

May 1, 2019

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

RE: *Southwest Power Pool, Inc.*, Docket No. ER19-460-____
Submission of Response to Request for Additional Information

Dear Secretary Bose:

Pursuant to the Federal Energy Regulatory Commission's ("Commission") letter issued on April 1, 2019,¹ in this proceeding, Southwest Power Pool, Inc. ("SPP") submits additional information concerning the filing it submitted on December 3, 2018, in Docket No. ER19-460-000,² as amended on February 6, 2019 and February 28, 2019.

I. BACKGROUND

In the Compliance Filing, SPP, as authorized by its Board of Directors, submitted revisions to the SPP Open Access Transmission Tariff ("Tariff")³ in order to comply with Order No. 841.⁴ On February 6, 2019, SPP submitted an amended compliance filing to

¹ *Sw. Power Pool, Inc.*, Letter Requesting Additional Information, Docket No. ER19-460-000, et al. (April 1, 2019) ("April 1 Letter").

² Order No. 841 Compliance Filing of Southwest Power Pool, Inc., Docket No. ER19-460-000 (December 3, 2018) ("Compliance Filing").

³ Southwest Power Pool, Inc., Open Access Transmission Tariff, Sixth Revised Volume No. 1. References in this filing to "Tariff" refer to the version of SPP's Tariff currently in effect. "Proposed Tariff" refers to a version reflecting the revisions proposed in the Compliance Filing or Amended Compliance Filing. All capitalized terms not otherwise defined in this filing shall have the definitions assigned by the Tariff.

⁴ *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018) ("Order No. 841").

add additional revisions to Attachment AE of the Tariff.⁵ On February 28, 2019, SPP submitted a request for deferral of the effective date for the provisions filed in this proceeding.⁶ In the request, SPP also requested that the Commission issue an order no later July 1, 2019 accepting SPP's compliance filings.⁷ Numerous parties filed doc-less motions to intervene in this proceeding. Advanced Energy Economy, Energy Storage Association, NextEra Energy Resources, LLC, Tesla, Inc. filed comments.

In the April 1 Letter, the Commission directed SPP to provide additional information required to process the filing. The Commission required that responses be submitted within thirty (30) days of the date of the request for additional information. In the instant filing, SPP submits its responses to the specific questions raised in the April 1 Letter.

II. RESPONSE TO APRIL 1 LETTER

1) Creation of a Participation Model for Electric Storage Resources

Order No. 841 added section 35.28(g)(9)(i) to the Commission's regulations to require that each regional transmission organization/ independent system operator (RTO/ISO) to have tariff provisions providing a participation model for electric storage resources consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, facilitate their participation in the RTO/ISO markets.⁸

SPP states that, as a part of its participation model, it proposes to add section 2.8.3 to Attachment AE of its Tariff, entitled "Aggregators of Other Resources," which will "ensure the language is applicable to [Electric Storage Resources] that elect to aggregate."⁹ However, SPP's proposed Tariff language in section 2.8.3 of Attachment AE does not

⁵ Amended Order No. 841 Compliance Filing of Southwest Power Pool, Inc., Docket No. ER19-460-001 (February 6, 2019) ("Amended Compliance Filing").

⁶ Request for Deferral of Effective Date for Order No. 841 Compliance Filing of Southwest Power Pool, Inc., Docket No. ER19-460-002 (February 28, 2019) ("February 28 Request").

⁷ February 28 Request at 1, 4-5.

⁸ Order No. 841 at P 51.

⁹ Compliance Filing, Transmittal at 9.

explicitly reference Electric Storage Resources, but provides that “[a]n aggregator of generation must be a Market Participant, satisfying all registration and certification requirements applicable to Market Participants.”¹⁰

- a. Please explain whether the proposed section 2.8.3 of Attachment AE is intended to apply only to those Electric Storage Resources electing to use the Market Storage Resource participation model, to all Electric Storage Resources, or to all types of generation resources eligible to participate in the Integrated Marketplace.

Response:

The proposed Section 2.8.3 of Attachment AE is intended to apply to all generation Resources that a Market Participant wants to aggregate into a single Resource in the Integrated Marketplace. Order No. 841 allows storage connected to the distribution lines to be registered as Resources, as long as they meet the minimum size requirement of 0.1 MW. The minimum size may require aggregation to achieve.¹¹ With the addition of the language in proposed Section 2.8.3 of Attachment AE, aggregators may also aggregate and register any behind the meter generation as any Resource type in the Integrated Marketplace.

2) Eligibility of Electric Storage Resources to Participate in the RTO/ISO Markets

Order No. 841 added section 35.28(g)(9)(i)(A) to the Commission’s regulations to require each RTO/ISO have tariff provisions providing that a resource using the participation model for electric storage resources is eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing, including services that the RTOs/ISOs do not procure through an organized market.¹²

SPP states that, although it does not have a capacity market, Load Serving Entities (LSEs) are subject to a resource adequacy requirement.¹³ SPP further explains that an LSE

¹⁰ Compliance Filing, Proposed Tariff at Attachment AE, Section 2.8.3.

¹¹ See Order No. 841 at n. 16 (“(4) opportunities for distribution-level and aggregated electric storage resources to participate in the RTO/ISO markets”).

¹² Order No. 841 at P 76.

¹³ Compliance Filing, Transmittal at 16.

may designate capacity resources to satisfy its resource adequacy requirement and that SPP's current rules do not preclude an LSE from designating an Electric Storage Resource to satisfy its resource adequacy requirement provided that the Electric Storage Resource meets "the continuous run time requirement applicable to all Resource types."¹⁴

- a. Please define the continuous run time requirement that is applicable to all resource types designated as capacity resources for the purpose of satisfying the resource adequacy requirement. Please provide citations to the relevant existing and/or proposed tariff sections that demonstrate these provisions.
- b. Please identify and describe any additional technical, operational and/or performance requirements that resources, including Electric Storage Resources, must meet in order to qualify for designation as a capacity resource for the purpose of satisfying an LSE's resource adequacy requirement.

Response:

- a. Section 7.0 of Attachment AA of the Tariff describes the Qualification of Deliverable Capacity, Firm Capacity, and Firm Power for purposes of meeting SPP's resource adequacy requirements. The seasonal net capability rating requires availability for four continuous hours that satisfies the daily load pattern of the member. SPP Planning Criteria¹⁵ Section 7.1.5 *Procedures for Establishing Capability Ratings*, subpart 7.1.5.2(2) states:

"The total seasonal net capability rating shall be that available regularly to satisfy the daily load patterns of the member and shall be available for a minimum of four continuous hours taking into account possible fuel curtailments and thermal limits."

As referenced, Load Responsible Entities ("LREs") or Generator Owners must submit operational and capability test results in accordance with the SPP Planning Criteria. Under each of these tests, the capability must be demonstrated for a minimum of 1 hour. SPP Planning Criteria Section 7.1.1 *Accredited Capability Test* states:

"Capability Tests are required to demonstrate the claimed capability of all synchronous generating units, excluding run-of-the-river hydroelectric

¹⁴ *Id.*

¹⁵ The SPP Planning Criteria is posted on SPP's website at: <https://www.spp.org/spp-documents-filings/?id=18162>.

plants and wind/solar plants. During a Capability Test, a unit shall generate its rated net capability for a minimum of one hour period. Only minor changes in unit controls shall be made during this time as required to bring the unit into normal, steady-state operation.”

SPP Planning Criteria Section 7.1.2 *Operational Test* states:

“An Operational Test is used to demonstrate the ability of a generating unit to be loaded to its nominal rating. Operational tests shall be conducted at a minimum of 90% of claimed member’s peak season capability for a minimum of 1 hour. Any normal operating hour with the unit at or above 90% of claimed capability may be deemed an Operational Test.”

Additionally, for Resources external to the SPP Balancing Authority, Section 7.3 of Attachment AA of the Tariff requires the submission of operational test results per the requirements of the Balancing Authority where the resource(s) is located.

- b. Section 7.0 of Attachment AA of the Tariff requires that LREs or Generator Owners (a) register the Resource in the Integrated Marketplace, (b) submit operational test results in accordance with SPP Planning Criteria, and (c) submit capability test results in accordance with SPP Planning Criteria for Deliverable Capacity, Firm Capacity, and Firm Power from Resources internal to the SPP Balancing Authority. The technical, operational, and/or performance requirements for the operational and capability tests for Resources internal to the SPP Balancing Authority are described in SPP’s Planning Criteria Section 7.1.

For Firm Capacity and Firm Power from Resources external to the SPP Balancing Authority, LREs and Generator Owners must submit operational test results per the requirement of the Balancing Authority where the Resource is located.

3) Participation in the RTO/ISO Markets as Supply and Demand

Order No. 841 stated that while RTOs/ISOs should allow resources using the participation model for electric storage resources to participate as supply and demand simultaneously (i.e., submit bids to buy and offers to sell during the same market interval),

consistent with the opportunities available to other market participants, the RTOs/ISOs should not require them to do so simultaneously.¹⁶

SPP states that Market Storage Resources that are “not continuously dispatchable across 0 MWs” will choose between offering supply or bidding in demand for a given market interval.¹⁷ In the event that a Market Storage Resource cannot be dispatched continuously along an Energy Offer Curve, they must choose a direction for each market interval: either supply or demand.”¹⁸ SPP further states that “the language on non-continuously dispatchable storage is provided in an abundance of caution with expectation that it will not be needed.”¹⁹

- a. Please define, or provide the criteria used to define, a Market Storage Resource that is “not continuously dispatchable across 0 MWs.” Please provide specific citations to the relevant existing and/or proposed tariff sections that demonstrate these provisions. In particular, please clarify which “language on non-continuously dispatchable storage” SPP refers to in its transmittal.
- b. Please describe the changes that SPP would need to make to its market clearing software to accommodate simultaneous participation by these resources and provide an estimate of the cost and time to implement such changes.
- c. Please explain why including Market Storage Resources’ start-up time constraints in their resource offer parameters does not allow for SPP to accommodate Market Storage Resources simultaneous supply offers and demand bids in a given market interval.

Response:

- a. A Market Storage Resource (“MSR”) that is not continuously dispatchable across 0 MWs is an MSR that has an operational limitation that prevents it from changing states, i.e., moving from charging to discharging or discharging to charging, during a single RTBM Dispatch Interval. To be continuously dispatchable across 0 MWs, an MSR must be linearly dispatchable from the

¹⁶ Order No. 841 at P 165.

¹⁷ Compliance Filing, Transmittal at 17-18.

¹⁸ *Id.*

¹⁹ *Id.* at 18.

discharge side to the charge side, or vice versa, during the RTBM Dispatch Interval. This operational limitation occurs when any of the following offer parameters are not equal to zero during a single RTBM Dispatch Interval: (1) Minimum Charge Time, (2) Minimum Discharge Time, (3) Minimum Charge Limit, and (4) Minimum Discharge Limit. An MSR that is not continuously dispatchable across 0 MWs is described in the SPP Integrated Marketplace Market Protocols (“Market Protocols”)²⁰ Section 4.2.2.3(10).

- b. If any of the parameters listed in the response to 3(a) are non-zero, the system must understand when to ignore the parameter in order to change the state from discharging to charging and charging to discharging. This results in the unit commitment decision no longer being a two-state decision (off or on) but would instead become a three-state decision (off, charging, or discharging). SPP would use the result of the unit commitment decision to determine which state would be available for economic dispatch. The cost to implement the three-state decision in the commitment logic would be at a minimum an additional \$365,000. Optimistically, these changes would require at least another three to six months to develop revisions to the SPP Tariff and Market Protocols and would increase the implementation timeline by no less than four months. The systems that would need to change to implement the three-state commitment decision would be the market clearing engine, the market database, the market user interface, the market application programming interface, settlements, and the market commercial modeling tool. This change would also have impacts to performance for the Reliability Unit Commitment and the Day-Ahead Market. SPP would attempt to manage those performance impacts prior to implementation; however, the extent to which these impacts could be mitigated could affect both the cost of the implementation as well as increase the implementation time further.

The changes mentioned above do not include changes to the economic dispatch process. Changing the dispatch decision from a linear decision (dispatchable anywhere between the Minimum and Maximum) to an integer decision (dispatch on the charging side or dispatch on the discharging side) would be substantially more complex and would require significant redesign to existing market software.

- c. SPP is not limiting MSR offers based on start-up time. Only the values submitted for the (1) Minimum Charge Time, (2) Minimum Discharge Time, (3) Minimum Charge Limit, and (4) Minimum Discharge Limit parameters determine whether an MSR is continuously dispatchable across zero. SPP’s

²⁰ The Market Protocols are posted on SPP’s website at: <https://www.spp.org/spp-documents-filings/?id=18162>.

proposed participation model does not allow an MSR to offer multiple startup times for each state for a single market interval.

4) State of Charge Management

Order No. 841 required that, among other things, RTOs/ISOs accept wholesale bids from resources using the participation model for electric storage resources to buy energy, consistent with the rules related to wholesale purchasers of energy in each RTO/ISO, and that resources using the participation model for electric storage resources must be allowed to participate in the RTO/ISO markets as price takers, consistent with the existing rules for self-scheduled resources.²¹ In addition, Order No. 841 required each RTO/ISO to allow resources using the participation model for electric storage resources to self-manage their state of charge.²²

SPP states that it does not have a mechanism to explicitly manage state of charge for electric storage resources and that it does not propose to add any such mechanism in its compliance filing. SPP states that it “presumes that the market participant is the default manager for the Electric Storage Resource State of Charge.”²³ SPP proposes to define Self-Charging as “[w]ithdrawing Energy from the Transmission System without a Transmission Provider Dispatch Instruction to provide a service under the Tariff.”²⁴ SPP states that this definition will draw a distinction between Market Storage Resources that are following dispatch instructions to provide a service under the Tariff, and those that are managing their own state of charge and withdrawing energy from the transmission system of their own accord.²⁵

- a. Please clarify how a Market Storage Resource will “self-charge” in the Integrated Marketplace. In your response, please describe the specific commitment status, any specific values for relevant offer parameters, or other indicators a Market Storage Resource would need to submit in order to “self-charge,” and explain if there is more than one method to “self-charge.” In

²¹ Order No. 841 at P 142.

²² *Id.* at P 253.

²³ Compliance Filing, Transmittal at 32.

²⁴ Compliance Filing, Proposed Tariff at Attachment AE, Section 1.1, Definitions S.

²⁵ Compliance Filing, Transmittal at 33-34.

addition, in your response, please indicate the relevant existing and/or proposed tariff sections that outline how a Market Storage Resource can “self-charge.”

SPP proposes Tariff language stating that, in the event of insufficient capacity during the Day-Ahead Market execution, the Security Constrained Unit Commitment (SCUC) algorithm may, among other things, “de-commit Self-Charging [Market Storage Resources]”²⁶ and that, during the Day Ahead and Intra-Day Reliability Unit Commitment execution, the SCUC algorithm may “de-commit self-committed charging Resources” until the shortage is eliminated.²⁷

- b. Please clarify whether the proposed provisions to “de-commit self-committed charging Resources” to address insufficient capacity in the Day-Ahead and Intra-Day Reliability Unit Commitment processes apply to all Electric Storage Resources or only to Market Storage Resources. Please also explain any differences between the terms “self-committed charging Resources”²⁸ and “Self-Charging [Market Storage Resources].”²⁹

Response:

- a. SPP will consider MSRs to be “self-charging” when the MSR charges without market direction. This would include any intervals when the MSR 1) self-schedules the Resource as described in Section 4.1(10)(a) of Attachment AE of the Tariff and charges in real time or 2) is not able to follow Dispatch Instructions and is charging. MSRs may “self-charge” through their offer parameters (which can be changed hourly), or through their telemetered real-time SCADA operating status. MSRs have the ability to self-commit in the Day-Ahead Market or Reliability Unit Commitment processes through the commitment status offer parameter as specified in Section 4.1(10)(a) of Attachment AE of the Tariff. MSRs also have the ability to set charge and discharge maximum and minimum parameters in order to communicate their dispatchable range as proposed in Section 4.1(9) of Attachment AE of the

²⁶ Amended Compliance Filing, Proposed Tariff at Attachment AE, Section 5.1.2(1)(a)(i).

²⁷ Compliance Filing, Proposed Tariff at Attachment AE, Sections 5.2.2(2)(a) and 6.1.2(2)(a).

²⁸ Compliance Filing, Proposed Tariff at Attachment AE, Sections 5.2.2(2)(a) and 6.1.2(2)(a).

²⁹ Amended Compliance Filing, Proposed Tariff at Attachment AE, Section 5.1.2(1)(a)(i).

Proposed Tariff. In Real-Time, MSRs also have the ability to utilize the telemetered operating status (control mode 3) to communicate that the MSR is not currently dispatchable by SPP. In this case, the market clearing engine will echo the current output of the MSR. This is part of the SCADA data in Section 6.2.1.2(2) of Attachment AE of the Tariff.

- b. The proposed provisions to “de-commit self-committed charging Resources” to address insufficient capacity in the Day-Ahead and Intra-Day Reliability Unit Commitment processes apply to only MSRs. These provisions do not apply to “self-charging” Electric Storage Resources (“ESRs”) registered as another Resource type because these ESRs “self-charge” through a corresponding registered Load Settlement Location. Under our current Tariff, the Transmission Provider only commits or decommits Resources; load is never committed or decommitted. Curtailment of load is not done systematically through the Day-Ahead and Intra-Day Reliability Unit Commitment processes but, if conditions warrant, would be handled according to the SPP BA Emergency Operating Plan.³⁰ The terms “self-committed charging Resources” and “Self-Charging” both apply only to MSRs. The difference being that Self-Charging can be accomplished without self-committing by using the previously described telemetered operating status, while a self-committed charging Resource is one that has self-committed into the Market through the offer parameter described in Section 4.1(10)(a) of Attachment AE of the Tariff.

5) Energy Used to Charge Electric Storage Resources

Order No. 841 added section 35.28(g)(9)(ii) to the Commission’s regulations to require that the sale of electric energy from RTO/ISO markets to an electric storage resource that the resource then resells back to those markets be at the wholesale locational marginal price (LMP).³¹

To help implement the new requirement in section 35.28(g)(9)(ii) of the Commission’s regulations, Order No. 841 required each RTO/ISO to implement metering and accounting practices as needed to address the complexities of implementing the requirement that the sale of electric energy from the RTO/ISO markets to an electric storage

³⁰ The SPP BA Emergency Operating Plan is posted on SPP’s website at: https://www.spp.org/documents/58740/spp%20ba%20emergency%20operating%20plan_v%206.5.pdf.

³¹ Order No. 841 at P 294.

resource that the resource then resells back to those markets be at the wholesale LMP.³² Order No. 841 also required RTOs/ISOs to prevent electric storage resources from paying twice for the same charging energy (i.e., they should not have to pay both the wholesale and retail price for the same charging energy).³³

SPP notes that it does not directly meter any facility and that meter agents submit settlement meter values directly to SPP.³⁴

Under SPP's proposed Tariff provisions, electric storage resources not registered as Market Storage Resources are required to include any energy withdrawal from the transmission system in a load settlement location and are subject to the same rules as other load.³⁵ SPP's proposed Tariff provisions further specify that, as with other resources, the metering requirements for Market Storage Resources include real-time and settlement quality metering and that, for Market Storage Resources that are not directly connected to the transmission system, metering may include facilities used by the distribution company.³⁶ SPP states that, "consistent with the handling of pseudo-tied [r]esources, the actual meter values of distribution-sited Market Storage Resources may be split among the retail and wholesale use by the meter agent in both real-time and for settlement."³⁷

- a. Please explain how these proposed metering and accounting practices will meet the Commission's requirement in Order No. 841 that the sale of electric energy from the RTO/ISO markets to an electric storage resource that the resource then resells back to those markets will be at the wholesale LMP, including for electric storage resources located on a distribution system or behind the meter, regardless of whether the electric storage resource is using the participation model for electric storage resources or another participation model.

³² *Id.* at P 322.

³³ *Id.* at P 326.

³⁴ Compliance Filing, Transmittal at 42.

³⁵ *Id.* at 43; Compliance Filing, Proposed Tariff at Attachment AE, Section 2.17(1).

³⁶ Compliance Filing, Transmittal at 43; Compliance Filing, Proposed Tariff at Attachment AE, Section 2.17(2)(d).

³⁷ Compliance Filing, Transmittal at 43.

- b. Please explain how these proposed metering and accounting practices will meet the Commission's requirement in Order No. 841 that electric storage resources should be prevented from paying twice for the same charging energy.
- c. Please explain how the handling of metering and accounting for distribution-sited Market Storage Resources would be "consistent with the handling of pseudo-tie resources." In your response, please provide citations to the relevant existing and/or proposed tariff sections that demonstrate these provisions.

Response:

- a. SPP settles energy injections and withdrawals on the Transmission System at Local Marginal Price ("LMP") and calculates LMP at every injection/withdrawal location from the Transmission System. Additionally, all withdrawals are calibrated with the injections in order to assure that the reported load is neither deficient nor over reported.

ESRs that are not registered as MSRs and that withdraw energy from the Transmission System must be included in a Load Settlement Location and will pay the LMP calculated at that Load Settlement Location for the withdrawal from the Transmission System. As for ESRs that do register as an MSR, the metering process will be similar except the withdrawal is at the Resource Settlement Location. Therefore, all withdrawals from the Transmission System are always priced at LMP regardless of how they are modeled.

To the extent that an ESR is capable of injecting and withdrawing for both retail and wholesale purposes, it is the responsibility of the meter agent to report the meter values reflecting the amount of energy withdrawn from and then injected into the Transmission System separate from the reduction or increase of the retail load resulting from the withdrawal and injection for retail purposes. Note that this can only occur when the load is located at the same injection/withdrawal location. Otherwise, as with any other Resource, the ESR is withdrawing from and injecting to the Transmission System.

- b. The metering described above will ensure the ESR will only either pay retail or wholesale through the metered amount submitted to SPP. If the ESR is registered as a MSR and the distribution company is unable or unwilling to separate the charging activity from other retail service, the MSR will not be subject to settlement by SPP as described in Section 2.17(2)(g)(i) of Attachment AE of the Proposed Tariff. If the ESR is not registered as an MSR and the distribution company is unable or unwilling to separate the charging activity from other retail service, the ESR's withdrawal would be included in the retail load and settled by the retail provider.

- c. Pseudo-tied resources may be pseudo-tied for less than the full capacity of the generator to another Balancing Authority. When such a situation occurs, it is the responsibility of the meter agent to split the output reporting of the resource among the Balancing Authorities because they know the intent at the time. This occurs in both the Real-Time and settlement data. The meter agent for the storage device is the only party aware of the intent of the injection and bears the responsibility for appropriately reporting the data.

III. CONCLUSION

For all of the reasons discussed in the Compliance Filing, Amended Filing, and this instant filing, the Commission should accept the Tariff revisions submitted in the Compliance Filing and Amended Compliance Filing as just and reasonable.

Respectfully submitted,

/s/ Christopher M. Nolen

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated this 1st day of May, 2019.

/s/ Michelle Harris
Michelle Harris