td>
<td>1/17/2016</td>
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</tbody>
</table>
## Regulatory Report to MWG for August 2016

### Current Filings

<table>
<thead>
<tr>
<th>Description (Regulatory Lead)</th>
<th>FERC Docket No.</th>
<th>Activity</th>
<th>Status</th>
</tr>
</thead>
</table>
| RR 91—Annual Allocation Percentage Change *(Marisa Choate)* | ER16-13 | Filing made on October 2, 2015 requesting a January 28, 2016 effective date. Comments due by October 23, 2015.  
- Five doc-less interventions were filed.  
- One comment (SPP MMU) was filed.  

Deficiency letter issued by FERC on November 23, 2015.  


Order issued by FERC on February 19, 2016 conditionally accepting the filing with compliance requirements outlined in the order.  

Compliance filing made on March 21, 2016.  
- One doc-less intervention was filed.  

**Order issued on July 21, 2016 conditionally accepting the filing with compliance requirements outlined in the order.**  

**Compliance filing made on August 4, 2016.** | Awaiting order. |
| RR 126—Netting of TCR Credit Portfolio *(Patti Kelly)* | ER16-1086 | Filing made on March 4, 2016 requesting a May 3, 2016 effective date  
Comments due by March 25, 2016  

One (doc-less) intervention filed on March 7, 2016.  

Received order on 5/3/16 rejecting the proposed Tariff revisions.  

Requests for rehearing filed by KCP&L/KCP&L-GMO and SPP (separately) on 6/2/16. | Awaiting order on rehearing. |
### Regulatory Report to MWG for August 2016

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Reference</th>
<th>Details</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order granting rehearings for further consideration issued on July 5, 2016.</td>
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<tr>
<td>RR 145—OOME Clarification <em>(Marisa Choate)</em></td>
<td>ER16-1912</td>
<td>Filing made on June 10, 2016 requesting a July 1, 2016 effective date. Comments due by July 1, 2016. - Eight doc-less interventions were filed. - One comment was filed.</td>
<td>Deficiency letter issued by FERC on July 28, 2016. SPP working on deficiency response to be filed on or before August 29, 2016.</td>
</tr>
<tr>
<td>Order 745 Compliance Filing <em>(Patti Kelly)</em></td>
<td>ER12-1179-024</td>
<td>On May 24, 2016, SPP made a compliance filing responding to requirements from an April 1, 2014 Order “Conditionally Accepting Compliance Filing” with Order No. 745 (Demand Response Compensation). No Tariff language was filed. Comments to filing were due 6/14/16 – no comments were filed.</td>
<td>Awaiting response from FERC.</td>
</tr>
<tr>
<td>Electric Storage Participation in Regions with Organized Wholesale Electric Markets <em>(Patti Kelly)</em></td>
<td>AD16-20</td>
<td>SPP provided a response to FERC Staff’s Data Request issued on April 11. 2016. Responses were provided on May 16, 2016.</td>
<td>Awaiting further action from FERC.</td>
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</tbody>
</table>
### Regulatory Report to MWG for August 2016

**Future Filings**

<table>
<thead>
<tr>
<th>RR</th>
<th>Title</th>
<th>Status/Anticipated Filing Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>4b  (MPRR 130b)</td>
<td>Must Offer Penalty Calculation and Rules</td>
<td>Approved by Board/Tabled by SPP Market Design/Not filed at FERC</td>
</tr>
<tr>
<td>5   (MPRR 140)</td>
<td>Mitigated Transition State Offers</td>
<td>3/1/2017; filing with FERC scheduled for late 2016</td>
</tr>
<tr>
<td>82</td>
<td>Modification of Make Whole Payment Grace Period</td>
<td>Sometime in 2017</td>
</tr>
<tr>
<td>106</td>
<td>Outage Deviation</td>
<td>3/1/2017</td>
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<tr>
<td>112</td>
<td>ECC Cleanup</td>
<td>3/1/2017; filing with FERC scheduled for late 2016</td>
</tr>
<tr>
<td>116</td>
<td>Quick-Start Real-Time Commitment</td>
<td>3Q2017</td>
</tr>
<tr>
<td>127</td>
<td>JOU Combined Option - Aggregate Energy Offer Curve</td>
<td>2Q2017</td>
</tr>
<tr>
<td>142</td>
<td>Quick-Start Multi-Configuration Ineligibility</td>
<td>3Q2017</td>
</tr>
<tr>
<td>153</td>
<td>Offer Database Roll Forward</td>
<td>2Q2017</td>
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<tr>
<td>161</td>
<td>Commitment Level Cost Recovery and MCR Settlement Design Enhancements</td>
<td>3/1/2017; filing with FERC scheduled for late 2016</td>
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<tr>
<td>166</td>
<td>Interim TCR Process Removal</td>
<td>Filing scheduled for early November 2016</td>
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<tr>
<td>167</td>
<td>TCR EESL Validation</td>
<td>1/5/2017; filing scheduled for early November 2016</td>
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