2017 Deliverability Study Scope

Resource Adequacy

SPP Southwest Power Pool

Revision History

Date or Version Number	Author	Change Description	Comments
1/19/2017	SPP Staff	Initial Draft	
4/20/2017	SPP Staff	Removed “Items to Consider” section	These items were discussed vetted through the SAWG

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Introduction

The Deliverability Study provides the option to rely upon a pre-established determination of deliverability to allow a Load Responsible Entity (LRE) to meet its Planning Reserve Margin (PRM) portion of its Resource Adequacy Requirement in excess of its Net Peak Demand, including losses, without requiring firm transmission service. Firm transmission service, whether for network or point-to-point service, will continue to be required for an LRE to count generating capacity toward serving an LRE's forecasted Net Peak Demand for the upcoming Summer Peak Season.

Annually, each LRE in SPP must report capacity committed to supply its Resource Adequacy Requirement. PRM is required to ensure resources are readily available in the situation of unexpected loss of generation or unexpected significant increase of demand. ~~Capacity which is deliverable~~Capacity, which is deliverable, will allow a LRE to rely on available transmission capacity, for its PRM portion of its Resource Adequacy Requirement, in short near-term timeframes, without sacrificing reliability.

The Deliverability Study will analyze all generation registered in the SPP Balancing Authority Area to determine if the associated capacity is deliverable to all demand in the Balancing Authority Area and not to specific delivery points, model areas, or zones.

Executive Overview

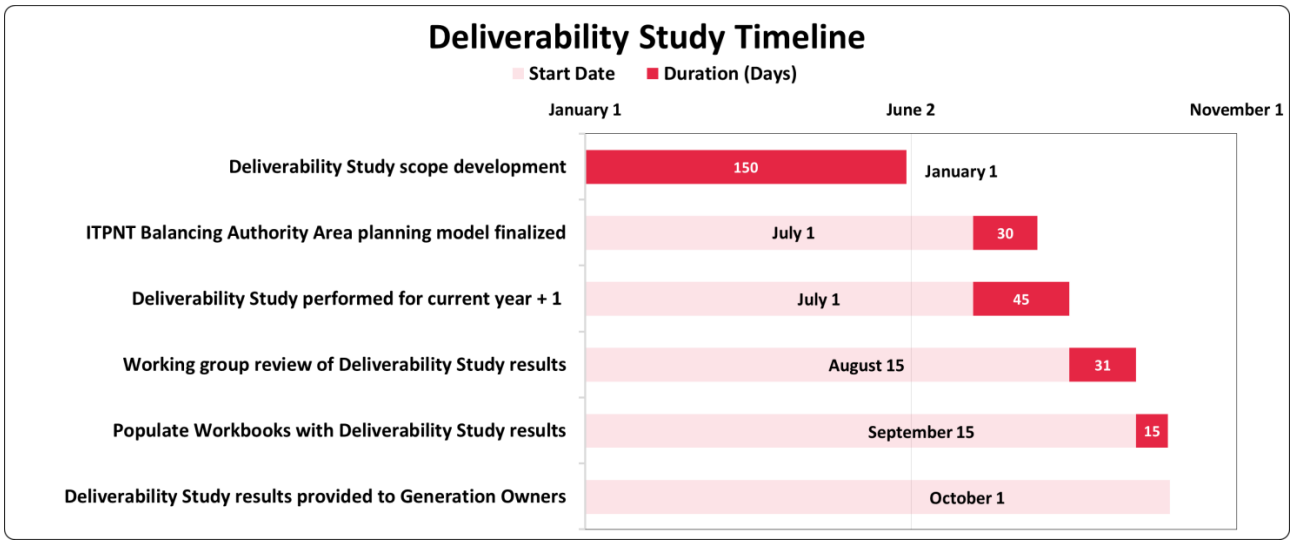
The Deliverability Study process starts with scope definition and continues with refinement progression. The scope of work and assumptions for the Deliverability Study are thoroughly vetted using the SPP stakeholder process. Once the scope is finalized, input data is collected based on the requirements listed in the scope. The data is then modeled using the appropriate software along with the assumptions for the study. This study will be performed for individual generating plants registered in the SPP Balancing Authority Area while incorporating a First Contingency Incremental Transfer Capability (FCITC) transfer limit analysis. Final metric results are compiled into a summary report and presented to the SPP Supply Adequacy Working Group. The results for each plant will be populated in the applicable generator owner's Workbook[1] and posted to TrueShare no later than October 1st.

[1] Example of the Resource Adequacy Workbook (Workbook): https://www.spp.org/Documents/45077/Resource%20Adequacy%20Workbook.xlsm

Objective

The Deliverability Study provides an assessment for the amount of the deliverable capacity in the SPP Balancing Authority Area.

Study Timeline



Deliverability Study Timeline

1. Deliverability Study scope development
2. Integrated Transmission Planning Near Term (ITPNT) Balancing Authority (BA) planning model finalized
3. Deliverability Study performed for current year + 1
4. Working group review of Deliverability Study results
5. Populate Workbooks with Deliverability Study results
6. Deliverability Study results provided to generator owners

Deliverability Study Process Steps

The steps listed below are performed January 1 to October 1 of the process timeline.

Step 1: Create scope
Step 2: Gather and modify input data
Step 3: Model data using TARA software
Step 4: Perform Deliverability Study
Step 5: Evaluate results
Step 6: Present results to the Supply Adequacy Working Group
Step 7: Compile results into individual generator owner Workbooks
Step 8: Post Workbooks on TrueShare
Step 9: Notification of Deliverability Study results posting

Input Data

Software

The Deliverability Study will utilize a PowerGEM© software called Transmission Adequacy & Reliability Assessment (TARA). TARA is a steady-state power flow software tool with modeling capabilities and analytical applications that extend beyond traditional power flow solution. Using extraordinarily robust and speedy linear (DC) and non-linear (AC) power flow calculations, TARA has the capabilities to perform data checking, N-1reliability analysis, transfer limit calculation, preventive and corrective dispatch, critical facility identification, reactive analysis, outage analysis, model building, and region specific tools for generation deliverability and reserve requirements analysis. The multi-transfer limit function in TARA will be used to perform the Deliverability Study.

Base Models and Topology

SPP staff and members develop planning models representing specific system conditions as part of the ITPNT process[2]. SPP members request generator capability data from the appropriate entities for resources and reflect the capability ratings in the planning models. Transmission projects are developed through the ITPNT process to address thermal and voltage needs in each model. Based on these system conditions, the ITPNT BA model demonstrates expected transmission system flows under a Security Constrained Economic Dispatch (SCED) similar to the Integrated Marketplace dispatch. The ITPNT BA will be utilized for the Deliverability Study as a representation of the Resources registered in the Integrated Marketplace and economically dispatched. Additional information about the ITPNT BA model can be found in the ITPNT Scope[3].

The topology included in the Deliverability Study will be for the current year +1 forecasted Summer Peak Season. The 2017 Deliverability Study will utilize the 2018 summer season ITPNT BA model. The capacity deemed deliverable from the Deliverability Study can be used for up to two consecutive summer peak seasons beginning with the upcoming summer peak season.

Subsystem File

The subsystem file will be created based the site and point of interconnection for each resource when determining the grouping of resources.

Transfer File

The transfer file will be created based on the difference of the dispatched capacity and the nameplate capacity of the plant. For example, a plant with the nameplate capacity of 200 MW is dispatched at 150 MW. The amount for the transfer analysis would be 50 MW.

[2] Link to the latest ITP Manual: https://www.spp.org/engineering/transmission-planning/
[3] Link to the latest ITPNT process scope: https://www.spp.org/engineering/transmission-planning/

Monitored Elements File

The monitored elements will include all SPP transmission facilities 100kV and above as well as first tier area transmission facilities 230kV and above.

Contingency Elements File

The contingency elements will include all SPP transmission facilities 100kV and above as well as first tier area transmission facilities 230kV and above.

Excluded Contingencies File

The excluded contingencies file will include invalid contingencies reported for the ITPNT process.

Study Process and Assumptions Summary

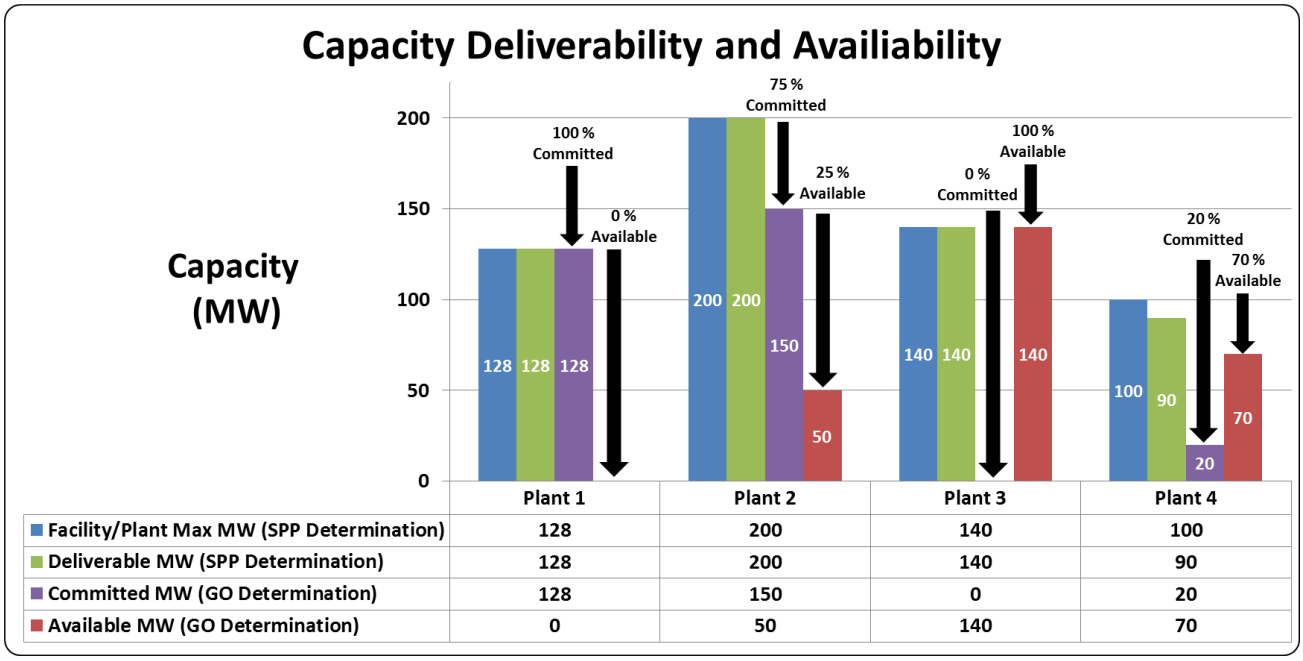
The current-year +1 summer ITPNT Balancing Authority Area planning model will be used to evaluate deliverability of each plant in the Balancing Authority Area. The initial assumption is that any resource generating in the model is automatically deliverable to the SPP Balancing Authority Area for the dispatched output since the model dispatches around constraints and sets amount dispatched for each resource. Each modeled plant that was not committed or dispatched at its maximum output is then evaluated individually to determine that plant's total deliverability. Each plant's deliverability amount will be the amount deliverable to the SPP Balancing Authority Area from the studied plant.

A plant's maximum output is the summation of the maximum output of all resources at the same site. Each plant is studied to capture the maximum possible MW injection at the point of interconnection as opposed to an individual resource analysis that might only identify the MW deliverability of a plant's largest resource. A transfer level equal to the difference between the facility/plant max capacity and the amount dispatched in the model is determined for each plant. The transfer will be analyzed as a generation to load transfer sinking into SPP Balancing Authority Area so as the individual plant generation is increased; the SPP Balancing Authority Area demand uniformly increases. A FCITC analysis of each transfer will be performed to determine the deliverability of the resources. If the FCITC is equal to the transfer amount then the resource is fully deliverable to the SPP Balancing Authority Area. SPP facilities 100 kV and above will be included in the FCITC analysis. Limits associated with invalid contingencies and Transmission Operating Guides will be excluded as constraints. A three percent transfer distribution factor threshold will be used to analyze constraints impacted by the transfer.

Applicability

The SPP Balancing Authority Area deliverability amount allows an entity to use the SPP Balancing Authority Area deliverability amount to contract capacity. This is similar to the Integrated Marketplace simulated approach so that as demand increases across the SPP Balancing Authority Area, individual plant generation increases accordingly to serve the incremental Balancing Authority Area demand. This approach allows for demand to be served with the pool of SPP resources based on an economic dispatch regardless of long-term firm transmission service amounts.

The amount of committed capacity, as determined by the owner of the Resource, would be subtracted from the amount determined to be deliverable. This amount will reflect the capacity that could be made available for purchase for the PRM portion of the Resource Adequacy Requirement. (See Figure 1 below for an example.)



	Plant 1	Plant 2	Plant 3	Plant 4
Facility/Plant Max MW (SPP Determination)	128	200	140	100
Deliverable MW (SPP Determination)	128	200	140	90
Committed MW (GO Determination)	128	150	0	20
Available MW (GO Determination)	0	50	140	70

Figure 1: Chart representation of deliverable, committed, and available capacity

Based upon these results, the owner of a Resource can work with applicable LREs to develop a plan for acquiring the necessary capacity for Planning Reserve Margin requirements. An LRE may enter into a capacity contract to meet all or part of its PRM shortfall with any resource(s) within the SPP Balancing Authority Area, if the resource has deliverable capacity that is not already committed. In other words, deliverable capacity, in excess of the committed capacity, from a resource is available to be contracted to a LRE. The Deliverability Study results of each annual study will extend for two consecutive Summer Peak Seasons[4].

[4] The Summer Peak Season is defined as June 1st to September 30th.

Jointly Owned Units (JOU)

Deliverability Study results for each Resource will consist of the total plant deliverability percentage and MW amounts without generator ownership percentage breakdown. The MW deliverability amount based on percentage of generator ownership will be determined by each owner of a Resource.

Reporting and Deliverables

The Deliverability Study scope and results will be reviewed and approved by the Supply Adequacy Working Group with additional review by the Operational Reliability Working Group and the Transmission Working Group.

The Deliverability Study results will be inserted into individual Workbooks for each owner of a Resource and posted to TrueShare no later than October 1.

TWG Recommendation's

Monitor known System Operating Limits (SOLs) for stability and voltage issues during the analysis, down to 69 kV. The SOLs will be captured from the book of flowgates.

Currently the study is performed on multiple generating units at the same point of interconnection (same site). (Current)

The TWG recommends performing the FCITC analysis on multiple generating units, not at the same point of interconnection (same site), versus ramping up each generator individually. A process will need to be created for identifying the grouping of generation. (Identify Units)

Methodology for Grouping Multiple Generating Units:

- Generators at the same plant are grouped together
- Generators connected > 300kV
    - Generators are grouped together that share a PTDF impacts > 25% on any transmission element in SPP
- Generators connected < 300kV
    - Generators are grouped together that share PTDF impacts > 25% on transmission elements < 300kV