

2014 ITPNT Scope

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TWG Approved

Engineering



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Overview

This document presents the scope and schedule of work for the 2014 Integrated Transmission Planning (ITP) Near-Term (NT) Assessment. This document was reviewed by the Transmission Working Group (TWG) in December 2012.

Objective

The third phase of the ITP process is the Near-Term Assessment (ITPNT). The main objectives of 2014 ITPNT are to evaluate the reliability of the SPP transmission system in the near-term planning horizon, collaborate on the development of improvements with stakeholders, and identify necessary upgrades for approval and construction. The 2014 ITPNT's primary focus is identifying solutions required to meet the reliability criteria defined in OATT Attachment O Section III.6. The process will also include coordination of transmission plans with the ITP20, ITP10, Aggregate Study, and Generation Interconnection processes.

The 2014 ITPNT will create an effective near-term plan for the SPP footprint which identifies solutions to potential issues for system intact and (N-1) conditions using the following principles:

- Identifying potential reliability-based problems (NERC Reliability Standards TPL-001 and TPL-002, SPP and local criteria)
- Utilizing Transmission Operating Guides
- Developing additional mitigation plans including transmission upgrades to meet the region's needs and maintain SPP and local reliability/planning standards

The 2014 ITPNT study horizon will include modeling of the transmission system for six years (i.e. 2019). This will provide enough lead time requirements such that NTC letters can be issued and project owners can begin work in a timely fashion to enable the completion of more complex projects by the identified need date.

The process is open and transparent, allowing for stakeholder input. Study results are coordinated with other entities and regions responsible for transmission assessment and planning. TWG will review and vet components of the 2014 ITPNT process, which includes but is not limited to the following items: model development, reliability analysis, stability analysis, transmission plan development, seams impacts, and 2014 ITPNT Report.

Data inputs

SPP will consider power flow models with individual Balancing Authorities (BA) as well as models with a Consolidated Balancing Authority (CBA Scenario). SPP will use 2014, 2015, and 2019 models in the 2014 ITPNT for the following seasons: 2014 light load, 2014 summer peak, 2015 summer peak, 2019 light load, and 2019 summer peak. Thus, 15 model scenarios will be analyzed as part of the 2014 ITPNT Assessment. The modeling assumptions are detailed in sections below.

A. Load

The load density and distribution for the steady state analysis will be provided through the MDWG model building process¹. The load will represent each individual BA's coincident 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 type loads and which load grows over time.

B. Generation Resources

Existing generating resources will be represented in the power flow models taking into account planned retirements and 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 approved for construction upgrades, SPP Transmission Owners' planned (zonal sponsored) upgrades, and first tier entities' planned upgrades (AECI, Entergy, MEC, and WAPA). The model development processes for SPP MDWG and SERC account for long-term transmission line outages as forecasted by each process's member transmission owners.

D. Transmission Service

To account for the confirmed long-term transmission service SPP will create two scenario models representing individual BAs. The first scenario (S0) contains projected transmission transfers between individual BA's and generation dispatch on the system. The second scenario (S5) contains all confirmed long-term firm transmission service with its necessary generation dispatch.

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 2014 ITPNT Assessment. The CBA scenario will model SPP as a single Balancing Authority and will only model transmission transfers across the SPP seams. The CBA scenario will utilize the 2013 Flowgate Assessment, 2014 ITPNT transmission topology, and 2013 ITP20 economic dispatch data. The goal will be to attain a security-constrained economic dispatch and unit commitment

¹ [SPP MDWG Powerflow Procedure Manual](#)

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(SCED/SCUC) scenario for each year and season of the 2014 ITPNT Assessment. Making use of the economic data from the 2013 ITP20, the CBA scenarios will dispatch the most economical power around the flowgates identified in the 2013 Flowgate Assessment. The security constrained economic dispatch in the CBA will be applied to the SPP footprint only. The rest of the Eastern Interconnect remained unchanged.

F. Demand Response

Demand response will be incorporated into the models through lower load and capacity forecasts, which is developed in Subsection A above.

Analysis

A. Steady state assessment

The steady state assessment will use the following models: 2014 light load and summer peak, 2015 summer peak, 2019 summer peak and light load using individual BA dispatch. Staff will also use consolidated Balancing Authority models of these same seasons. An N-1 contingency analysis will be conducted for the peak and off-peak cases for facilities 60 kV and above in SPP and facilities 100 kV above in first-tier. 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 problems identified.

B. Solution development

SPP will use a pool of possible solutions to evaluate upgrades used to create the 2014 ITPNT plan. This pool of solutions will come from SPP transmission service studies, generation interconnection studies, previous ITP studies, local reliability planning studies by TOs, Attachment AQ studies, stakeholder input and staff evaluation.

C. Shunt reactive requirements assessment

If any 300 kV and above upgrades are identified as solutions and presented in the 2014 ITPNT Project Plan, line-end reactive requirements analysis will be performed for the new transmission lines greater than 300 kV system. This analysis will be performed on the 2019 light load models by opening each end of the new line to identify preliminary shunt reactive needs. The analysis will provide the amount of MVAR needed to maintain both 1.05 and 1.1 p.u. voltage at both ends of each new line identified. 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 reactor needs before design level studies are completed. This analysis will be completed with the entire 2014 ITPNT Project Plan included in the model.

D. Load pocket analysis

SPP will perform voltage stability analysis for 6 load pockets as part of the 2014 ITPNT Assessment. These areas include: Central Nebraska, South Oklahoma, South Central Westar, Northeast Westar, Oklahoma City, and Lincoln/Omaha.

Contingencies used for the stability analysis will be developed by determining the single worst generator unit outage within the load area. This identified generator outage will be paired with all transmission line outages within the load area. By pairing the largest generator outage with each transmission line outage, the largest amount of voltage instability will occur in the load pocket.

Methodology to test the load pockets for voltage collapse will begin by increasing the amount of load within the load pocket. Simultaneously, a power transfer sending power from adjacent areas to the load pocket will be simulated. The load and power transfer will increase until voltage collapse occurs within the load pocket. This simulation will be tested under system intact conditions as well as the previously identified contingency conditions on the 2014 ITPNT 2019 summer peak models. The simulation will be run with and without the 2014 ITPNT proposed upgrades included in the models to determine the difference in stability with and without the 2014 ITPNT portfolio.

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E. 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 issues.

Seams

In the development of 2014 ITPNT, Staff will review expansion plans of neighboring utilities and Regional Transmission Organizations (RTOs) and include first-tier party's planned projects in the 2014 ITPNT models. Based upon that review, Staff may take into account other external plans. The models used in the 2014 ITPNT incorporate the latest data from the neighboring utilities and RTOs through the MMWG model development process.

Potential impacts of the 2014 ITPNT on neighboring systems will be considered. Coordination is done in accordance with existing Seams agreements. For those without an explicit agreement, those neighbors will be contacted in order to discuss the potential impacts of the ITP 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 to verify the models before analysis proceeds.
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 1-6. 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 footprint.
4. With input from stakeholders, 60 kV and above solutions will be developed to mitigate potential criteria violations. An NTC could be issued from the CBA scenario if another solution cannot be found. Solutions will be coordinated with the Aggregate (AG) and Generation Interconnection (GI) Study processes for the SPP transmission system footprint.
 - a. Since Transmission Operating Guides (TOG) 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 the purpose of this study, the 2014 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 ITP20 or ITP10 assessments will eliminate or defer any projects identified in the 2014 ITPNT.
5. A follow-up analysis will be performed repeating the steps above on the identified solutions to validate the solutions and check for potential violations that may have been created.
6. Load pocket analysis will be performed on the final portfolio of upgrades for the specified load pockets.
7. Stability analysis will be performed on the final portfolio of upgrades.

Timeline

The study will begin in January 2013 with final results complete by January 2014. The estimated study timeline is as follows:

	Group to review/endorse	Start Date	Completion Date
Scoping	TWG	November 2012	January 2013
Model Development (S0, S5)	TWG	February 2013	May 2013
Model Development (CBA)	TWG	May 2013	June 2013
Reliability Assessment (S0, S5)	TWG	June 2013	
Reliability Assessment (CBA)	TWG	July 2013	
Solution Development	TWG	June 2013	December 2013
Load Pocket Assessment	TWG	August 2013	December 2013
Stability Assessment	TWG	August 2013	December 2013
Final Reliability Assessment	TWG	December 2013	
Review report	TWG	November 2013	November 2013
Final report with recommended plan	TWG	December 2013	January 2014
	MOPC/BOD	January 2014	

Staff plans to hold stakeholder planning summits at least twice during the 2013 calendar but may hold more as appropriate.

Deliverables

The results from the 2014 ITPNT, which define a set of transmission upgrades needed to meet the near-term needs 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 2014 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.