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I appreciate the opportunity to participate in today's technical conference and to share with you SPP's perspective regarding Generator Interconnection issues.

State of the SPP Generator Interconnection Queue

Since changing its Generator Interconnection Procedures in 2009, SPP has performed interconnection studies for thousands of MW of generation. The majority of these studies were related to wind generation. To put this in perspective, SPP's installed wind generating capacity in 2009 was approximately 3,000MW, compared to over 12,000MW currently installed.

SPP has revised its interconnection procedures to enhance the efficiency of its interconnection process. In addition, the transition to the Integrated Marketplace and to a consolidated balancing authority has facilitated the ability to integrate larger amounts of variable resources. Finally, through efficient regional planning processes, SPP has constructed thousands of miles of EHV transmission lines representing over two billion dollars of investment that, among other uses, has facilitated the interconnection of new generation, including variable resources.

However, it is critical to understand the impact of the increased penetration of variable resources on system reliability. Consistent with the Commission's focus in this proceeding, these comments focus on concerns related to the interconnection process. The Commission needs to recognize these concerns and appreciate that independent system operators must address them in all aspects of their functions, including generator interconnection, to ensure the reliability of the electric gird is maintained.

In SPP, Interconnection Service for variable generation must be reviewed in a larger context. As noted, SPP currently has over 12,000MW of wind generation in service. SPP's minimum load is approximately 20,000MW. Typically, wind generators are likely to be operating at maximum capability during low load conditions. Due to the operational characteristics of wind and production tax credits – e.g. wind generation is not as responsive to market price signals as other types of generation - this can create operational issues during periods of high wind and light load.

Looking forward, SPP has an additional 10,000 MW of signed GIAs for wind generation. Although it cannot be predicted with certainty, for the purposes of this discussion, it is reasonable to assume that of this amount, 2-3 GW may go into service in the next one to two years. It should also be noted that this includes the 2,300MW of wind under signed interconnection agreement for the Western Area Power Administration (WAPA) that recently became part of the SPP region.

This potential increase in wind penetration raises issues as it would only increase the percentage of wind relative to low load conditions in SPP. These concerns are exacerbated by the submittals of the last two cluster windows in SPP's open season

process. Specifically, the DISIS-2015-002 study cluster, which consists of requests that were submitted through September 30, 2015, included 10,000MW of generation, most of which was wind generation. Proceeding into the Interconnection Facilities Study, which is intended to signify the viability of interconnection requests, 7,750MW of the 10,000MW in the study cluster moved into this next step of the process. This is fairly indicative that the hurdle to prevent speculative projects from moving forward into the Interconnection Facilities Study is not high enough. Additionally, the DISIS-2016-001 study cluster, which window closed on March 30, 2016, included over 11,000MW of generation. Similar to the DISIS-2015-002 study cluster, most of the 11,000 MW in this cluster was wind and solar. Accordingly, just these last two study windows contain over 18,000MW of variable generation, which is in addition to the 22,000MW of wind that have executed GIAs. With a minimum load of approximately 20,000MW, this amount of wind generation, which is twice the minimum load, cannot be studied without reducing the dispatch or even de-committing conventional generation in interconnection studies.

With respect to the practical impact of the wind generation interconnection numbers described above, they are rising to a level that exceeds any expectations for permissible wind penetration at this point. To date, SPP's observed wind peak has been 10,989MW with a 43% penetration level during that time period. SPP's highest observed wind penetration level is 49%. While SPP has recently completed phase 1 of its latest Wind Integration Study, the highest level of wind penetration the study evaluated was 60% under minimum load. While phase 2 of the study has not yet begun, SPP has not studied penetration levels higher than 60%.

To better understand the impact of such high wind penetration levels, SPP intends on delaying the completion of the DISIS-2016-001 cluster study. This is necessary because SPP does not have the load within its footprint to analyze the increased amount of variable generation in the queue due to the addition of this cluster. The DISIS-2016-001 study will resume once the requests in the DISIS-2015-001 study, which contains 2,700MW of wind and solar generation, and the DISIS-2015-002 study, which contains 7,750MW of wind and solar generation, have signed Generator Interconnection Agreements. The purpose of this delay is to gain a better understanding of the amount of wind from those studies that is most likely to materialize on the system. This delay and the corresponding informational value it provides (*i.e*. understanding the amount of wind that may actually be placed in service) will allow SPP time to perform phase II of the Wind Integration Study in an informed, and therefore, effective manner. Specifically, it will enable SPP to determine whether Generator Interconnection Agreements need to prescribe additional conditions to accommodate higher amounts of wind generation. These additional requirements could include, but are not limited to, primary frequency response and dynamic voltage control[1].

[1] Interconnection Requests in the DISIS-2016-001 cluster will have the option to request Interim Interconnection Service in accordance with Section 11A of the GIP.

Time to complete the interconnection process

In SPP, the length of time it can take to complete the interconnection process can vary for many reasons. However, SPP's procedures facilitate the goals of participants by offering flexibility in terms of the stage at which they enter the process. Interconnection Customers have the option of entering into the Feasibility Study, the Preliminary Interconnection System Impact Study, or proceeding directly to the Definitive Interconnection System Impact Study. For Customers that are not ready to meet the milestones of the DISIS study, the Feasibility and PISIS studies are viable alternatives for entering into the queue, receiving study results, and likewise being able to request the models used in the study. While this provides flexibility for participants relative to their business objectives, there are necessarily different timelines associated with each study phase. The timelines are related to the scope/purpose of the studies relative to the complete study process – earlier studies provide information to the participant but the participant must ultimately go through the complete study process. Accordingly, going through the preliminary study processes adds additional study cycles, which impacts the total length of time in the queue. Going through the Feasibility study can add 3-6 months to the study time, and the PISIS study can add another 6 months.

In addition to the typical timelines associated with each phase of the generator interconnection process, there are also practical impacts associated with the variable generation development focus in the western part of the SPP footprint. For Customers whose requests are located in the central and eastern part of SPP's footprint, generators can usually obtain a GIA within 12-15 months after the study process began. For

requests on the western edge of the footprint, which has seen more interconnection requests than the other areas, the existing transmission infrastructure in the this area cannot support the amount of generation requests for that area. This is despite the fact that SPP has approved in excess of two billion dollars of transmission projects that facilitate west to east transmission in SPP. The result is that interconnection requests in the western part of the footprint can take longer to process than in other parts of the SPP region. A major reason this occurs is due to the need to restudy the impacts of remaining interconnection requests as a result of withdrawals of higher queued requests from the queue. Thanks to SPP's recent interconnection queue reforms, there recently has been little backlog in the SPP queue. That has changed with the last two cluster study windows.

Going forward, the primary concern with respect to potential study delays is driven by the submittals in the last two cluster study windows. The anticipated completion of these two studies is expected to take two to three years. Although there are multiple factors contributing to queue backlogs, the introduction of numerous speculative requests can potentially undermine the effectiveness and efficiency of the interconnection process, which, in turn also potentially creates a barrier to entry to viable projects.

Study Costs

SPP has set study deposits in the tariff for Feasibility and Impact Studies. While SPP's impact studies are large studies that costs hundreds of thousands of dollars in both internal SPP staff time and external consultant time (DISIS-2015-002 had a cost of

$940,000), the cost per customer is fairly low due to the large volume of requests that have been present in the last few studies (a 200MW request was charged $16,000) .

Information available to Customers

SPP has prior studies and study guidelines posted on its OASIS. Entities can review these for potential impacts, cost estimates, and study assumptions. SPP also provides base case models to entities that request them in accordance with the interconnection procedures. Finally, SPP provides the study models to customers that have completed studies.

Regarding curtailments, the generator interconnection study is not a market study or a wind integration study. Rather, consistent with its purpose, it evaluates whether generation in a given local area can interconnect to the transmission system, not the number of potential curtailment hours a generator may expect. The large majority of interconnection agreements in SPP are for Energy Resource Interconnection Service (ERIS), which allows generators to deliver to the system on an "as-available" basis. The scope of the interconnection studies is appropriate given the independent functions performed by SPP (and other ISOs/RTOs). The focus of these studies is to identify upgrades to interconnect, not market curtailments.

Variable generation modeling

Again, the focus of the generation interconnection process is to identify upgrades necessary to interconnect. To accomplish this in the most effective and efficient manner,

the generator interconnection process studies generation, including variable generation, at its full nameplate value. Modeling the generator at 100% of its output implicitly considers the impact of the unit at lower levels of output. This is consistent with the purpose of the study (understanding reliability impacts), and also mitigates the potential for prolonged studies due to the need to run the studies over all generator outputs.

With respect to variable generation capacity factors, SPP assumes 100% nameplate for the local area under study. SPP has kept the nature of the interconnection study somewhat local (75 mile radius of the study generators) as SPP has other processes for the delivery of energy and regional planning. This approach makes sense for the SPP region, because if the local area is designated as the entire SPP footprint, all generation (existing and under study) would need to be dispatched, which could total over 70-80GW of generation. That would be impossible to evaluate under any load conditions.

Triggers for Restudies

Restudies are limited to the reasons listed in the GIP and GIA. These include the withdrawal of higher queued requests, termination of interconnection agreements, or changes in reliability criteria[2]. These are reasonable bases for restudies of generator interconnection studies, which are focused on grid reliability, because they potentially change the reliability impact of lower queued projects.

[2] Article 11.4.2 of the pro-forma GIA

Restudies are necessary to prevent the construction of unnecessary transmission projects. However, in the SPP region, SPP believes that currently there are too many restudies occurring due to project withdrawals. For example, in SPP certain clusters studies have undergone up to eight restudies to address project withdrawals. To address this issue, interconnection rules/procedures should further reduce the incentives to engage in speculative requests. While SPP's current procedures require a deposit to enter into the Interconnection Facilities Study, there are still many avenues for the deposits to be refunded. If customers knew that deposits were not refundable, it would prevent speculative requests from proceeding to the Facilities Study phase (i.e. 7,750MW of generation moving into Facility Study in one cluster this year). This, in turn, would prevent the need for restudies years down the road.

Affected Systems

There are issues with respect to coordinating with affected systems. For example, some transmission providers' interconnection areas span multiple states while some use much smaller areas. Some assume that generators will have firm delivery into an energy market and may have relatively less stringent requirements for obtaining that delivery product, while others require transmission service for delivery while assuming more stringent requirements.

Modifications

Most modification requests in SPP are related to scenarios where entities are able to keep their queue positions and/or executed GIAs active without having them terminated or withdrawn.

Modifications are necessary to manage legitimate changes to projects. However, modifications rules should mitigate the ability to use the procedures to unjustifiably maintain a queue position. This an inefficient and ineffective use of the interconnection process.

One means to mitigate this potential impact to generator interconnection processes, is to establish reasonable deadlines for interconnection customers to build generation. This would require Interconnection Customers to have legitimate plans for building generation prior to entering the queue, and would mitigate the use of modification rules to unjustifiably prolong a queue position. SPP has deadlines in its current GIA to mitigate this issue, but it also has dozens of GIAs under the older process that do not have the same deadlines.

Withdrawals

Withdrawals are the primary reason for restudies and the length of time it takes to complete the interconnection process. This issue was discussed above – please refer to the prior related comments.

SPP notes that it has preliminary study processes for customers to assess the viability of projects. However, these are not utilized often, most likely because there are

no incentives to use the preliminary assessment processes. Because there is no financial risk to submitting a project directly to the queue process (because deposits are returned if a project is withdrawn) there are effectively no barriers to moving a project to this phase regardless of its viability.

One way to provide entities with a way to understand the potential costs of interconnection, while also mitigating the potential impact that withdrawal of unviable projects has on the interconnection process is to impose stronger rules that result in the loss of deposits at more advanced stages of the interconnection study process. For example, a customer may receive the full refund of its deposit for the impact study phase (SPP currently has this free pass), but for later phases – e.g. the Facility Study - the entity would lose its deposit if they do not construct the project within a reasonable time period.

Coordination between SPP, Transmission Owners, and Interconnection Customers

SPP coordinates with Interconnection Customers on the front end of the study to make sure that all information has been received. SPP provides information and checklists to customers prior to their submitting requests to make sure those requests are submitted in a complete manner. SPP coordinates with Transmission Owners during the entire study process by providing all customer applications to the respective transmission owners, by requesting transmission owner estimates for facilities during the DISIS study, and by requesting input from the transmission owners to relieve impacts found during the study analysis. SPP relies on the transmission owners to perform the Interconnection Facilities Study portion of the interconnection process. Due to the enormous volume of

interconnection requests in SPP, the size of recent studies, and the limited time allowed by the interconnection procedures to complete those studies, coordination could be improved, but most likely would require more time to complete Impact Studies, possibly at least nine months to complete as opposed to the four months currently allowed by the tariff.

Interconnection Configuration – designation of Network Upgrades, etc.

The most common dispute SPP had over interconnection configuration is for the customer's desire for the Transmission Owner to build a new designated substation for the project interconnection. SPP has seen this request from Interconnection Customers when a viable substation already exists for the interconnection of the project. In this scenario, SPP does not support the construction of a new designated substation for a project. This is not only not necessary from a system planning perspective, it also results in other issues. For example, the construction of a designated substation for a project would result in having the obligation to pay the generator credits for its expenditures for the substation. In addition, customers also have demonstrated their ability to deny access to the substation to subsequent generators in the area by not granting land easements into the new substation, which, in turn, potentially provides the incentive for subsequent generators to request the construction of new designated substations for their projects. These issues are further exacerbated by the fact that the operations and maintenance costs for the new designated substation would be borne by ratepayers. These results are not warranted when there is an existing substation suitable for interconnection of the project.

If an Interconnection Customer desires to have its own interconnection substation, it should pay for all expenses toward that substation, including operations and maintenance for the life of the facility, thereby not treating the substation as a Network Upgrade.

Again, I appreciate this opportunity and will be glad to answer any questions.