2021 ITP FURTHER EVALUATION SCOPE OF WORK

SPP SYSTEM PLANNING

By SPP System Planning

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Version 1.0
## REVISION HISTORY

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BACKGROUND

At the conclusion of the 2021 ITP assessment, SPP recommended the Crossroads-Phantom 345 kV double-circuit project (Crossroads-Phantom project) to address the system needs identified in the SPS South target area. Although SPP staff recommended the project should be approved for construction to the Transmission Working Group (TWG), the Economic Studies Working Group (ESWG), and the Markets and Operations Policy Committee (MOPC), the project was not approved for issuance of a Notification to Construct with Conditions (NTC-C). Instead, during the January 2022 MOPC meeting, the MOPC approved a motion to recommend further evaluation of the project due to significant changes observed in the area during the study timeline. At the subsequent SPP board of directors meeting, the same recommendation was approved. This scope document outlines the process used to further evaluate the Crossroads-Phantom project.

FURTHER EVALUATION OVERVIEW

The further evaluation of the Crossroads-Phantom project will require review and adjustment of major milestone work performed during the standard ITP assessment. This review will ensure a comprehensive evaluation of assumption changes in the SPS South target area are incorporated into the analysis. The further evaluation will consider updates to the base reliability (BR) and market economic models (MEM) prior to re-performing project evaluation work in order to determine the best project for the target area.

The process to evaluate the Crossroads-Phantom project is broken down into four stages:

1. Model Updates
   - Data updates (BR/MEM)
   - Resource plan updates (MEM)
2. Assessment Updates
   - Constraint assessment review (MEM)
   - Needs assessment update (BR/MEM)
3. Solution Development
   - Project evaluations (BR/MEM)
   - Sensitivity analysis (BR/MEM)
   - Additional analysis (BR/MEM)
4. Deliverables
   - Project recommendation(s)
   - 2021 ITP report addendum
STUDY METHODOLOGY

MODEL UPDATES

As noted in the 2021 ITP Report, the SPS South target area had a significant number of known changes to assumptions in the models approved for the needs assessment. Some changes were known prior to the Detailed Project Proposal (DPP) window opening, while others were not known until the study was near completion. Some changes to the models, such as a load forecast reduction for the SPS zone, will affect other milestones, such as the conventional resource plan developed for the economic models.

The following models will be updated with the data revisions identified later in this section:

- Base Reliability – Years 5 and 10, summer and winter seasons, Tolk retirement year 10
  summer only
- Market Economic Models – Year 5 and 10, Future 1 and Future 2, Tolk retirement year 10
  Future 1 and Future 2

The updated data submitted for this evaluation came from Southwestern Public Service Company (SPS), the incumbent transmission owner (TO), and are consistent with data and assumptions included in subsequent ongoing ITP assessments. The following subsections outline the modeling changes to be incorporated in the models used for the further evaluation of the Crossroads-Phantom project.

DATA UPDATES

SPS AREA PEAK LOAD REDUCTIONS

Late in the process of the 2021 ITP, SPS discovered an error in the load forecasts submitted in the 2021 and 2022 ITP. SPS requested the TWG and ESWG consider a revision to the 2022 ITP load data while also questioning the need for the Crossroads-Phantom project. These load reductions were approved for the 2022 ITP using the ITP Manual 10.3 process. For the purposes of the further evaluation, the load reductions have been resubmitted to ensure they the data is applied appropriately when incorporated into the 2021 ITP BR and MEM models.

SPS GENERATOR RETIREMENT UPDATES

SPS provided updated information on expected retirement dates and updated unit capacities based upon subsequent ITP generator reviews and recent generator testing results. These units all have long-term firm transmission service and will be dispatched in the updated cases in accordance with the ITP Manual.
**DELIVERY POINT ADDITIONS (DPA)**

Five (5) load additions were submitted for inclusion in the updated models. One additional load considered in the original 2021 ITP analysis was not included based upon a reduced confidence level that the load will be energized. These loads were determined to be impactful to the analysis because they are located within the SPS area or within the target area. A list of the delivery point additions is shown below:

- DPA-2020-Dec-1263 Red Hills (57 MW)
- DPA-2021-March-1295 Chevron Eddy (50 MW)
- DPA-2021-AUG-1358 Caveman (5 MW)
- DPA-2020-May-1206 Sisko (28.5 MW)
- DPA-2019-Oct-1126 Lynch (20 MW)

**PHANTOM STATIC VAR COMPENSATOR REMOVAL**

The original 2021 ITP BR models required a static var compensator (SVC) be located at the Phantom substation to provide reactive support and make it possible to converge the models. Largely due to the generation retirement assumption changes considered in the further evaluation, the SVC is no longer required.

**LONG-TERM FIRM TRANSMISSION SERVICE**

The Sagamore Wind Farm (522 MW) interconnecting near the Crossroads substation was awarded long-term firm transmission after the completion of the 2021 ITP BR models. For the purposes of this further evaluation, the Sagamore Wind Farm will be dispatched in accordance with the renewable dispatch methodology found in the ITP Manual. Topology updates necessary for the modeling of the Sagamore Wind Farm will also be added to the models. The Sagamore Wind Farm is already included in the 2021 ITP MEM.
**LOCAL IN-LINE SHUNT REACTORS**

As part of solution development, SPP analyzed a number of solution options including existing reactive setting adjustments. Included in these adjustments were a number of in-line shunt reactors that were switched off in coordination with high-performing transmission upgrades to provide additional voltage support. For the purposes of this further evaluation, these reactors will be modeled offline.

**TOLK RETIREMENT SENSITIVITY**

The Tolk coal plant (units 1 and 2, totaling 1,067 MW) is tentatively planned for retirement in 2033, which is just outside the study horizon of the 2021 ITP. Due to the plant’s location and size, SPS discussed the potential impact this planned retirement may have on their area, which was not considered in the 2021 ITP assessment. For the purposes of the further evaluation of this area, a sensitivity model will be developed retiring Tolk units 1 and 2 in a year 10 summer BR case and the MEM year 10 Future 1 and Future 2.

**2021 ITP PROJECTS APPROVED FOR CONSTRUCTION**

The projects approved for construction by the SPP board of directors from the 2021 ITP recommended portfolio will be added to the BR and MEM models.

**CONVENTIONAL RESOURCE PLAN REVIEW (MEM ONLY)**

The conventional resource plan for SPS will be reviewed with consideration of the load and generation revisions in order to ensure reserve margins are still being met. Adjustments to the SPS resource plan will be made in accordance with the ITP Manual and 2021 ITP Scope.

An additional update to the resource plan will be made to account for the retirement of the Tolk units 1 and 2 for consideration in the sensitivity MEM.

**ASSESSMENT UPDATES**

Any significant model changes will require the constraint assessment and needs assessment to be updated. A description of the work required is described in the following sections.

**CONSTRAINT ASSESSMENT (MEM ONLY)**

The Constraint Assessment process is a significant milestone in the ITP as it identifies future system constraints based upon the assumptions in the economic model like the renewable resource plan and the siting of resources. The standard constraint assessment process is rigorous; however, an hourly scan will be done on the peak and off-peak cases to identify any additional constraints for those hours.
NEEDS ASSESSMENT

SPP will use the updated models and re-perform a portion of the needs assessment to identify updated thermal and per unit voltage values for SPS needs identified during the 2021 ITP needs assessment, including NERC TPL-001-4 P3 event violations. The need assessment list posted on a secure website will be reposted with the updated values for both the reliability needs assessment and the economic needs assessment. If any violations are mitigated as a result of the model updates, they will no longer be considered needs. To the extent the model changes result in any new violations impactful to the SPS South target area, these may be considered in solution development efforts to ensure the robustness of the project.

Additional P3 event contingencies may also be considered for units dispatched in the further evaluation BR models that were planned for retirement in the original 2021 ITP approved models.

SOLUTION DEVELOPMENT

PROJECT EVALUATION

SPP staff will reconsider the projects submitted in the 2021 ITP DPP window, as well as the staff solutions created during the solution development milestone, in an effort to identify the best project for the SPP region using the new and/or updated assumptions and model data for the SPS South target area. The projects will be evaluated in the same manner as described in the 2021 ITP report, including the use of the stakeholder-approved metrics such as the CLR and CVR metrics. Additionally, qualitative information may also guide SPP in the development of the recommended project(s). Adjusted Production Cost (APC) will be the only benefit metric calculated for project evaluation in accordance with the stakeholder-approved mitigation plan from the 2021 ITP assessment.

An additional DPP window will not be opened and SPP will not accept any project submissions for consideration in this further evaluation.

ADDITIONAL ANALYSIS

SPP may perform additional analysis in the SPS South target area to provide valuable qualitative information on high-ranking solutions. The intent of this analysis will be to assess voltage stability, voltage support margins, and project longevity. This analysis may be performed using the DSA Tools VSAT software used for the standard voltage stability assessment or the voltage adequacy and stability (PVQV) add-on for analysis in PSS®E which can solve multiple power flow solutions in order to generate a PV curve for a particular transfer or a QV curve at a given bus.
SENSITIVITY ANALYSIS

Staff will perform sensitivity analysis on high-ranking solutions to identify qualitative information on project performance under the natural gas and load changes assessed on the 2021 ITP portfolio.

DELIVERABLES

PROJECT RECOMMENDATION

SPP will present the recommended solution to the TWG, ESWG, MOPC, and SPP board of directors for the necessary endorsement and/or approval.

2021 ITP REPORT ADDENDUM

The 2021 ITP report will be updated with an addendum describing the efforts and results of this further evaluation. The addendum will be approved by the appropriate working groups and committees, and added to the previously approved 2021 ITP report.

WORKING GROUP COORDINATION

SPP staff will work in conjunction with the TWG and ESWG to review the model revisions are appropriate and applied correctly. The TWG and ESWG will also be given an opportunity to review the models used for this further evaluation, ensure updates are applied appropriately, and approve the set of updated models before analysis begins. The following list identifies the coordination points with SPP stakeholders and the topics which may require endorsement or approval:

- Relevant data updates to be allowed in the updated models (TWG/ESWG)
- Model review and approval (TWG/ESWG)
- Constraint assessment revisions (TWG approval only)
- Needs assessment updates
- Discussion of high-performing projects
- Analysis results and recommended solution
- Addendum to ITP Report (TWG/ESWG, MOPC, Board of Directors)
- Project Approval (TWG/ESWG, MOPC, Board of Directors)
The 2021 ITP further evaluation began following the SPP board of directors’ decision on January 25, 2022, and will complete by the July 2022. The timeline and schedule are shown below in Error! Reference source not found. and Table 2: 2021 ITP Further Evaluation Schedule.

**Task Name** | **Start** | **Finish**
--- | --- | ---
2021 ITP - Further Evaluation of the Crossroads-Phantom 345 kV Project | January 2022 | July 2022
Scope Development | February 2022 | March 2022
Base Reliability Powerflow Modeling updates | February 2022 | March 2022
Market Economic Modeling updates | February 2022 | March 2022
Reliability Needs Assessment | March 2022 | March 2022
Economic Needs Assessment | March 2022 | March 2022
Further Evaluation & Analysis - Reliability | March 2022 | April 2022
Further Evaluation & Analysis - Economic | March 2022 | May 2022
Finalize Further Evaluation & Analysis | May 2022 | May 2022
Models Updates for Final Assessments | May 2022 | May 2022
Final Assessments | May 2022 | June 2022
Report work | May 2022 | June 2022
Final TWG/ESWG Approval | July 2022 | July 2022
MOPC | July 2022 | July 2022
Strategic Planning Committee | July 2022 | July 2022
SPP board of directors | July 2022 | July 2022