Tolk Analysis: Session 4 of the 1st Technical Conference

02/08/2021

Today's Agenda

1. Recap prior technical conferences
2. Tolk Analysis – Final proposed retirement dates and operating scenarios
3. Replacement Resources in the Encompass Model
4. Critical Modeling Parameters / Sensitivities
5. Value of Tolk water rights
6. Summary of 1st Technical Conference
7. Final review of questions previously submitted by Sierra Club

RECAP OF PRIOR TECHNICAL CONFERENCES

Recap - Overview

Technical Conferences

"SPS shall hold two technical conferences located in either Santa Fe or Albuquerque, NM. ***The first technical conference will be for SPS to present and solicit feedback on the basic parameters and approach of its analysis****. The second technical conference will be for SPS to provide and solicit feedback on the preliminary conclusions of its analysis"*

Subsequent Changes

- COVID-19 required technical conferences to be held virtually
- SPS proposed splitting the first technical conference into multiple sessions - with today being the fourth and final session of the 1st Technical Conference

Recap – 1st Session

1. General approach of the Tolk Analysis
   - PVRR Analysis using the Encompass production cost modeling software
   - Evaluate multiple retirement and operating scenarios – each with an optimized expansion and generator replacement plan
   - Type, technical characteristics, and cost of replacement generation will be the result of an RFI process
   - An Independent Evaluator ("IE") will oversee the RFI process and Tolk Analysis
2. Request for Proposal ("RFP") to acquire the services of an IE

   *Guidehouse was subsequently appointed as IE
3. Draft Request for Information ("RFI") to obtain pricing of replacement resources

   *RFI was subsequently issued and proposals received on November 6th, 2020
4. Outline of the scenarios SPS is proposing to evaluate

Recap – 2nd Session

1. Prior and Future Technical Conferences
2. Updates from Prior Technical Conference
   A. Independent Evaluator
   B. Request for Information for generating resources
3. Encompass – Production Cost Modeling Software
4. Responses to Parties Comments and Questions
   A. SPS Load Forecast Update
   B. Sierra Club Modeling Questions (outstanding questions to be addressed today)

Recap – 3rd Session

1. Modeling parameters for Harrington Station
   A. Background & NAAQS compliance
   B. Harrington operating on gas
   C. Economic Analysis

TOLK ANALYSIS – RETIREMENT DATES AND OPERATING SCENARIOS

Operating & Retirement Scenarios

After originally presenting the Operating & Retirement Scenarios in the 1st Session of the 1st Technical Conference, SPS has reviewed the feedback provided and propose the following operating and retirement scenarios:

- Scenario 1 – Annual Economic Dispatch
  - Summer only economic dispatch throughout 2021
  - Annual economic dispatch thereafter
  - Both units retire at end of economically available water (~2025 – 2026)
  - Harrington converted to gas EOY2024

- Scenario 2 – Summer Only Economic Dispatch
  - Summer only economic dispatch 2021 and beyond
  - Both units retire at end of economically available water (~2032)
  - Harrington converted to gas EOY2024

Operating & Retirement Scenarios

- Scenario 3 – Earliest Retirement of Tolk Units (2023)
  - Summer only economic dispatch 2021
  - Annual economic dispatch thereafter (2022 & 2023)
  - Harrington converted to gas EOY2024
- Scenario 4 – Staggered Retirement of Tolk Units
  - Unit 1 retires EOY 2023
  - Unit 2 retires at end of economically available water (~2031)
  - Summer only economic dispatch 2021
  - Annual economic dispatch thereafter
  - Harrington converted to gas EOY2024

Operating & Retirement Scenarios

- Scenario 5 – Staggered Retirement of Tolk Units (2023) & Seasonal Operations
  - Unit 1 retires EOY 2023
  - Unit 2 retires EOY 2032
  - Summer only economic dispatch
  - Harrington converted to gas EOY2024
- Scenario 6 – Earliest Retirement of Tolk & Harrington Units
  - All Tolk and Harrington Units Retire EOY 2023
  - Tolk - Summer only economic dispatch 2021
  - Tolk - Annual economic dispatch thereafter
  - Harrington – Annual economic dispatch in all years

Sierra Club Requested Scenarios

(Staggered Retirements)

Staggered retirement of both Tolk and Harrington's units (starting as early as possible, likely 2023)

Scenario 4 incorporates a staggered retirement of the Tolk Units. As discussed in previous technical conferences, the Harrington Units are required to comply with NAAQS by EOY2024. A staggered retirement of the Harrington Units would not meet NAAQS compliance. Scenario 6 incorporates an early retirement of all Tolk and Harrington units.

Staggered retirement AND seasonal operation of both Tolk and Harrington (seasonal operation starting this year, staggered retirement starting ASAP).

Added Scenario 5 to incorporate this request for the Tolk Units. However, as previously discussed, seasonal operations of the Harrington units will not meet NAAQS compliance.

Staggered Retirement scenarios: please confirm that both units will be economically committed and dispatched at all times, and that the no unit's retirement date would be later than 2032

Confirmed, to the extent of this Tolk Analysis

Sierra Club Requested Scenarios

(Environmental Controls)

Tolk has to comply with Regional Haze regulations by installing dry scrubbers by 2024 (this is likely the earliest there would be any such requirement as it takes at least three years to install)

SPS has recently evaluated the installation of scrubbers and dry sorbent injection on the Harrington units to comply with NAAQS. As presented in the 3rd session of the 1st technical conference, the installation of capital-intensive environmental controls is cost prohibitive for the Harrington Units. Based on current modeling inputs, the same conclusion can almost certainly be applied to the Tolk Units. If SPS is required to comply with Regional Haze regulations, or any other regulations that require environmental controls, SPS will reevaluate the retirement date(s) of the units at that time.

Run at least one modeling scenario in which Tolk is required to retire, repower, or comply with Regional Haze regulations by installing dry scrubbers or dry sorbent injection by 2024

See previous response.

Environmental Compliance: What operational assumptions and compliance costs is Xcel planning to use to model Tolk and Harrington's **likely** environmental compliance obligations?

See previous response.

REPLACEMENT RESOURCES

Generator Replacement Resources

- The Encompass model will create an optimized expansion plan / generator replacement plan for each of the scenarios previously described
- Resources proposed in the RFI process will be available for optimized selection by Encompass (including selection solely for economic energy benefits), generally, this is through EOY 2025
- Thereafter ‘generic-priced’ resources will be available for selection, including but not limited to, solar, wind, simple cycle combustion turbines, battery storage, and combined cycle gas generation

RFI Replacement Resources

- SPS received information from nearly 20 different bidders
- Proposals included approximately 75 different pricing structures
- Majority of proposals were either solar, solar + storage or wind projects
- Other technology included: combined cycle generation with hydrogen production and storage, gravitational energy storage, compressed air storage
- Commercial operation dates generally ranged from 2022 to 2025
- Project output ranged from 25MW to 1,100MW+

MODELING PARAMETERS / SENSITIVITY ANALYSIS

Gas Forecast Methodology

Gas Forecast

The price of natural gas is a significant variable. SPS uses a combination of market prices and fundamental price forecasts, based on multiple highly respected, industry leading sources, to calculate monthly delivered gas prices. As the foundation of the gas price forecast, Henry Hub natural gas prices are developed using a blend of market information (New York Mercantile Exchange ("NYMEX") futures prices) and long-term fundamentally based forecasts from Wood Mackenzie, IHS Energy, and S&P Global. The forecast is fully market-based for the first few years, then transitions into blending the four sources to develop a composite forecast. The Henry Hub forecast is adjusted for regional basis differentials and specific delivery costs for each generating unit to develop final model inputs.

SPS will use the company's 1H21 gas forecast in the Tolk Analysis. The 1H21 gas forecast is expected to be released in March 2021.

Gas Forecast Sensitivity

Gas Forecast Sensitivity

SPS will conduct low and high gas price forecast sensitivity analyses. For the low and high price cases, the base gas forecast for Henry Hub is adjusted down by 50% of the growth (escalation) in the base gas case to represent the low gas case, and adjusted up by 150% of the growth in the base gas to represent the high gas case.

Market Price Forecast Methodology

Market Price Forecast

In addition to resources that exist within SPS's service territory, SPS has access to a regional market located outside its service territory. SPS is a member of the SPP, which operates as a consolidated balancing authority and dispatches all available generation resources within its boundaries. This consolidated dispatch allows SPS access to energy resources outside SPS's service territory for purchases, as well as the opportunity to sell from its generating sources to other market participants. SPS uses a simple average of long-term on-peak and off-peak implied heat rate forecasts provided by Wood Mackenzie, S&P Global and IHS Markit for SPP South Hub. The implied heat rates, denominated in million British thermal units/megawatt-hour, are then multiplied by SPS's long-term natural gas price forecast to convert the implied heat rate values into energy prices. This process is repeated for all months, distinguishing between on and off-peak prices, through the end of the modeling period.

SPS will use the company's 1H21 market price forecast in the Tolk Analysis. The 1H21 market price forecast is expected to be released in March 2021.

Market Price Forecast Sensitivity

Market Price Forecast Sensitivities

SPS's market price forecast is dependent on the gas price forecast used. As such, the market price forecast will be adjusted with the low and high gas sensitivity analyses

As preliminary results become available, SPS may analyze additional market price sensitivities depending on the optimized generation portfolio's reliance on purchases from, or sales to, the SPP integrated market.

Demand and Energy Forecast Methodology

Demand and Energy Forecast

Projections of future energy sales and coincident peak demand are fundamental inputs into SPS's resource need assessment. SPS forecasts retail energy sales and customers by rate class for each jurisdiction. Retail coincident peak demand is forecasted in the aggregate at the total SPS level. The wholesale energy sales and coincident peak demand forecasts are developed at the individual customer level of detail. SPS models its forecasts on a monthly basis and uses monthly historical data to develop the customer, energy sales, and coincident peak demand forecasts. Annual energy sales are an aggregation of the monthly energy sales estimates. Energy sales are forecasted at the delivery point and peak demand is forecasted at the generating source.

SPS will use the company's Spring 2021 sales and demand forecast in the Tolk Analysis.

Demand and Energy Forecast Sensitivity

Demand and Energy Forecast

Development and use of different energy sales and demand forecasts for planning future resources is an important aspect of the planning process. SPS will conduct sensitivity analyses using a high and low forecast. The high and low forecasts are based on a Monte Carlo simulation for energy sales and peak demand forecasts with probabilistic inputs for the economic, energy, and weather drivers of the forecast models and for model error. The high forecast scenario is the forecast level from the Monte Carlo simulation that represents a plus one standard deviation confidence band from the base case forecast. The low forecast scenario is the forecast level from the Monte Carlo simulation that represents a minus one standard deviation confidence band from the base case forecast.

TOLK WELLFIELD WATER VALUATION

RICHARD L. BELT, DIRECTOR – CHEMISTRY & WATER RESOURCES

Tolk Overview and Water Transaction Background

- **Tolk overview**
  - ~50,000 acres, entirely within Lamb County
  - SPS does not own the surface estate, except at plant sites
  - Saturated thickness from <30 ft to >70 ft (generally from west to east)

- **Texas groundwater rights basic principles**
  - Rule of capture – entitled to groundwater under surface estate, not volume certain
  - Groundwater right can be severed from surface estate
  - Local groundwater districts establish production limits, spacing rules, reporting requirements

- **Typical water rights transaction considerations & resources**
  - Sold on per-acre basis vs. per-acre foot basis
  - Value of any surface improvements conveyed with sale (i.e. wells)
  - Water value = value of irrigated acreage minus value of dry acreage, adjusting for improvements or other considerations (TX/NM are non-disclosure states, a complication)
  - Other adjustments needed?, i.e. groundwater depletion
  - HPWD annual groundwater depreciation study

Critical Assumptions

- **Exclusion of acres with depleted groundwater**
  - Acres with <40 feet of saturated thickness should be excluded from valuation estimate
- **Probable buyer needs**
  - Need for conveyance system and details (deduction)
  - Municipal buyer may need to replace all wells not completed to TCEQ standard (deduction)
  - Prospective buyer pool limitation (negotiation limitation)
  - Lower water right valuation bound is $0
- **When is groundwater valuation determined?**
  - Time to identify a buyer, close the transaction, and develop a conveyance system?
  - Per HPWD, Lamb County water valuation declined 40% from 2016 to 2020
  - Rate of future saturated thickness decline & growth of excluded acreage?
  - Seasonal vs. year-round generation & impact on available water
- **Sale limits utility of Tolk and Plant X sites in the future**
  - Future site optionality may be highest/best value for ratepayers

Recommended Approach to Water Valuation

- **Determine appropriate date or date range for valuation**
  - Adjust HPWD water valuation
  - Estimate wellfield acreage with depleted groundwater based on latest groundwater model
  - Establish Tolk operational assumptions during the preceeding period

- **Option 1 – HPWD district-wide depreciation study**
  - Use HPWD water valuation with appropriate adjustment
  - Multiply by wellfield acreage as adjusted for depleted groundwater
  - Evaluate assumption sensitivities

- **Option 2 – Local expert evaluation**
  - Engage a local Realtor or general appraiser to assess comparable Lamb County irrigated and dryland acreage to establish water value, including infrastructure adjustment.
  - Multiply by wellfield acreage as adjusted for depleted groundwater
  - Evaluate assumption sensitivities

SUMMARY OF 1ST TECHNICAL CONFERENCE

First Technical Conference Summary

The first technical conference will be for SPS to present and solicit feedback on the basic parameters and approach of its analysis

- Present Value Revenue Requirement (PVRR) analysis conducted in Encompass model
- Evaluate multiple operating parameters and retirement dates for the Tolk Units
- Model incorporates the technical characteristics, operating parameters, cost, retirement dates etc. of SPS's existing generation fleet
- Each scenario will incorporate an optimized generator expansion / replacement plan
- Generator expansion / replacement plan will be based on the proposals received in the RFI process
- Independent Evaluator will oversee the Tolk Analysis
- [

First Technical Conference Summary

The first technical conference will be for SPS to present and solicit feedback on the basic parameters and approach of its analysis

- Critical inputs, such as gas prices, market prices, energy and demand forecasts will be evaluated using sensitivity analyses

FINAL REVIEW OF QUESTIONS PREVIOUSLY SUBMITTED BY SIERRA CLUB

Sierra Club June 26th Model Input Clarifications

- **Staggered Retirement scenarios:** please confirm that both units will be economically committed and dispatched at all times, and that the no unit's retirement date would be later than 2032**
- **Sustaining Capital Costs:** Does Xcel have a schedule of sustaining capital costs that it plans to incorporate into EnCompass? What is the assumed step-down in spending in years prior to retirement? *****
- **Market power, both firm and non-firm:** Is Xcel modeling just resources from the RFP process, or is the Company also planning to model market power as an option to replace some generation and capacity? What cost and availability assumption is Xcel using for these potential purchases? *****
- **Environmental Compliance**: What operational assumptions and compliance costs is Xcel planning to use to model Tolk and Harrington's likely environmental compliance obligations?**
- **Load and peak assumptions**: What baseline load and peak levels is Xcel using, and what sensitivities does Xcel plan to use in the Tolk analysis, especially in light of COVID's impact on sales and economic activities**
- **Responses provided in prior technical conferences*
- *** Responses provided in this technical conference*

Sierra Club June 26th Model Input Clarifications

- **Optimized modeling vs scenario modeling**: We would like to understand the main factors driving Xcel / EnCompass' selection of optimal retirement date. We believe that optimized retirement runs should be foundation of this analysis. However we would encourage Xcel to also think about hard coding sensitivities based on optimized results to understand how sensitive the model is to specific assumptions. For example, if an optimized run indicates that a 2027 retirement date for Tolk is least cost, but a hard coded retirement of 2025 is only a tiny bit more expensive, is the result of 2027 actually meaningful or is the difference between 2025 and 2027 just a reflection of, for example, the estimated sustaining capital cost assumptions? It is essential that the Company understands and is transparent about which modeling results are significant and which are likely not.*****

- **Reliability**: How is Xcel planning to model the firm capacity contribution of solar and wind? Does the Company plan to conduct reliability modeling to inform its ELCC assumptions? Is the Company planning to use resource blocks to reflect the changing contribution of each resource as the amount installed on the system increases? What about paired wind and solar resources? *****

* *Responses provided in prior technical conferences*

*** Responses provided in this technical conference*

Sierra Club June 26th Request for SPS Model Runs

1. Tolk has to comply with Regional Haze regulations by installing dry scrubbers by 2024 (this is likely the earliest there would be any such requirement as it takes at least three years to install).**
2. Harrington has to install scrubbers for SO2 NAAQS and/or regional haze compliance by 2024 (same as above). *****
3. Harrington operates seasonally. *****
4. Staggered retirement of both Tolk and Harrington's units (starting as early as possible, likely 2023).**
5. Staggered retirement AND seasonal operation of both Tolk and Harrington (seasonal operation starting this year, staggered retirement starting ASAP).**
6. Load sensitivity, based in part on COVID impacts, assuming a slow-down in demand growth.**

* *Responses provided in prior technical conferences*

** *Responses provided in this technical conference*

Sierra Club August 20th Request for SPS Model Runs

1. Does SPS plan to use the IRP process to make the final decision on whether to retire, repower on natural gas, or install scrubbers at Harrington? Or does the Company plan to make a decision prior to or outside the IRP process? *****

2. When evaluating the least cost solution for Harrington, is SPS evaluating whether it actually has a need for the full capacity and services currently provided by Harrington, or is SPS simply comparing the cost of the plant on natural gas and coal to the cost of providing identical services from alternative resources? *****

3. What costs and assumptions for sustaining capital costs is SPS planning to use in its Harrington analysis? *****

4. Will the Company assume a reduction in spending in years directly prior to plant retirements? *****

5. Does SPS plan to model seasonal operation of Harrington when operating both on coal and natural gas in its analysis? *****

* *Responses provided in prior technical conferences*

** *Responses provided in this technical conference*

Sierra Club August 20th Request for SPS Model Runs

6. Will SPS model staggered retirement at Harrington when operating both on coal and natural gas in its analysis? *

7. Will the Company incorporate the results of its Tolk RFP into its modeling assumptions for Harrington's replacement costs? More specifically, we believe that the Company should use those RFP results (including costs for solar, wind, and battery storage) to inform its cost assumptions for replacing or retrofitting Harrington.**

8. When evaluating Harrington, the Company should run at least one scenario requiring compliance with National Ambient Air Quality Standard for sulfur dioxide as expeditiously as practicable, 42 U.S.C. § 7502(c)(1), and no later than 2024. *

9. We urge the Company to run at least one modeling scenario in which Tolk is required to retire, repower, or comply with Regional Haze regulations by installing dry scrubbers or dry sorbent injection by 2024.**

* *Responses provided in prior technical conferences*

** *Responses provided in this technical conference*