2016 ITPNT

2016 Integrated Transmission Planning Near-Term Scope

April 14, 2015
Final
Engineering

SPP Southwest Power Pool

Revision History

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Overview

This document presents the scope and schedule of work for the 2016 Integrated Transmission Planning (ITP) Near-Term Assessment. This document will be reviewed by the Transmission Working Group (TWG) beginning February 2015, with the expectation of approvals from the Market Operations and Policy Committee (MOPC) and the Board of Directors (BOD) in April 2016. The assessment begins in April 2015 and is a 12-month study scheduled to be finalized in April 2016.

Objective

The ITP process is an iterative three-year planning process performed in accordance with Attachment O of the SPP Open Access Transmission Tariff (SPP OATT) that includes 20-Year, 10-Year and Near Term Assessments (ITP20, ITP10 and ITPNT, respectively) designed to identify transmission solutions that address both near-term and long-term transmission needs. The ITP20 is conducted over the first half of the three-year cycle and the ITP10 is conducted over the second half of the three-year cycle. The ITPNT is an assessment that is performed annually in order to evaluate the reliability of the SPP transmission system in the near-term planning horizon, collaborate on the development of improvements with stakeholders, and assess system upgrades at all applicable voltage levels required in the near-term planning horizon to meet reliability criteria. The 2016 ITPNT's primary focus is identifying solutions required to meet the reliability criteria defined in OATT Attachment O, Section III.6. The process includes coordination of transmission plans with the ITP20, ITP10, Aggregate Study, and Generator Interconnection processes.

The 2016 ITPNT study will generate an effective near-term plan for the SPP Regional Transmission Organization (RTO) planning region by identifying solutions to potential violations for system intact (Basecase) and (N-1 contingency) conditions using the following principles:

- Identifying potential reliability-based problems (NERC Reliability Standard TPL-001-4 P1 events respecting SPP and local criteria)
- Utilizing Transmission Operating Guides (TOGs)
- Developing additional mitigation plans including transmission upgrades to meet the region's needs and maintain SPP and local reliability/planning standards

The 2016 ITPNT study horizon will include modeling of the transmission system for five years (*i.e.*, 2020). This five year look allows enough lead time requirements such that the Notification to Construct (NTC) issuance can be provided in time for project owners to complete their projects by the identified need date. In order to comply with FERC's Order 1000, SPP developed the Transmission Owner Selection Process, as outlined in Attachment Y of the SPP Tariff. In accordance with Attachment O, Section III.8.b, SPP shall notify stakeholders of identified transmission needs and provide a transmission planning response window of thirty (30) days during which any stakeholder may propose a Detailed Project Proposal (DPP). SPP shall track each DPP and retain the information submitted pursuant to Attachment O, Section III.8.b(i).

The SPP ITP process is open and transparent and allows for stakeholder input through the FERC Order 1000 and Order 890 processes. The Transmission Working Group (TWG) will have opportunities to review and vet components of the 2016 ITPNT process, which includes but is not limited to the following items: model development, reliability analysis, transmission plan development, seams impacts, and the 2016 ITPNT Report. In addition, SPP will present the ITPNT Project Plan at the SPP transmission planning summits as an opportunity for SPP stakeholders to provide feedback. SPP will also coordinate the study results with first-tier neighbors.

Data inputs

For the 2016 ITPNT, SPP will consider power flow models with individual load balancing areas, as well as models with a Consolidated Balancing Authority (CBA Scenario). SPP will analyze 2017 and 2020 models in the 2016 ITPNT for the following seasons: 2017 summer peak, 2017 winter peak, 2020 light load, 2020 summer peak, and 2020 winter peak. A total of 15 model scenarios will be analyzed as part of the 2016 ITPNT Assessment. The CBA model will include a wind dispatch with a bid cap based upon wind generation past performance max output. The modeling set is summarized in the table below.

Description	Scenario 0	Scenario 5	CBA
Year 2 peak	ITPNT 2017SP ITPNT 2017WP	ITPNT 2017SP ITPNT 2017WP	ITPNT 2017SP ITPNT 2017WP
Year 5 peak	ITPNT 2020SP ITPNT 2020WP	ITPNT 2020SP ITPNT 2020WP	ITPNT 2020SP ITPNT 2020WP
Year 5 off-peak	ITPNT 2020L	ITPNT 2020L	ITPNT 2020L

A. ***Load***

The load density and distribution for the steady state analysis will be provided through the Model Development Working Group (MDWG) model building process[1]. The load will represent each individual load balancing area's peak conditions per season (*i.e.*, non-coincident conditions for the SPP region). Resource obligations will be determined for the footprint taking into consideration what load is industrial (non-scalable) and residential, commercial and agricultural (scalable) type loads.

B. ***Generation Resources***

Existing generating resources will be represented in the power flow models taking into account planned retirements. New generating resources included in the power flow models will be limited to resources with a FERC-filed Interconnection Agreement not on suspension or resources with an executed Service Agreement. Exceptions to these qualifications are addressed in the ITP Manual.

C. ***Model Topology***

The topology used to account for the transmission system, excluding generation, will be the current transmission system and the following transmission upgrades: SPP upgrades that have been approved for construction, SPP Transmission Owner's planned (zonal sponsored) upgrades, and first-tier entities' planned upgrades (first-tier entities listed below). The model development processes for SPP MDWG and SERC account for long-term transmission line outages of 6 months or longer as forecasted by each member transmission owner.

[1] SPP MDWG Model Development Procedure Manual

First-tier entities include the following:

- Associated Electric Cooperative, Inc. (AECI)
- Alliant Energy West (ALTW)
- Ameren Missouri (AMMO)
- CLECO Corporation (CLEC)
- Dairyland Power Cooperative (DPC)
- Entergy Arkansas (EAI)
- Entergy Electric System (EES)
- Great River Energy (GRE)
- Lafayette Utilities (LAFA)
- Louisiana Energy and Power Authority (LEPA)
- MidAmerican Energy (MEC)
- Montana-Dakota Utilities Co. (MDU)
- Otter Tail Power Company (OTP)
- Saskatchewan Power Co. (SPC)
- Xcel Energy North (XEL)

D. ***Transmission Service***

To account for confirmed long-term transmission service SPP will develop scenario models representing individual load balancing areas. The first scenario (S0) is built similar to the MDWG models but removes any non-firm transmission service, removes generation without signed interconnection agreements, removes topology that is projected or unbudgeted and incorporates transactions provided by members. Wind generation is accredited according to SPP Criteria. The second scenario (S5) sets all wind generation to maximum firm service, then all reservations between companies are set to maximum firm service as much as load will allow on a pro rata basis.

E. ***Consolidated Balancing Authority***

In order to account for the impacts of the Integrated Marketplace on the SPP footprint, a Consolidated Balancing Authority (CBA) scenario model will be developed as part of the 2016 ITPNT Assessment. For each CBA scenario SPP will be modeled as a single Balancing Authority with interchange modeled across the SPP seams. The CBA scenario will utilize the SPP portion of the NERC Book of Flowgates updated with information from the 2016 Flowgate Assessment, 2016 ITPNT transmission topology and latest ITP10 economic generator data. The goal will be to attain a security-constrained unit commitment and economic dispatch (SCUC/SCED) for each year and season identified as part of the 2016 ITPNT Assessment. In an effort to capture future constraints that are not currently in the NERC Book of Flowgates due to seasonal topology changes and load growth, a constraint assessment will be completed to determine if any constraints should be added, removed, or modified before the SCUC/SCED are developed. The updated constraint list will be reviewed and approved by the TWG before being applied to the CBA scenario models.

Making use of the economic data from the latest ITP10, an economic DC tool will perform a security constrained economic dispatch on the SPP footprint to deliver the most economical power around the given constraints. An N-1 contingency analysis described in subsection A (Load) of the Analysis

section above will then be performed on each CBA power flow model. The Eastern Interconnect generation outside of SPP will remain unchanged.

F. ***Demand Response***

Demand response will be incorporated into the models through lower load and capacity forecasts, which is developed as described in subsection A (Load) above.

Analysis

A. ***Steady State Assessment***

The steady state assessment will use the following models: 2017 summer peak and winter peak, 2020 light load, summer peak and winter peak using individual load balancing area's dispatch. SPP will also use Consolidated Balancing Authority models of these same seasons. An N-1 contingency analysis will be performed for the peak and off-peak cases for facilities 60 kV and above in SPP and facilities 100 kV and above in first-tier. The Integrated System (IS) will be included in the analysis as part of the SPP planning region. All facilities 60 kV and above in SPP and 100 kV and above in first-tier will be monitored for this analysis in consideration of 60 kV and above solutions to the potential violations identified. SPP will use engineering judgment to resolve "blown up" and non-converged cases. If these cases cannot be solved, the potential violations will be posted in the needs list specifying the result of the analysis (*e.g.*, voltage collapse).

B. ***Solution Development***

SPP will analyze a pool of possible solutions to perform needs assessment to develop the 2016 ITPNT plan. This pool of solutions will be comprised of DPPs submitted for the 2016 ITPNT, SPP upgrades approved for construction, local reliability planning studies by Transmission Owners (TOs), SPP-identified solutions, and any other solutions proposed by SPP stakeholders.

C. ***NERC Reliability Standard TPL-001-4***

SPP will identify potential violations using the NERC TPL-001-4 standard Table 1 planning events that do not allow for non-consequential load loss or curtailment of firm transmission service. These potential violations will be posted on a secure website for informational purposes only.

D. ***Shunt Reactive Requirements Assessment***

If any 300 kV and above upgrades are identified as solutions and presented in the 2016 ITPNT Project Plan, a line-end reactive requirements analysis will be performed for those solutions. This analysis will be performed on the 2020 light load models by opening each end of the new line to identify preliminary shunt reactive needs. The analysis will provide the amount of MVars needed to maintain both 1.05 p.u. and 1.1 p.u. voltage at both ends of the new line. After performing the light load analysis, the reactor will be studied under steady state summer peak conditions to determine if switched capability is needed. This analysis will provide an indicative amount of reactive needs before design level studies are completed. This analysis will be completed with the entire 2016 ITPNT Project Plan.

E. ***Stability Analysis***

SPP will not perform stability analysis as part of the 2016 ITPNT Assessment.

F. ***Final Reliability Assessment***

After all upgrades have been identified and incorporated into the power flow models, a steady state N-1 contingency analysis will be conducted to identify any new potential violations.

Seams

In the development of the 2016 ITPNT Project Plan, SPP will review expansion plans of neighboring utilities and RTOs and include first-tier parties' planned projects in the 2016 ITPNT models. Based upon that review, Staff may take into account other external plans. The IS will be included as a member and the new first-tier areas are ALTW, DPC, GRE, MEC, MDU, OTP, SPC and XEL, as previously identified. The models used in the 2016 ITPNT incorporate the latest data from the neighboring utilities and RTOs through the Multiregional Modeling Working Group (MMWG) model development process. In addition to the MMWG model development process, SPP will coordinate with first-tier neighbors to receive any additional model updates to ensure SPP's models are aligned with how first-tier neighbors plan their own systems.

SPP will also coordinate the results of the steady state assessment with first-tier neighbors highlighting needs relevant to the seam with that neighbor. As a part of this coordination, SPP will also solicit first-tier neighbors to participate in the solutions development portion of the study by submitting potential projects to be considered.

Cost-effectiveness testing will be performed for all potentially beneficial seams projects. This additional cost-effectiveness testing will identify what level of cost sharing would be needed for each seams project to make the seams project a more cost-effective solution than an SPP regionally-implemented solution.

SPP will coordinate the potential impacts of the 2016 ITPNT with neighboring systems. This coordination is conducted in accordance with the relevant Joint Operating or Seams agreements. In the absence of such an agreement, SPP will contact the relevant entities to discuss the potential impacts on their systems.

Study Process

1. The resource additions and retirements, load profiles, and transmission service inclusion processes will be developed through stakeholder reviews.

2. The TWG/MDWG will oversee the development of the models that incorporate the assumptions developed in step #1 above, including review of data and results. A model review will be conducted by MDWG and TWG to verify the models before analysis starts.

3. An initial steady state analysis will be performed using applicable planning standards on power flow models that represent the applicable load profiles and generation dispatch per year and season. The assessment will be for the horizon years one (1) through five (5). Within SPP, all facilities 60 kV and above in the models will be monitored and within the first-tier for all facilities 100 kV and above will be monitored in this analysis as a means to determine 60 kV and above solutions in the SPP planning region.

    a. With input from stakeholders, 60 kV and above solutions will be developed to mitigate potential violations. Solutions will be coordinated with the Aggregate (AG) and Generation Interconnection (GI) Study processes for the SPP planning region. Since TOGs are tools used to mitigate violations in the daily management of the transmission grid, TOGs may be used as alternatives to planned projects and are tested annually to determine effectiveness in mitigating violations. For purposes of this study, the 2016 ITPNT will identify all solutions where the use of TOGs is deemed not effective.

    b. A check will be performed to determine if projects identified in the ITP10 assessments will eliminate or defer any projects identified in the 2016 ITPNT.

4. A final reliability assessment will be performed, repeating the steps above on the identified solutions to validate the solutions and check for new potential violations.

5. Short-term reliability projects will be separately identified and posted with an explanation of the reliability violations and system conditions for which there is a time-sensitive need. There will be a thirty day comment period as required in Section I.3.c of Attachment Y of the SPP Tariff.

Schedule

The study will begin in February 2015 with final results complete by April 2016. The estimated study timeline is as follows:

Item	Approval By	Start Date	Completion Date
Scoping	TWG	November 2014	March 2015
Model Development (S0, S5 & CBA)*	TWG	March 2015	September 2015
Reliability Assessment	TWG	May 2015	September 2015
DPP Response Window	TWG	September 2015	October 2015
Solution Development	TWG	October 2015	November 2015
Draft Portfolio	TWG	December 2015	December 2015
Final Reliability Assessment	TWG	March 2016	
Review report	TWG	February 2016	March 2016
Final report with recommended Project Plan	TWG	February 2016	March 2016
	MOPC/BOD	April 2016	

*Note: Model Development for the CBA Scenario includes TWG review of constraints to be used in the models

Deliverables

The results from the 2016 ITPNT study, which define a set of transmission upgrades needed to meet the near-term potential violations of the system, will be compiled into a report detailing the findings and recommendations of SPP Staff.

Changes in Process and Assumptions

In order to protect against changes in process and assumptions that could present a significant risk to the completion of the ITPNT, any such changes must be vetted. If TWG votes on any process steps or assumptions to be used in the study, those assumptions will be used for the 2016 ITPNT. Changes to process or assumptions recommended by stakeholders must be approved by the TWG. This process will allow for changes if they are deemed necessary and critical to the ITP, while also ensuring that changes, and the risks and benefits of those changes, will be fully vetted and discussed.