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SIERRA CLUB

March 28, 2022

VIA ELECTRONIC FILING

Jasmine Kirkland
Public Utility Commission of Texas
Central Records
P.O. Box 13326
Austin, Texas 78711
512-936-7180

Re: PUCT Docket No. 52485, Application of Southwestern Public Service Company to Amend Its Certificate of Convenience and Necessity to Convert Harrington Generating Station from Coal to Natural Gas

Dear Ms. Kirkland:

This letter is to follow up on our correspondence regarding the public, unredacted Direct Testimony of Devi Glick and Exhibits filed on behalf of Sierra Club, filed March 25, 2022, Tracking Number BZESGKVV. As discussed, the Commission's interchange system was unable to process the filing, although Sierra Club submitted it before the 3:00 p.m. deadline on March 25, 2022. Per our discussion, enclosed please find a re-filed copy of the public, redacted Direct Testimony of Devi Glick on behalf of Sierra Club. We will submit the originally-attached exhibits as part of a separate filing. If you have any questions or require any additional information, please to not hesitate to contact me.

Respectfully submitted,

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PUC DOCKET NO 52485

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY TO CONVERT HARRINGTON GENERATING STATION FROM COAL TO NATURAL GAS	§ § § § § § § § §	**PUBLIC UTILITY COMMISSION OF TEXAS**

*****PUBLIC, REDACTED VERSION*****

DIRECT TESTIMONY OF

DEVI GLICK

ON BEHALF OF SIERRA CLUB

March 25, 2022

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1. INTRODUCTION AND PURPOSE OF TESTIMONY

Q Please state your name and occupation.

A My name is Devi Glick. I am a Principal Associate at Synapse Energy Economics, Inc. ("Synapse"). My business address is 485 Massachusetts Avenue, Suite 3, Cambridge, Massachusetts 02139.

Q Please describe Synapse Energy Economics.

A Synapse is a research and consulting firm specializing in energy and environmental issues, including electric generation, transmission and distribution system reliability, ratemaking and rate design, electric industry restructuring and market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government agencies, and utilities.

Q Please summarize your work experience and educational background.

A At Synapse, I conduct economic analysis and write testimony and publications that focus on a variety of issues related to electric utilities. These issues include power plant economics, utility resource planning practices, valuation of distributed energy resources, and utility handling of coal combustion residuals waste. I have submitted expert testimony on unit-commitment practices, plant economics, utility resource needs, and solar valuation before state utility regulators in Texas, Arizona, Connecticut, Florida, Indiana, Michigan, Nevada, New Mexico, North Carolina, South Carolina, Wisconsin, and Virginia. In the

course of my work, I develop in-house electricity system models and perform analysis using industry-standard electricity system models.

Before joining Synapse, I worked at Rocky Mountain Institute, focusing on a wide range of energy and electricity issues. I have a master's degree in public policy and a master's degree in environmental science from the University of Michigan, as well as a bachelor's degree in environmental studies from Middlebury College. I have more than seven years of professional experience as a consultant, researcher, and analyst. A copy of my current resume is attached as Exhibit DG-1.

Q On whose behalf are you testifying in this case?

A I am testifying on behalf of Sierra Club.

Q Have you testified previously before the Public Utility Commission of Texas ("Commission" or "PUCT")?

A Yes. I submitted testimony in Texas PUC Docket No. 49831, Application of Southwestern Public Service Company for Authority to Change Rates, Docket No. 50997, Application of Southwestern Electric Power Company for Authority to Reconcile Fuel Costs for the Period May 1, 2017–December 31, 2019, in Docket No. 51415, Application of Southwestern Electric Power Company for Authority to Reconcile Rates, and Docket No. 52497 Application of Entergy Texas Inc. to Amend its Certificate of Convenience and Necessity to Construct Orange County Advance Power Station.

Q What is the purpose of your testimony in this proceeding?

A In this proceeding, I review SPS's 2021 Harrington Analysis, presented in the testimony of Company witness Ben Elsey. I also evaluate the prudence of the Company's decision to convert Harrington to operate on gas, relative to retirement and replacement with alternatives based on the results of its own modeling. I present alternative analysis on the cost to replace the Harrington units using the same modeling platform as the Company, known as EnCompass, and based on revised assumptions and sensitivities.

Q How is your testimony structured?

A In Section 2, I summarize my findings and recommendations for the Commission.

In Section 3, I provide a summary of SPS's coal fleet and introduce SPS's proposal to convert the three units at the Harrington Generation Station to operate on gas.

In Section 4, I review the analyses that SPS conducted to justify converting Harrington to operate on gas to comply with sulfur dioxide ("SO_2") National Ambient Air Quality Standards ("NAAQS"). I discuss the main drivers of the Company's results and outline the major shortcomings in its 2021 Harrington analysis.

In Section 5, I present the results of Synapse's updated alternatives modeling analysis. I discuss the correction, updates, and sensitivities that we tested, and I present the cost and emission results.

Q What documents do you rely upon for your analysis, findings, and observations?

A My analysis relies primarily upon the workpapers, exhibits, and discovery responses of SPS witnesses. I also rely on other publicly available documents.

2. FINDINGS AND RECOMMENDATIONS

Q Please summarize your findings.

A My primary findings are:

1. No later than mid-2019, SPS made the decision to convert Harrington to operate on coal. And the Company did so without properly considering, or attempting to test the market for, alternative resource options. If SPS had begun a procurement process at that time, it would likely have been able to procure replacement resources by the end of 2024. Instead, it has locked SPS ratepayers into continued reliance on at least two units at Harrington.
2. SPS was not upfront in its Certificate of Convenience and Necessity ("CCN") application that retirement of two or three Harrington units is not a viable resource option based on the timeline required to procure transmission interconnection rights for replacement resources. As a practical matter, the decision facing the Commission is now whether to approve the conversion of all three units, or instead to approve the conversion of only two units and require the retirement of Unit 1.
3. SPS's 2021 Harrington Analysis that the Company uses to support its decision to convert the three Harrington units to operate on gas has a number of flaws and shortcomings. These include: (1) substantially understating the sustaining capital expenditures at the plant after it

converts to gas; (2) assuming only minimal reductions in pipeline and capital costs with the retirement of incremental Harrington units; (3) modeling the wrong fixed operation and maintenance ("FOM") cost streams for the units after they convert to operate on gas; (4) overstating the cost of renewables and battery storage and assuming that the investment tax credit ("ITC") expires; (5) failing to model a CO_2 price; and (6) failing to model alternative financial assumptions for the undepreciated plant balance at Harrington after the units retire.

4. SPS has not demonstrated that it needs the capacity provided by Unit 1. In fact, SPS's modeling shows that all three units are minimally used after conversion to operate on gas, and Unit 1 at Harrington is never actually operated after its conversion to gas operation.

5. SPS's own modeling results do not show any savings from converting Unit 1 to operate on gas relative to retirement. In fact, both SPS's and Synapse's modeling shows that retiring one unit is a no-regrets decision that has a lower net present value ("NPV") than converting all three units to operate on gas. And the Independent Evaluator's review confirms that retiring at least one Harrington unit is the best option for ratepayers.

6. All of SPS's modeling assumes near-term accelerated depreciation of the retiring Harrington assets. Under alternative financing mechanisms that assume some or all of the balance is disallowed, or that a rate of return is disallowed post-retirement, any of the cost savings the Company claims from conversion versus retirement are reduced or disappear.

7. SPS omitted a CO_2 price sensitivity, and consideration from any future environmental regulations, from its Harrington Analysis. If the Company is concerned about minimizing cost risk in the event that a carbon price—or other environmental regulations having material compliance costs—are

implemented during the units' remaining lives, it should choose to retire between one and three Harrington units.

8. Synapse's modeling, which uses updated assumptions for renewable and battery storage costs as well as realistic ongoing sustaining capital expenditures at Harrington, finds that it likely costs less to retire Harrington Unit 1 and fill any outstanding capacity gaps with Solar PV and battery storage than to convert the unit to gas.

Q Please summarize your recommendations.

A Based on my findings, I offer the following recommendations:

1. The Commission should require the retirement of Unit 1 or affirm that it will not allow the Company to collect a rate of return on any plant balances that are not used and useful.
2. The Commission should find that SPS did not meet its obligation to demonstrate that converting Harrington Unit 1 to operate on gas is the least-cost option. This finding should be based SPS's use of unrealistic projections for ongoing capital costs, its failure to conduct a CO_2 price sensitivity, its flawed cost assumption for alterative resources, and its omission of any analysis on alternative financing mechanisms such as a regulatory asset or securitization, which can spread out the costs over the economic life of the asset.
3. The Commission should require SPS to issue a request for proposal ("RFP") and determine which resources are still available and their timeline for availability.

3. SPS IS REQUESTING A CCN TO CONVERT ONE OF ITS TWO COAL-FIRED POWER PLANTS TO OPERATE ON GAS

i. Application overview

Q Describe SPS's coal-fired fleet.

A The Company owns two coal-fired power plants. The Harrington Generating Station is a three-unit coal-fired power plant located near Amarillo, Texas. Unit 1 has a net capacity of 340 MW and is scheduled to retire in 2035. Units 2 and 3 have a net capacity of 355 MW each and are scheduled to retire in 2038 and 2040, respectively.[1] The plant burns sub-bituminous coal from the Powder River Basin of Wyoming.[2]

The Company also owns the Tolk Generating Station, a 1,067 MW, two-unit coal-fired power plant located in Lamb County, Texas. SPS plans to operate both units seasonally through their scheduled retirement date in 2032. The Company switched to seasonal operation at Tolk in 2022 because it does not have access to enough economically recoverable water to operate the plant year-round through its scheduled retirement date.

Q What is SPS requesting in this case?

A SPS is requesting that the Commission amend its CCN at Harrington to allow the conversion of the three coal-power steam turbine units to natural gas ("Harrington

[1] Direct Testimony of William A. Grant, page 9.
[2] Direct Testimony of Jeffrey L. West, page 7.

Conversion"). The Company is requesting no change in the retirement dates of any of the units.

Q What prompted the Company to consider converting the Harrington units to operate on gas?

A In mid-to late-2018, air quality monitoring data near Harrington revealed that emissions from the plant were likely causing or contributing to exceedances of the Clean Air Act's health-based National Ambient Air Quality Standard for sulfur dioxide ("SO_2"). To address those exceedances, SPS evaluated options for retrofitting the Harrington units with pollution controls, converting one or more units to burn gas, or retiring the units. By mid-2019, SPS decided to convert the units to burn gas.

Q What analysis did SPS prepare to support its application for a CCN at Harrington?

A In 2019, SPS conducted an initial economic analysis using the Strategist model to support its request to accelerate the depreciation of the coal assets at Harrington.[3] The Company subsequently updated its analysis in 2021 ("Harrington 2021 Analysis") using the EnCompass model; I will discuss this updated analysis in depth in the next section. The Company presents this analysis to support its application for a CCN in this docket. SPS conducted the Harrington 2021 Analysis concurrently with the Tolk Analysis, which the Company used to support its decision to continue operating the Tolk units seasonally, rather than retiring and replacing them with alternatives.

[3] Direct Testimony of Ben R. Elsey, page 12.

Q Were the Harrington Units operating economically prior to SPS's decision to convert them to operate on gas?

A No. In Case No. 19-00170-UT, I presented analysis showing that Harrington incurred net losses of $194 million[4] over the four-year period between 2015–2018 on a total cost basis, and $35 million on just a variable cost basis.[5] I also found that Harrington was likely to lose ratepayers anywhere between $49 million and $510 million between 2020–2032 (with the likely value falling around $202 million).[6]

ii. SPS is assuming full recovery of all undepreciated balances associated with the Harrington Plant

Q What is the undepreciated balance remaining at the Harrington Plant?

A Harrington has an undepreciated balance of over $240 million as of June of 2021.[7]

Q Why is it concerning that the plant has such a large undepreciated balance?

A The large undepreciated balance at the Harrington plant has become, in the eyes of the utility, a barrier to the retirement of otherwise marginal or uneconomic generation units. Over the past several years, SPS's investments have created substantial costs in both the Tolk and Harrington generating stations despite

[4] Ex. DG-3, Direct Testimony of Devi Glick, pages 11-12. Docket No. 49831 (filed February 10, 2020).
[5] *Id.*, page 16.
[6] *Id.*, page 29.
[7] Ex. DG-2, SPS Response to SC 1-7, Exhibit SPS-SC 1-7(n).

numerous red flags. These include: the water shortage challenges at Tolk, SO_2 regulatory compliance concerns at Harrington, evidence that the plants are uneconomic, and stakeholders' repeated concerns that ratepayers would be forced to bear the costs of continued operation and investment at the plants. The utility then cited these largely self-inflicted undepreciated plant balances, and the near-term impact on ratepayers, as barriers to early retirement. We saw this first with the Tolk Analysis in Case No. 20-00169-UT, and now we see it with the Harrington Analysis. But this claim that ratepayers will be harmed by an early retirement is based on the assumptions that (1) the Company is entitled to full cost recovery of the remaining undepreciated plant balance plus a return on that investment, and (2) the cost recovery must happen entirely before each plant retires. Neither of these assumptions is justified.

As discussed above, SPS now seeks to invest substantial funds at Harrington to convert the plant to operate on gas and to build a gas pipeline to serve the plant—all while there is substantial evidence that retiring its coal generation assets and replacing them with clean energy resources is a lower-cost option. Any costs approved to convert the plant to operate on gas and to build the necessary pipeline infrastructure will only end up further inflating the undepreciated plant balance and will make early retirement even more of a challenge.

Q Is SPS guaranteed recovery of the full undepreciated plant balance at Harrington if the plant or any of the units retire early?

A No. The Company has not demonstrated that continued investment and operation of all three Harrington units is prudent relative to alternatives. Therefore, it is not appropriate for SPS to assume full recovery of its undepreciated plant balance prior to retirement in all scenarios.

I am not an attorney, but it is my understanding that the Commission has the ability to weigh the relevant facts when an existing utility plant becomes no longer used and useful, and to specify alternatives other than full recovery and return on investment for the undepreciated plant balances if that is in the public interest. Even if the Commission deems that full recovery is appropriate, the Commission can require recovery to occur over a lengthier period representing the plant's original projected lifetime, rather than all at once.

SPS stated that it did not consider the development of a regulatory asset to allow the plant balance to be depreciated over the current project lifetime even after it retires.[8] When asked about depreciating the plant balance over the project's current lifetime, SPS indicated it had not conducted such analysis, and that such an approach would require customers to continue to incur depreciation expenses for up to 16 years after they are used and useful.[9] But it is inappropriate for SPS to assume that the only option for cost recovery post-retirement is to include the full depreciation expense.

SPS's own modeling shows Unit 1 is never used after it is converted to operate on gas.[10] Therefore, is it unclear how the investments being made at Unit 1, and any associated incremental pipeline or common plant investments to convert Unit 1, meet the definition of used and useful as required for inclusion in rate base.

[8] Ex. DG-2, SPS Response to SC 3-2(b).

[9] Ex. DG-2, SPS Response to SC 3-1(b).

[10] Ex. DG-2, SPS Response to SC 1-3, SC 1-3(i)(HS)(USB) – EnCompass Output Files for *EO_SPS_2021 CCN_PL_400TRX_2021-06-21.xlsb*.

Q Is there precedent for disallowing or limiting the recovery of costs for a plant that is retired early?

A Yes. In Southwest Electric Power Company's ("SWEPCO") most recent rate case PUC Docket No. 51415, the PUCT final order allowed SWEPCO to place the undepreciated plant balance for the Dolet Hills Power Plant into a regulatory asset after the plant retires; but it also disallowed the Company's request to earn a rate of return on its investment once the plant retired.[11] The Commission's treatment of the undepreciated plant balance at SWEPCO's Dolet Hills is consistent with the PUCT's treatment of the undepreciated plant balance at the retired Welsh Unit 2, in Docket 46449. In light of that precedent, SPS should also have conducted analysis evaluating this option for early retirement.

Q Did SPS consider securitization of the undepreciated plant balance or any other alternatives?

A No. There is no evidence that SPS has considered securitization, or any other approach that would result in recovery of the remaining plant balance but at a lower rate of return. When asked about this the Company stated "SPS is unaware of any legal authority permitting the securitization of the undepreciated balance at the Harrington units."[12]

In New Mexico, the *New Mexico Energy Transition Act* ("ETA") was enacted to authorize securitization of undepreciated plant balances for abandoned coal plants located within New Mexico, and also for certain energy transition funding for local communities. Securitization results in very favorable interest rates for the

[11] Final Order, SOAH Docket No. 473-21-0538, Pub. Util. Comm'n of Tex. Docket No. 51415, page 12, (Jan. 14, 2022).
[12] Ex. DG-2, SPS Response to SC 1-11.

bonds which finance these costs. But the ETA has an embedded policy that is implementable without securitization. This policy is that utilities shall only receive a *return of* undepreciated asset balances for abandoned plants, and shall not receive any *return on* such investment, or shall only recover the cost of debt.

In Case No. 16-00276-UT, predating the ETA, the New Mexico Commission ordered that Public Service Company of New Mexico ("PNM") would only be able to recover, at most, a return based on the cost of debt for certain Four Corners coal plant investments.[13] In another case predating the ETA, the Commission accepted a stipulation in connection with the early retirement of two of the four units at the San Juan Generating Station in which ratepayers were required to pay for only 50 percent of the undepreciated plant balances.

I am advised by counsel that securitization is conceivably possible in Texas as well, at least if SPS has the will to pursue securing legislation and approval. Accordingly, SPS should have provided an analysis evaluating retirement with recovery only at the cost of debt as an option, and also at varying percentages of recovery.

[13] Case No. 16-00276-UT, Revised Order Partially Adopting Certification of Stipulation at ¶ 67 (Jan. 10, 2018).

4. SPS'S APPLICATION TO CONVERT HARRINGTON TO GAS IS DRIVEN BY THE NEED TO COMPLY WITH EXISTING ENVIRONMENTAL REGULATIONS, BUT THE COMPANY FAILS TO CONSIDER THE RISK OF FUTURE REGULATION IN ITS ANALYSIS

i. SPS must cease burning coal at Harrington to comply with an agreement with the Texas Commission on Environmental Quality to address exceedances of the SO_2 NAAQS

Q Is SPS required to convert Harrington to operate on gas or else shut the plant down?

A Yes. As noted, by mid-2018, air quality monitoring data indicated that Harrington was causing or contributing significant and routine exceedances of the health-based SO_2 NAAQS. To address those violations, the Company met with the Texas Commission on Environmental Quality ("TCEQ"), and agreed to study the cost of retrofitting the plant to continue operation on coal, converting the plant (partially or entirely) to operate on gas, or retiring the plant and replacing it with alternatives. On September 18, 2020, after a series of private, bilateral negotiations with TCEQ, SPS agreed to the issuance of an administrative order requiring the Company to cease burning coal at the Harrington units by January 1, 2025. On October 27, 2020, TCEQ issued a final administrative order implementing the negotiated agreement. Although the administrative order also directs SPS to make appropriate modifications to the units to burn gas, the order does not preclude SPS from retiring one or more Harrington units, so long as the Company ceases burning coal at all three units by January 1, 2025.[14]

[14] *See* Direct Testimony of Jeffrey L. West, Attachment JLW-1 at 4.

Q Explain how the NAAQS regulations for SO_2 apply to the Harrington plant in this docket.

A Under the Clean Air Act, the U.S. Environmental Protection Agency ("EPA") is required to set NAAQS for pollutants considered harmful to public health and the environment. Compliance is monitored by the EPA and TCEQ. One of the pollutants regulated under the NAAQS is SO_2, which is a major pollutant emitted from coal plants.

In 2016, TCEQ installed monitors in the vicinity of Harrington and found that over the three-year period between 2017–2019, SO_2 levels exceeded the standard of 75 parts per billion ("ppb"). Because Harrington emits the majority of SO_2 emissions in Potter County, it was found to be a major contributor to the monitored violations of the SO_2 NAAQS.[15]

To address those air quality violations, TCEQ required SPS to develop a plan to comply with NAAQS standards. This plan was submitted to the TCEQ and agreed to in October 2020. The compliance date was set for January 1, 2025. The agreed order required SPS to convert Harrington to operate on gas and cease all coal burning by January 1, 2025.[16]

[15] Direct Testimony of Jeffrey L. West, pages 8 and 9.

[16] *Id.* page 10. As noted, although the TCEQ order directs SPS to convert the Harrington Units to burn gas, the order "does not . . . prohibit any modification of the facility . . . so long as such modification does not conflict with" the requirement to cease burning coal at all three units by January 1, 2025. *See id.*, Attachment JWL-1 ¶¶ I.15 and II.1.

ii. SPS has not evaluated the impact of other potential and likely environmental regulations on the proposed project

Q Are there any other environmental regulations directly relevant to the Harrington plant in this docket?

A Yes. There are likely to be future regulations on carbon emissions that are relevant to the Company's decision here. Additionally, even if Harrington were not violating the SO_2 NAAQS as discussed above, the Clean Air Act's Regional Haze program would likely require the Harrington units to reduce emissions to protect visibility in national parks and wilderness areas. Under the Regional Haze Rule, states (or EPA, where the state fails to act) must implement Clean Air Act plans that require many older and disproportionately large sources of pollution, like Harrington Units 1 and 2, to install and operate "best available retrofit technology" to reduce SO_2, nitrogen oxide, and particulate matter pollution that impair air quality in certain national parks and wilderness areas.[17] Separately, states and EPA are required this year, and again in 2028, to reevaluate all major sources of haze-causing pollution and to adopt pollution controls as necessary to ensure "reasonable progress" towards the national goal of eliminating haze pollution in all protected national parks and wilderness areas.[18]

Because Texas failed to submit a lawful haze plan addressing "best available retrofit technology" for sources like Harrington, EPA proposed a regulation on January 4, 2017 that would have required Harrington Units 1 and 2 to install and operate flue gas desulfurization technology ("scrubbers") to reduce SO_2 emissions. EPA subsequently withdrew that proposal and finalized an emission

[17] *See generally* 42 U.S.C. § 7491(b)(2); 40 C.F.R. § 51.308(e).
[18] 40 C.F.R. § 51.308(d), (f).

trading rule in lieu of pollution controls. However, the federal agency's trading rule has been challenged in federal court and the new administration announced its intent to reconsider the imposition of source-specific controls to satisfy the Clean Air Act's best available retrofit requirements. Thus, setting aside compliance with the SO_2 NAAQS, the installation of scrubbers at Harrington Units 1 and 2 to comply with the Regional Haze Rule would cost approximately $400 million.[19]

Meanwhile, Texas and EPA are currently evaluating whether additional pollution controls to reduce SO_2 or nitrogen oxides from large electric generating units are necessary to fulfill the Clean Air Act's separate reasonable progress requirements. Even if the Harrington units are converted to burn gas, compliance with the Act's reasonable progress requirements could necessitate the installation of pollution controls to reduce nitrogen oxides. Under the Regional Haze Rule, EPA and other states have routinely required electric generating units without post-combustion nitrogen oxide controls, such as Harrington, to install and operate selective catalytic reduction ("SCR") or selective noncatalytic reduction ("SNCR") technology to reduce nitrogen oxide emissions.[20]

[19] Ex. DG-4, SPS, 2021 Integrated Resource Plan, Appendix K at 7, Case No. 21-00169-UT (July 16, 2021).

[20] In response to requests for information, SPS indicated that it anticipates Harrington's emission rates to be similar to Jones Unit 2, which the Company assumes will achieve a nitrogen oxide emission rate of 0.1 lb/mmBtu. SPS Response to SC 3-7 (referencing Resource Annual Emissions tab in the EnCompass Output Files provided in Exhibit SPS-SC 1-3(i)(HS)(USB). SPS did not provide any analysis supporting this assumption. Modern nitrogen oxide controls are capable of achieving an emission rate of 0.05 lb/mmBtu nitrogen oxides—about a 50 percent reduction from SPS's anticipated emissions—and EPA and other states have concluded that such controls are

Q Have there been any recent changes in environmental rules that could impact the Harrington plants?

A Yes. On February 28, 2022, the EPA administrator signed a proposed "Good Neighbor" federal implementation plan ("FIP") for the 2015 Ozone NAAQS. This action, known as the Transport Rule, addresses the potential in 26 states (including Texas) for emissions to cross state lines and make it harder for neighboring states to meet 2015 Ozone NAAQS. Although the proposed rule's implications for Harrington are uncertain, if finalized, the rule could require major emitters of nitrogen oxides, like the Harrington power plant, to incur capital or operational costs or require SPS to purchase additional NOx credits.

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cost-effective under the Regional Haze program. *See, e.g.*, 76 Fed. Reg. 52,387 (Aug. 22, 2011) (requiring the San Juan Generating Station in New Mexico to install selective catalytic reduction technology and meet a nitrogen oxide emission rate of 0.05 lb/mmBtu). While we can't estimate the exact cost of SCR or SNCR technology for Harrington, the EPA's Integrated Planning Model (IPM) cost methodology provides a range for SCR and SNCR technologies (*see* Ex. DG-5, EPA IPM v6 – Emission Control Technology Attachment 5-3 SCR Cost Development Methodology (May 2018) and Attachment 5-4 SNCR Cost Development Methodology (May 2018)). The EPA estimates that installing SNCR at a 500 MW unit would cost approximately $11.7 million in 2021$ and installing SCR at a 600 MW unit would cost $368 million. Using this as a proxy for the three Harrington units implies a range of $25 million–$368 million to install nitrogen oxide pollution control measures, a total which does not include annual O&M costs. Even if Harrington were not required to install additional controls, the continued operation of the units could require costs to optimize its current control equipment.

Q Has SPS incorporated consideration of any of these rules into its Harrington Analysis or any other recent modeling exercises?

A No. SPS's 2021 Integrated Resource Plan ("IRP") included a qualitative description of the potential impacts of the Regional Haze Rule at Harrington, but the CCN application fails to mention the environmental compliance risks associated with Regional Haze, ozone transport, or any other environmental regulations (aside from the SO_2 NAAQS). SPS fails to acknowledge or model any scenario that includes the compliance *costs* that could be required to continue operating the Harrington units throughout their currently planned life-spans. In fact, in rebuttal testimony in New Mexico Docket 21-00200-UT, Company witness West dismissed my concerns about SPS's lack of consideration of future environmental compliance costs and risk. He justified the Company's decision not to consider the risk of future regulations stating that "neither SPS nor the Sierra Club can predict at this time whether or when any of the proposed rule changes referred to above might be adopted."[21] But uncertainty on the exact cost and timeline of future regulations does not excuse the Company from evaluating and understanding the risk that future regulations pose to its plan to keep Harrington online for another decade and a half. This is especially true when (1) it is more likely than not that there will be some new or more stringent environmental regulations in the coming years, consistent with signals and proposals by the current administration as well as long-term historical trends, and (2) any such future regulations will very likely impose additional costs on the operation of an old, inefficient steam plant such as Harrington.

[21] Rebuttal Testimony of Jeffrey L. West, page 5. Case No. 21-00200-UT.

5. SPS's Harrington 2021 Analysis does not support the Company's request to convert Unit 1 to operate on gas

i. SPS presents modeling results for scenarios retiring two-units or all three-units but was not upfront that these options are not feasible given the timeline to procure alternatives

Q What analysis did SPS conduct to justify conversion of, and continued investment in, the Harrington plant?

A SPS modeled various scenarios and determined that compliance required either pollution controls, conversion to gas, or retirement. SPS's initial economic analysis was conducted in 2019 using the Strategist model. SPS then switched to the EnCompass model and updated its analysis in 2021 to support its application to convert the plant to operate on gas. The Harrington 2021 Analysis compared the revenue requirement of (1) complying with SO_2 NAAQS by adding environmental retrofits to the Harrington units; (2) retrofitting the three Harrington units to operate on gas and building out the necessary gas pipeline infrastructure; (3) retiring one of more of the units and replacing them with alternatives.

Q What did SPS find about the economics of continuing to operate the plant on coal?

A In its 2021 modeling, SPS found that it is more expensive to install environmental upgrades to comply with the SO_2 standards necessary to continue operating the plant on coal than to convert or retire the plant. It is concerning, however that SPS's CCN Application presents these pollution controls as viable options, even though, at the time the Company submitted the Application, SPS had already

entered into a binding agreement with TCEQ to cease burning coal by the end of 2024.

Q What is SPS proposing in its application?

A SPS is proposing to convert all three units at Harrington to operate on gas by the end of 2024. The conversion will not change the capacity of the plant.[22] To meet the plant's natural gas requirements, SPS is proposing to build a new 20-inch diameter natural gas supply line that will connect to two different gas supply transmission lines 20 miles northwest of the plant.[23]

Q Did SPS consider retirement of one or more units at Harrington and replacement with alternative resource option?

A No, not in a meaningful way. The Company conducted modeling that evaluated the cost of retiring one, two or three units at Harrington. But SPS was not clear in its application that retirement of either two and three units was not a viable option given the timeline required to acquire transmission interconnection rights for replacement resources. Specifically, in direct testimony in this docket, the Company indicated that it would be challenging to procure replacement resources and that the cost to do so was unknown.[24] But SPS was not clear until the Company submitted rebuttal testimony in the New Mexico Docket 21-00200-UT, that the results it presented for two- or three-unit retirement scenarios were purely academic. In this docket SPS is concurrently seeking approval from the New Mexico Public Regulation Commission to convert Harrington to operate on Gas.

[22] Direct Testimony of Mark Lytal, page 10.
[23] *Id.*, page 8.
[24] Direct Testimony of Ben Elsey, page 19.

Q Why is it infeasible to procure replacement resources by the end of 2024?

A The Company attributes the challenge with procuring resources on the necessary timeline to the interconnection backlog in the Southwest Power Pool ("SPP"). But as the Company itself explains, SPS is a member of the SPP and therefore has some responsibility over managing the interconnection queue.[25] This means that addressing and resolving the interconnection queue is not dependent on an un-related entity, but is a process that SPS itself has a role in. SPS's President has served on the SPP Members Committee, and the Company has a representative on SPP's Transmission Working Group. SPS has represented that it takes an active role in addressing the transmission backlog,[26] but the Company also declined to provide any documentation supporting that statement, so it is unclear what action SPS is taking in its role on the SPP board to address the backlog.

Q Was SPS proactive in evaluating alternatives to converting Harrington to operate on gas when it determined in 2019 that it likely would not comply with NAAQS if it continued to operate Harrington on coal?

A No. As discussed above, the Company conducted analysis in 2019 using the Strategist model and determined that upgrading the plant to allow it to continue operating on coal was not the least-cost option. SPS claims that its "2019 analysis supported converting the Harrington units to operate on natural gas. Therefore, at that time, it was determined that replacement resources were not necessary, which

[25] *Id.* 19.
[26] Ex. DG-2, SPS Response to SC 5-3.

means that SPS would not need to obtain approval from the Southwest Power Pool to interconnect a new generation resource."[27]

This is concerning for several reasons. First, it means that the Company decided in 2019 (or earlier), based on its Strategist modeling, that it was going to convert Harrington to operate on gas.

Second, it means SPS took no action to issue an RFP or a request for information ("RFI"), or otherwise procure resources at the time it decided to convert the units to operate on gas. If the Company had started pursuing alternatives at that time, it is more likely that SPS would be able to procure replacement resources by the end of 2024. The Company's inaction on procurement in 2019 had the consequence of presently precluding the Company from considering retirement of two or all three units as a viable resource option. That inaction has effectively and has locked ratepayers into the costs of continuing to operate at least some of the Harrington units.

Third, it is unclear how the Company determined that conversion of Harrington to operate on gas was lower cost than alternatives without actual market data on the cost of alternative resources. If the Company did not test the market for alternatives, it could not model the cost of alternatives. That means the only real analysis SPS did to determine that conversion to gas was the least-cost option was to compare conversion to gas with the cost of retrofitting the plants to continue operating on coal.

Finally, this means that the 2021 Harrington Analysis conducted in EnCompass was little more than an academic exercise to placate the Commission. Based on

[27] Direct Testimony of Ben Elsey, page 20.

the facts in SPS's rebuttal testimony in Docket 21-000200-UT, the only question the Commission may actually consider at this point without threatening the Company's capacity obligations is whether to approve conversion of all three units to operate on gas, or instead to approve conversion of two units while one unit is retired.

ii. SPS's modeling shows that the Harrington units will be inefficient, expensive, and minimally used after they are concerted to operate on gas

Q What assumptions did SPS make about the operational performance of the Harrington plant if converted to gas operation?

A For heat rate, SPS assumed that the plant would operate in the range of [redacted] This is [redacted] than what SPS modeled for the plant when operating on coal between 2022–2024, where it had a heat rate range of [redacted].[29] SPS indicated that it relied upon the emission rates of its most similar gas-steam unit, Jones 2, for modeling the Harrington units after they convert to gas operation.[30]

As shown in Table 1, SPS projects that Harrington's emissions rate will fall by around 40 percent, its SO_2 rate will drop to zero, its nitrogen oxide rate will decline by around one-quarter, and its particulate matter rate will drop by around 30–40 percent.

[28] Calculated based on outputs of SPS Response to SC 1-3, SC 1-3(i)(HS)(USB), Encompass Optimized Database 10.18.21.
[29] *Id.*
[30] Ex. DG-2, SPS Response to SC 3-7.

Table 1: CONF Average emissions rates of Harrington on coal and on gas

Unit Name	*lb/MWh* CO_2	*lb/MWh* SO_2	*lb/MWh* NO_x	*lb/MWh* PM	*lb/MWh* Hg
Harrington 1 – Coal	2,180	4.91	1.70	0.53	0.01
Harrington 1 – Gas	NA	NA	NA	NA	NA
Harrington 2 – Coal	2,135	4.77	1.41	0.12	0.01
Harrington 2 – Gas	1,259	0.1	1.14	0.08	0.00
Harrington 3 – Coal	2,280	4.98	1.49	0.15	0.01
Harrington 3 – Gas	1,258	0.01	1.14	0.08	0.00

Source: SPS Response to SC 3-7; SPS Response to SC 1-3(i)(HS)(USB), EnCompass Output Files, EO_SPS_2021_CCN_PL_400_TX_2021-06-21.

Q How would the Harrington units, after conversion to gas, compare to other gas generating plants?

A The Harrington units would not be very attractive gas-fired generation assets. The units' projected heat rate will be more than [redacted] (i.e., less efficient) than the heat rates for current combined cycle gas plants, which average around 7,604 btu/kWh).[31] The Harrington units' heat rates will be [redacted] heat rates of many gas-fired combustion turbine peakers, but the units will have none of the performance benefits of a fast-ramping combustion turbine plant.[32] Without even doing any modeling, I can say it is likely that these plants would only be called upon in an economic dispatch scenario when there are outages at more efficient plants or when there are other unusual system conditions.

[31] U.S. Energy Information Administration (EIA), Form EIA-860. Table 8.2 Averages Tested Heat Rates by Prime Mover and Energy Source, 2010-2020. Available at https://www.eia.gov/electricity/annual/html/epa_08_02.html.

[32] *Id.*

Q What did SPS's modeling show about the utilization of the Harrington plant after it is converted to gas operation?

A SPS's modeling results show that the Company assumed the plant would operate only minimally after conversion to gas operation (as shown in Table 2). Specifically, SPS modeled the Harrington units at a capacity factor of between 45.2 percent and 77.7 percent while operating on coal between 2022 and 2024. After the units are converted to operate on gas, SPS models the unit's operating at a maximum capacity factor of 3.9 percent, with Harrington 1 not operating at all after it is converted to operate on gas. This substantial change in capacity factor once the units convert to gas operation is mainly driven by the fuel delivery cost adder that SPS attaches to the Harrington units in EnCompass. This input increases the cost of delivered fuel at Harrington [redacted], with an average increase of [redacted] between 2025 and 2041, when compared to new gas combustion turbines.[33] Separate from the delivery cost adder, there is an additional cost of approximately [redacted] applied to Harrington fuel costs via a plant-specific commodity charge.[34] These delivery and commodity adders were included in SPS's EnCompass input files and remained unchanged in all modeled scenarios discussed in this testimony.

[33] SPS Response to SC 1-3(i)(HS)(USB), EnCompass Optimized Database Input Files, *SPS_ReferenceCase_1H21_2021-06-21.*
[34] *Id.*

Table 2: Average annual capacity factors at Harrington on coal and gas

Unit	Harrington (3 units) on Coal (2022–2024)		Harrington (3 units) on Gas (2025–2040)	
	Min	Max	Min	Max
Harrington 1	51.2%	64.5%	0%	0%
Harrington 2	45.2%	70.8%	0%	1.9%
Harrington 3	57.6%	77.7%	0%	3.9%

Source: Calculated based on SPS Response to SC 1-3(i)(HS)(USB), EnCompass Output Files, EO_SPS_2021_CCN_PL_400_TX_2021-06-21.

Q Is this the first time SPS's modeling has indicated that the Harrington Units would be minimally utilized if converted to operate on gas?

A No. It's actually the third set of analysis the Company has completed since 2019 that has shown the plants will be minimally utilized after conversion to operate eon gas. First, in July 2019, the Company's Transmission Planning team completed a study that concluded the Harrington units would provide little reliability value after being converted to gas because they would almost never run. Specifically, the report stated: "It is concerning that the Harrington units did not make it into the economic dispatch used in the models for this study, leading us to believe that these units may not be dispatched when converted."[35]

Also, in 2019, the Company also conducted modeling in Strategist to evaluate whether to retrofit the units to allow them to continue operating on coal, convert them to gas, or retire them. In this analysis too, the Company's results showed a substantial decrease in utilization after conversion to operate on gas. This was

[35] Ex DG-8, Harrington Station Fuel Repowering System Impact Study. Xcel Energy Services, Inc. Transmission Planning, South. July 10. 2019. Page 2.

driven in part by the Company's assumptions that the average energy costs would increase by [redacted] after the units were converted to operate on gas.[36]

Q How does SPS explain investing tens of million dollars in a gas pipeline and plant upgrades for a resource that will operate on average less than 2 percent of the time?

A SPS does not explain this at all. But these results show that SPS is either (1) planning to maintain Harrington as strictly a capacity resource and rely on the plant only minimally as an energy resource; or (2) significantly understating how often the Harrington plant will actually operate and the associated costs that SPS will incur to operate it.

Both options are concerning. The first is concerning because the Company is investing substantially in a plant that will almost never run. The second is concerning because in the Harrington Analysis, the plant operated very minimally in the model based on plant economics. This means that SPS can meet its energy needs through a combination of its lower cost generation resources and market purchases. But there is no requirement that SPS actually operate the plant in alignment with its modeling. And unlike a new combustion turbine or other gas peaking resource, Harrington is not small and nimble, will not be able to provide fast-ramping generation capability, and will require potentially significant continued investment to stay operational. It is hard for a utility to justify continued investment in a plant that is only minimally utilized.

[36] SPS Response to SC 1-3(ii), Attachment SO - _FF_SPS_HARRINGTON SO2_Gas 3.

Another concern is whether SPS will be able to secure a firm gas contract that will give it access to enough gas to run each plant at full capacity during only peak times. SPS is proposing to build a pipeline and invest in upgrades for Unit 1, all while appearing to intend to never actually use it.

Q Given SPS's projected reductions in air pollution with the gas conversion, isn't it reasonable to assume that there will be few, if any, environmental compliance costs associated with converting the Harrington units?

A No, not necessarily. While SPS projects that emissions will decrease by around 40 percent, that projection is based solely on the economic model's projected operation of the units. If the Harrington units are, in fact, operated only 2 percent of the time, as the model forecasts, emissions will decrease. Setting aside the prudence of spending approximately $75 million to convert a plant to operate a plant only 2 percent of the time, that low projected capacity factor will not necessarily avoid environmental compliance risk.

Under the Clean Air Act's Regional Haze program, for example, states must require large sources to install cost-effective pollution controls to protect air quality in national parks. To the extent that a state declines to impose additional pollution controls for any source based on that source's decline in utilization, the state must incorporate those operating parameters or assumptions as enforceable limitations in its regional haze regulation 40 C.F.R. §§ 51.308(i); (d)(3); (f)(2).[37] In other words, in evaluating the necessity of pollution controls, EPA generally evaluates the pollution benefits of controls based on a source's potential to emit,

[37] *See also* EPA, Guidance on Regional Haze State Implementation Plans for the Second Implementation Period at 22, 34, 42-43 (Aug. 20, 2019). Available athttps://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf.

not the source's unenforceable intention to operate for only limited hours. Thus, without a federally enforceable limitation on the hours of operation at Harrington, the conversion of those units to gas carries continued risk that the units could be required to install additional pollution controls to further reduce nitrogen oxides and particulate matter.

Moreover, as noted, EPA has now proposed a federal implementation plan under the 2015 Ozone NAAQS, which could require Texas power plants and major emitters of nitrogen oxides, like Harrington, to incur capital or operational costs or have to purchase additional NOx credits. This is a further indication that the Company's projected sustaining capital costs for the converted Harrington units is unrealistically low, as I discuss later in this testimony.

iii. SPS 2021 Harrington modeling relied on concerning assumptions and the Company has selectively highlighted specific results

Q Please summarize your concerns with SPS's Harrington 2021 Analysis.

A Before going into the modeling weeds, I note it is implausible to assume that a coal plant that is marginal today will somehow become more economic as its equipment ages, renewables come onto the grid, and the grid itself faces carbon constraints—just because it is converted to operate on gas. It is still fundamentally an old, inefficient, steam plant. The Harrington units, when converted to natural gas, will be neither as efficient as a modern combined gas cycle plant, nor as flexible and responsive as a combustion turbine.

Preserving all three units at Harrington as a gas-fired plant best serves the Company's shareholders' interest by guaranteeing continued recovery of the undepreciated plant investments and providing a rate of return on both the

existing balance and any new capital investments. But it is not the best alternative for SPS customers. Given this reality, SPS had to rely on overly conservative and unrealistic assumptions and on a questionable interpretation of the results to produce the results it presented.

Q Please explain which assumptions and results you find most concerning.

A I have the following specific concerns with SPS's Harrington 2021 Analysis:

1. **Interpretation of results:** The results do not definitively show that converting Harrington to operate on gas costs less than retiring one or more of the units. In fact, some of SPS's scenarios showed savings from retiring at least one unit under some scenarios. This is before factoring in the risk of CO_2 prices or other possible environmental regulation over the plant's remaining life.
2. **CO_2 price:** SPS did not model a CO_2 price.
3. **New gas pipeline costs:** SPS claimed no cost savings when scaling pipeline costs down from three units to two units.[38]
4. **Undepreciated plant balance:** SPS relied on the assumption that if the plant, or an individual unit, retires early, the entire remaining balance for that unit (or plant) has to be paid off by the ratepayers on an accelerated basis prior to retirement. Under alternative financial scenarios, retirement is more beneficial to ratepayers.
5. **Capacity need:** SPS has not demonstrated the need for the capacity from all three units.

[38] Ex. DG-2, SPS Response to SC 1-4(e)(i), Attachments *Encompass Cost Inputs – Gas Conversion, and Encompass Cost Inputs – Partial Gas Conversion*.

6. **Sustaining capital expenditures:** SPS's sustaining capital investment assumption for each unit when operating on gas are extremely low and unsupported. Specifically, without justification, the Company assumes that capital expenditure costs under gas operations will be only a fraction of the costs it has historically incurred at its gas steam plants. Second, the Company assumed no additional environmental compliance costs over the next 20 years. Additionally, SPS assumed only minimal incremental capital expenditure cost savings when retiring one unit and two units relative to retiring all three.
7. **Fixed O&M:** SPS's FOM cost adjustments for converting from coal to gas are inconsistent.
8. **Solar PV capital costs:** SPS assumed that the federal ITC expired and was not extended for future solar PV projects.
9. **Battery storage capital cost:** SPS modeled battery storage capital and fixed operation and maintenance ("FOM") cost together as a single FOM stream. This obscured the Company's individual assumption around capital cost and FOM costs.

Q Explain your concerns with SPS's conclusion that converting all three units to operate on gas is the prudent solution.

A SPS asserts that its results show that it costs less to retrofit Harrington to operate on gas than to retire the plant by the end of 2024. But SPS's own results show that it actually costs less to retire one unit and only convert two (instead of all three).

Q Explain your concerns with SPS not evaluating a CO_2 price sensitivity as part of its Harrington 2021 Analysis.

A SPS failure to evaluate a carbon price sensitivity as part of the Harrington 2021 Analysis means that it did not incorporate carbon risk into its evaluation of whether to convert Harrington to gas or retire the plant. CO_2 price sensitivities serve as a proxy for other types of environmental regulation targeting CO_2 emissions and making fossil fuel plants more costly. When asked about this, SPS stated that the Company did not "evaluate a speculative carbon pricing as part of the Harrington analysis as no such policy or regulation exists today or has ever been proposed in an actionable form."[39] This is concerning because SPS did evaluate carbon sensitivities as part of the IRP modeling in Case No. 21-00168-UT, and the carbon price had a large impact on the IRP results. While Harrington will emit less CO_2 operating on gas than it does currently operating on coal, it is still an aging, 30-plus-year-old fossil unit that emits a substantial quantity of CO_2.

As a steam-cycle plant, Harrington's converted units will have neither efficient heat rates or the flexibility to support wind and solar generation. A poor heat rate not only means higher fuel costs; it also means higher CO_2 emission per megawatt-hour of electricity produced. If a CO_2 price is imposed on Harrington's emissions at some point over the next 18 years (which is likely) that cost penalty would affect Harrington more than other gas plants in the Company's fleet (or in the SPP) and lead to even lower utilization than the 2 percent the Company projects.

[39] SPS Response to SC 3-4(b).

Q Explain your concerns with SPS's assumptions about the cost of the gas pipeline.

A SPS claimed there were no cost savings possible when scaling pipeline costs down from three units to two units, but did not conduct a robust analysis on the potential cost savings if only one unit was converted. The Company did say it could likely build a smaller pipeline with only one unit but went on to admit that the Company "has not conducted detailed analysis to determined what cost savings, if any, might be achieved through the installation of a smaller pipeline. Indicative numbers for a smaller pipeline were developed and used in evaluating for a single unit conversion."[40] The indicative savings SPS modeled were approximately $17.5 million or 27 percent of the full pipeline cost with the conversion of just one unit.[41]

Additionally, SPS indicated that it has not yet obtained authorization from any federal agencies for the pipeline. In fact, SPS has not had any correspondence with the U.S. Army Corp, the Fish and Wildlife Service, the EPA, or TCEQ about the project.[42] It is my understanding that to move forward with the pipeline SPS would need certification from U.S. Army Corp of Engineers under *Nationwide Permit 12*, authorization from the EPA and TCEQ under the *Clean Water Act*, and authorization from the Fish and Wildlife Service and Texas Parks & Wildlife Department the *Endangered Species Act*. This lack of communication is

[40] Direct Testimony of Mark Lytal, page 11.

[41] Ex. DG-2, SPS Response to SC 1-4(e)(i), Attachments *Encompass Cost Inputs – Gas Conversion, and Encompass Cost Inputs – Partial Gas Conversion*.

[42] Ex. DG-2, SPS Response to SC 3-11; SPS Response to SPS 3-12; SPS Response to SC 3-13; SPS Response to SC 3-14.

concerning because it is likely that the permitting process will require more time and resources than SPS has anticipated.

Q Explain your concerns with SPS's assumption around Harrington's undepreciated plant balance.

A As I discussed earlier, SPS relies on the assumption that if the plant, or an individual unit, retires early, the entire remaining balance for that unit (or plant) has to be paid off by the ratepayers on an accelerated basis prior to retirement. This front-loads the capital expenses for ratepayers, which results in a substantial increase in the net present value revenue requirement (NPVRR) over the near term (2022–2024). But SPS is not guaranteed recovery of the full undepreciated balance at Harrington, with or without a return—especially if the assets are no longer used and useful. Additionally, there are alternative financing options, such as securitization and creation of a regulatory asset that can lower the cost of recovering the undepreciated plant balance, even after a plant retires. SPS should have explored all of these options and presented these scenarios. This is information the Commission needs to evaluate in order to grant the requested CCN.

Q Explain your assertion that SPS has not justified the need for all the Harrington capacity.

A SPS developed two different long-term load forecasts: first, a financial forecast that represents SPS's median expectation for future energy and peak demand, and second, a planning forecast that "accounts for the uncertainty in the pace of oil and gas expansion in the service territory."[43] The planning forecast represents the

[43] Direct Testimony of John M. Goodenough, page 7.

85th percentile of the financial forecast and shows energy sales that are 31 percent higher and peak demand that is 20 percent higher than the financial forecast for 2041.[44]

During the period 2021–2026, the financial forecast projects a decrease in peak demand of 5 percent while the planning forecast projects that the system peak will increase by 2 percent. But this planning forecast is not aligned with SPS's historical data, which shows SPS's system peak actually fell by 1.7 percent over the past five years (2017–2021). The difference between the Company's planning forecast and financial forecast peak projection is 373 MW by 2025. Reliance on the planning forecast drives the need for new capacity years earlier than under the more realistic financial forecast.[45]

SPS relied on the higher planning forecast as the basis of the Harrington 2021 Analysis, but it also modeled sensitivities using the financial forecast. SPS acknowledged that it has sufficient resources to meet its planning reserve margin in 2024, and that retiring one Harrington unit would not impact that.[46] But the Company claimed that if it retired one Harrington unit, it would need additional resources starting in 2025 (as shown in Table 3). When using the financial forecast, SPS's resource need is pushed back two years until 2027.[47] These two years could be valuable in allowing SPS time to build new resources and apply for interconnection approval for replacement resources.

[44] *Id.*, page 14.
[45] Direct Testimony of John M. Goodenough, Table JMG-3; Exhibit SPS-SC 1-13.
[46] Ex. DG-2, SPS Response to SC 1-12.
[47] Ex. DG-2, SPS Response to SC 1-13, Exhibit SPS-SC 1-13.

Table 3: Resource position for planning forecast and financial forecast

Resource Position	2025	2026	2027	2028	2029	2030
Planning Forecast						
Assuming all Harrington Units Are Converted	234	(70)	(199)	(502)	(699)	(774)
Assuming Harrington Unit 1 Is Retired	(106)	(410)	(539)	(842)	(1,039)	(1,114)
Financial Forecast						
Assuming all Harrington Units Are Converted	606	347	279	23	(134)	(168)
Assuming Harrington Unit 1 Is Retired	266	7	(61)	(317)	(474)	(508)

Source: Exhibit SPC-SC 1-13.

Q Explain your concerns with SPS's sustaining capital expenditure assumption for the plant when operating on gas.

A SPS's sustaining capital expenditure assumption for each unit when operating on gas is implausibly low. SPS assumed annual capital expenditures of $3.75 million per year (escalated at 2 percent per year) after the units were converted to operate on natural gas. SPS's source for its $3.75 million estimate is "discussions with the Xcel Energy Projects team."[48] The lack of support for this low estimate is concerning for a number of reasons:

- The historical average capital expenditures spending at Harrington when operating on coal is five times higher—around $18.6 million per year.[49]
- Industry standard estimates produced by the firm Sargent & Lundy for the U.S. Energy Information Administration ("U.S. EIA") were within 25 percent of SPS's actual reported sustaining capital costs when the plant was operating

[48] Ex. DG-2, SPS Response to SC Request 2-3 (a).
[49] Ex. DG-2, SPS Response to SC Request 1-7 (ix, x)

on coal but are around four times higher than what SPS estimates with the plant operating on gas. Specifically, Sargent and Lundy estimated capex for a gas steam plant over 1,000 MW and over 30 years in age at $12.5 million a year.[50]

- SPS's reported capital spending at its gas steam plants in the prior rate case (Test Year April 1 2018 – March 31, 2019) worked out to an average of $8.6 million per year in capital investments when scaled to a plant the size of Harrington.[51]

Table 4 below summarizes the cost comparisons discussed above.

[50] Ex. DG-6, Sargent & Lundy Consulting, prepared for U.S. EIA. Generating Unit Annual Capital and Life Extension Costs Analysis, December 2019. Available at https://www.eia.gov/analysis/studies/powerplants/generationcost/pdf/full_report.pdf.

[51] Ex. DG-7, Attachment LJW-2 to Direct Testimony of Laurie Wold on Behalf of SPS, Case No, 19-00170-UT.

Table 4: Sustaining capital expenditure estimates vs actual spending for steam coal plants and steam gas plants

Item	Description	Annual capital expenditure spending ($2021 Million)
Coal Capex		
Harrington historical capital expenditures spending (coal)	Average of 2015–2020 actual spending	$18.59
U.S. EIA estimate of sustaining capital expenditures for steam coal plant	Sargent and Lundy report, plant 30–40 years old, no FGD	$24.12
Gas Capex		
Harrington projected capex spending (gas)	**Projection for 2024–2040, escalated at 2%/year**	**$3.75**
U.S EIA estimate of sustaining capital expenditures for steam gas plant	Sargent and Lundy report, plant >30 years old, >1000 MW	$12.47
SPS historical capital expenditures spending on steam gas plants	Rate case spending, April 1, 2018–March 31, 2019 for company's steam gas units	$8.58

Source: Calculations based on SPS Response to SC Request 3-3 (a); Ex. DG-7, Exhibit Attachment LJW-2 to Direct Testimony of Laurie Wold on Behalf of SPS, Case No, 19-00170-UT; Ex. DG-6, Sargent & Lundy Consulting, prepared for U.S. EIA. Generating Unit Annual Capital and Life Extension Costs Analysis, December 2019.

Q Do SPS's assumptions around sustaining capital expenditures have a large impact on its overall findings?

A Yes. As shown in Table 5, SPS estimated the NPV of sustaining capital expenditures for Harrington operating on gas at between $16.1 million (with one unit converted) and $33.9 million (with all units converted) over the remaining

life of the plant.[52] These values are substantially lower than the $42.8 million (one unit converted) to $58.0 million (three units converted) range we estimate based on SPS's historical spending on its gas steam plants.[53] The comparison is even more jarring using EIA's methodology, which shows values of $79.9 million (one unit converted) to $167.8 million (three units converted).[54] While it is reasonable that SPS would want to minimize investments at a plant with such a low projected capacity factor, there is a baseline level of investment and maintenance required to ensure the plant is actually reliable and functional when needed. In total, this means that SPS has very likely understated the ongoing costs required to maintain the Harrington plant by between $42.8 million and $133.9 million.

Table 5: Total capex spending at Harrington using original and updated assumptions

Total capex spending (NPV $2021 Million)	**Convert 3 units to gas**	**Convert 2 units to gas**	**Convert 1 unit to gas**
Total			
SPS projection for sustaining capex on gas in Harrington 2019 Analysis	$33.9	$25.7	$16.1
U.S. EIA estimate of sustaining capex for steam gas plant	$167.8	$127.6	$79.9
SPS historical capex spending on steam gas plants	$91.8	$77.5	$58.9
Delta between SPS projection and updated sustaining capex assumptions			
U.S. EIA estimate of sustaining capex for steam gas plant	$133.9	$101.8	$63.7
SPS historical capex spending on steam gas plants	$58.0	$51.7	$42.8

Source: Calculations based on SPS Response to SC Request 3-3 (a); Ex. DG-7, Exhibit Attachment LJW-2 to Direct Testimony of Laurie Wold on Behalf of SPS, Case No, 19-00170-UT; Ex. DG-6, Sargent &

[52] Ex. DG-2, SPS Response to SC Request 2-3(a).

[53] Calculated based on Ex. DG-7, Attachment LJW-2 to Direct Testimony of Laurie Wold on Behalf of SPS, Case No, 19-00170-UT.

[54] Ex. DG-6, Sargent & Lundy Consulting, prepared for U.S. EIA. Generating Unit Annual Capital and Life Extension Costs Analysis, December 2019. Available at https://www.eia.gov/analysis/studies/powerplants/generationcost/pdf/full_report.pdf.

Lundy Consulting, prepared for U.S. EIA. Generating Unit Annual Capital and Life Extension Costs Analysis, December 2019.

Looking at SPS's modeling results, summarized in Table 6 below, the Company's likely underestimation of capex is significant; indeed, using SPS's own historical capex or EIA's estimates would make the case in favor or retiring Unit 1 even stronger.

Table 6: NPVRR Results from Table BRE-2

Scenario	Description	2022–2041 Delta ($M)
Scenario 2	Convert all Harrington units to natural gas	$0
Scenario 1	Retire all Harrington units	$124
Scenario 5	Convert 1 unit to gas / retire 2 units	$62
Scenario 6	Convert 2 units to gas / retire 1 unit	($5)

Source: Direct Testimony of Ben Elsey, page 29.

Q What is driving this large gap between SPS's assumptions around future sustaining capital expenditures and your updated assumptions?

A Part of this gap is due to SPS's failure to consider any future environmental compliance costs. Specifically, SPS indicated that it is unaware of any other impending regulations that will impact the Harrington units; therefore, it has modeled no additional environmental compliance costs beyond those relating to SO_2 controls.[55] But it is risky for SPS to plan as though Harrington is unlikely to incur other future environmental compliance costs over the next two decades. Especially as the EPA is actively proposing new rules to limit ozone emissions in the rgion.

[55] Ex. DG-2, SPS Response to SC 1-6.

Q Explain your concerns with SPS's FOM cost streams between 2022–2024 in the scenarios where the units are assumed to convert from coal to gas.

A SPS appeared to model the wrong FOM cost stream in EnCompass between 2022–2024 for units converted to operate on gas.[56] Specifically, the Company appears to have used the FOM cost stream intended for units that continue to operate on coal instead of using the intended ones with reduced FOM for units that convert to gas. Indeed, SPS admitted in a discovery response that the Company originally planned to model lower FOM costs for the years 2022–2024 for all scenarios where the units were converted to operate on gas.[57] These were provided in a separate discovery request.[58]

Q Explain your concerns with SPS's incremental reduction in sustaining capital expenditures when retiring one and two units.

A SPS assumed that there would be only small incremental reductions in sustaining capital expenditures with the retirement of additional units. Specifically, SPS modeled a reduction in sustaining capital expenditures of only 10 percent with the retirement of one unit, and 37 percent with the retirement of two units (relative to total projected spending for the entire plant) between the years 2024–2024.[59] While it is understandable that some economies of scale will be lost with reducing

[56] Ex. DG-2, SPS Response to SC 1-3(i)(HS)(USB), Encompass Optimized Database 10.18.21.

[57] Ex. DG-2, SPS Response to SC 3-6(c).

[58] Ex. DG-2, SPS Response to SC 1-4(i) Attachments *Encompass Cost Inputs – Gas Conversion, EnCompass Cost Inputs – Partial Gas Conversion, EnCompass Cost Inputs – Early Retirement.*

[59] Calculations based on SPS Response to SC 1-4(e)(i), Attachments *Encompass Cost Inputs – Gas Conversion, and EnCompass Cost Inputs – Partial Gas Conversion;* SPS Response to SC 1-3(i)(HS)(USB), *Encompass Optimized Database 10.18.21.*

the plant size, it is unclear why SPS can only reduce capital investments by 10 percent while reducing the plant capacity by a full third, and 37 percent when reducing plant capacity by a full two-thirds. These assumptions are unsupported and substantially understate the likely savings that SPS could experience if it shut down one or two units.

Q Explain your concerns with SPS's assumptions for the capital costs of new solar PV and battery storage resources.

A SPS models new generic solar PV project additions assuming that the ITC expires. This results in a large jump in solar PV costs after 2027. This decision makes solar look more expensive than it likely will be, and it disadvantages solar PV as a choice relative to new gas resources.

SPS also models new generic battery storage resources with a single fixed cost stream that includes all capital costs, fixed costs, financing costs and returns into one single value. This makes it very challenging to evaluate the reasonableness of SPS's individual cost stream and assumptions regarding new battery storage costs.

Q What is your conclusion with regard to the evidence on which SPS relied and the prudence of the Company's decision to convert Harrington to operate on gas?

A SPS has not demonstrated that conversion of all three units at Harrington to operate on gas is a lower cost option than retiring Unit 1 and converting the other two units. SPS relied on many concerning assumptions to produce the results that it published, omitted a sensitivity around CO_2 prices, and even had errors in its modeling. But even with all these assumptions that skewed the analysis in favor

of converting all three units at Harrington to operate on gas, SPS's own analysis shows that it is lower cost to retire Unit 1 than to convert it to operate on gas.

Q Does retiring Harrington Unit 1 pose any system reliability concerns?

A No. In July 2019, SPS conducted a transmission reliability study evaluating the Company's decision to convert all three Harrington units to burn gas. Much like SPS's EnCompass modeling in support of the Application, the Company's July 2019 transmission study indicated that the Harrington units "may not be dispatched when converted,"[60] concluding that "if the Harrington generation is converted to natural gas but is not dispatched, it is the same as retiring the generation,"[61] because unused units are not able to provide transmission support. The study went on to conclude that the Harrington generation should actually "be replaced and relocated to the south west part of the SPS transmission system,"[62] and that the retirement of the Harrington units "had no adverse impacts on the local SPS transmission system."[63] Given SPS's conclusion that the three Harrington units could be retired (or converted to synchronous condensers) without transmission reliability issues, SPS could certainly retire Unit 1 and convert the other two units while maintaining safe and reliable service.

[60] Ex DG-8, Harrington Station Fuel Repowering System Impact Study. Xcel Energy Services, Inc. Transmission Planning, South. July 10. 2019. Page 2.
[61] *Id,* page 20.
[62] *Id,* page 3.
[63] *Id,* page 14.

6. SYNAPSE'S MODELING FINDS THAT IT IS THE LOWEST-COST SCENARIO, AND A NO-REGRETS DECISION, TO RETIRE UNIT 1 AT HARRINGTON AND CONVERT ONLY TWO UNITS

Q Explain the alternative modeling that Synapse conducted.

A We began with SPS's Encompass files used by the Company to conduct its Harrington 2021 Analysis.[64,65] We reviewed the inputs and methodology as discussed in the prior section. We developed updates and corrections to address the items outline above.

We used SPS's scenario from the Harrington 2020 Analysis as the basis for our modeling and we used SPS's results as reference costs. Note that we originally evaluated all of SPS's conversion scenarios. But because SPS made it clear in its rebuttal testimony in NM Docket 21-00200-UT that retirement of two or three units are not viable options, given the timeline required to secure replacement resources, we will focus on the results regarding the conversion of two units and the retirement of Unit 1.

1. Scenario 2: Convert Harrington Units 1, 2, and 3 to operate on gas[66]
2. Scenario 6: Retire Unit 1 and convert Units 2 and 3 to operate on gas.

For each model run, we used the following assumptions as shown in Table 7:

[64] SPS Response to SC 1-3(i)(HS)(USB) *Encompass Optimized Databased 10.18.21* files.

[65] The modeling files provided by SPS did not contain the databases for Scenario 2. We therefore relied on the EnCompass files that were provided as part of the Tolk Analysis during the IRP Docket, Case No. 21-00169-UT as the basis of our evaluation of Scenario 2.

[66] *Id.*

Table 7: Scenarios modeled

Base Scenario	Tolk Retirement	Harrington Retirement / Conversion	Tx Cost[67]
Scenario 2	2032	All units converted at end of 2024	$400/kW
Scenario 5	2032	Units 2 and 3 units converted at and of 2024; Unit 1 retired	$400/kW

Q Explain each of the changes you made to the model.

A We first updated several assumptions in SPS's base runs.

First, for all generic solar, wind, and battery storage resource additions we relied on the National Renewable Energy Laboratory's ("NREL") Annual Technology Baseline ("ATB") capital cost assumption for generic solar PV and wind resources. SPS assumed that the federal ITC expires in 2025, while NREL assumed that it is extended beyond 2025 for solar PV.[68]

Second, we updated the FOM assumptions for the Harrington units between 2022–2024 using the correction we discussed above. We used the cost stream that was $1.5 million lower for all units that SPS planned to retire in 2024, and the higher cost stream for all units that SPS planned to convert to operate on gas.

Third, we did not allow the model to build any new gas projects prior to 2030 in any scenarios. Although we did allow new gas after 2030, we assume that any new gas projects that the model selects after 2030 are simply place-holders for firm and dispatchable capacity resources that SPS may need in the future.

[67] SPS modeled transmission costs of $200/kW, $400/kW, and $600/kW. We used SPS's central value of $400/kW in all scenarios.

[68] National Renewable Energy Laboratory, Annual Technology Baseline.

Fourth, we modeled sustaining capital expenditures for Harrington on the basis of SPS's historical spending. As discussed above in Table 4 and Table 5, the historical Harrington sustaining capital values we use in our modeling are higher than those used in the SPS scenarios but remain below EIA's projections.

Finally, we capped annual storage additions at 300 MW over the modeling horizon. This annual limit was used to ensure that the model would not overbuild battery storage in any single year. There was no cumulative constraint, however, on any resource type over the period of analysis.

Q Explain which sensitivities you tested.

A We tested a number of sensitivities based on likely future outcomes that SPS should consider in deciding whether to retire or convert Harrington to operate on gas.

1. **CO_2 price:** To assess the impact that future carbon regulations would have on the cost to continue to operate Harrington, we tested a carbon price sensitivity. We used the middle carbon price that SPS relied on for its most recent New Mexico IRP, which was $20/metric ton using a base year of 2011 and escalated at 2.5 percent per year.[69]
2. **Financial Load:** Like SPS, we tested our sensitivities using both the higher Planning Load and the lower Financial Load.
3. **Depreciation schedule:** Given the uncertainty around SPS's recovery of the remaining plant balance at Harrington, we tested several alternative assumptions for recovery of the undepreciated plant balance at Harrington:

[69] Ex. DG-4, SPS 2021 IRP, page 85.

a. Depreciate remaining balance over each unit's remaining life instead of three years for any unit that retired early *without* a return on investment post-retirement.
b. Disallow the entire undepreciated plant balance after a unit retired.
c. Disallow half the undepreciated plant balance after a unit retires and disallow a rate of return on the remaining balance.

4. **Gas sustaining capital expenditure costs:** SPS's assumptions around the sustaining capex costs required after the units are converted to gas operation are extremely low and unsupported. Therefore, we tested a sensitivity using SPS historical data based on its existing steam gas plants for sustaining capex costs. We did not model the risk of compliance costs from future environmental regulations. Technologies to limit nitrogen oxide emissions could cost between $24.9 million and $368 million for SNCR and SCR technologies respectively.[70] The inclusion of these costs, and the associated annual O&M, would make gas conversion more expensive in our modeling compared to a partial retirement or full retirement scenario.

Q What did you find when you made the changes and tested the sensitivities outlined above?

A Like SPS, I find that retiring Unit 1 results in a lower NPVRR than converting all three Harrington units to operate on gas, as shown in Table 8 below. Specifically,

[70] This range was calculated using the updated methodology developed by Sargent and Lundy in May 2018 for the EPA IPM Model v6. The Emission Control Technology Attachment 5-3 SCR Cost Development Methodology and Attachment 5-4 SNCR Cost Development Methodology are attached in Ex. DG-5.

our results show that SPS would save roughly $62 million if it chose to retire Unit 1 instead of converting all three units to gas.

Table 8: NPVRR results from Synapse modeling runs

	2022–2024		2022–2041	
Cost ($Million)	**Delta**	**NPV**	**Delta**	**NPV**
SPS Modeling Results				
Convert all Harrington (IRP Scenario 2)	$0	**$2,450**	$0	**$11,949**
Retain 2 Gas Harrington / Retire 1	$39	**$2,490**	($5)	**$11,944**
Planning Load				
Convert all Harrington	$0	**$2,428**	$0	**$11,534**
Retain 2 Gas Harrington / Retire 1	$40	**$2,468**	($62)	**$11,472**
Financial Load				
Convert all Harrington	$0	**$2,272**	$0	**$10,027**
Retain 2 Gas Harrington / Retire 1	$40	**$2,313**	($62)	**$9,965**
CO_2 Price				
Convert all Harrington	$0	**$2,855**	$0	**$12,491**
Retain 2 Gas Harrington / Retire 1	$41	**$2,896**	($65)	**$12,426**

Source: Synapse results from modeling completed based on SPS Response to SC 1-3(i)(HS)(USB), Encompass Optimize Databased 10.18.21.

While SPS would incur slightly higher capital costs and purchased power costs, it would also see savings from fuel, non-fuel VOM, and FOM costs, as shown in Table 9 below. Results are similar with both the planning load and the financial load.

Table 9: NPVRR breakdown for Synapse Unit 1 retire scenario

Cost Category Description	2022–2041 Delta from Convert All Baseline ($Million)
Capital Costs	$2.1
Fuel Costs	($11.3)
Commitment Costs	($0.7)
Non-Fuel VOM	($10.8)
FOM	($45.2)
Purchase Costs	$11.2
Contract Costs	($7.2)
Total	**($61.9)**

Source: Synapse results from modeling completed based on SPS Response to SC 1-3(i)(HS)(USB), Encompass Optimize Databased 10.18.21

As shown in Table 10, I also find that retiring Unit 1 is a no-regrets decision that results in nearly identical or lower NPVRR than converting all three units under every scenario and sensitivity I tested. Additionally, I find that SPS's modeling substantially understated the likely savings from retiring Unit 1 units relative to converting it. Despite recommending conversion of all three units to gas, SPS's own results did show that over the planning period (2022–2041), there would be NPVRR savings of $5 million from retiring Unit 1 relative to converting all three units. Our results show that the likely savings are larger, ranging between $62 and $65 million.

Table 10: NPVRR of retire one unit scenario Unit 1 retirement scenario

Description	2022–2041 Delta from Convert All Baseline ($Million)
SPS Scenario 5	
SPS Base (Planning Load)	($5)
Financial Load	($29)
Synapse Scenario 5	
Synapse Base with baseline changes discussed above	($62)
Financial Load	($62)
CO_2 Price	($65)
Undepreciated balance disallowed post-retirement	($109)
Undepreciated balance allowed but no return allowed	($77)
Financial Load, undepreciated balance disallowed post-retirement	($110)

Source: SPS results from Tables BRE-2 and BRE-3. Synapse results from modeling completed based on SPS Response to SC 1-3(i)(HS)(USB), Encompass Optimize Databased 10.18.21.

Q What resources are required to replace the units when they retire?

A The retirement of one unit does not necessitate a significant change in resource mix over what the model already selects in the "Convert All" scenario. My modeling results show an addition of 40 MW of incremental battery storage in 2027, and another 70 MW in 2028 for a total of 110 MW of battery storage. This minimal difference over the next decade, and in fact over the entire planning period, between the scenarios with and without Unit 1 shows exactly how little remaining value and use Unit 1 has for SPS and its ratepayers. This finding is supported by the Company's own modeling results which, as discussed above, shows that Unit 1 is never used even after it is converted to gas operation.

Q What did you find in terms of CO_2 prices, pollutants, and emissions?

A Synapse modeled a CO_2 price sensitivity set to $20/metric tonnes in Base Year 2011, escalating at 2.5 percent per year. The CO_2 price scenarios were identical to

the Synapse base EnCompass runs, with the exception of the CO_2 price. In these scenarios, we found that converting two Harrington units and retiring Unit 1would all be cheaper for SPS customers between 2022 and 2041 if a CO_2 price is implemented. As shown in Table 11, savings were $65 million with Unit 1 retired.

Table 11: CO_2 price sensitivity results

Scenario	NPVRR ($Million) 2022-2041	Delta ($Million) Compared to Convert All Scenario
Convert All Harrington Units	$12,491	$0
Convert Two Harrington Units	$12,426	($65)

Source: Synapse results from modeling completed based on SPS Response to SC 1-3(i)(HS)(USB), Encompass Optimize Databased 10.18.21.

Given these results, our recommendation is that SPS model a CO_2 price sensitivity so that the utility's modeling can capture the risk that the conversion of all Harrington units to gas would pose to SPS customers should federal carbon legislation be enacted.

Q What did you find under alternative financing options and plant balance assumptions?

A I found that when all or part of the undepreciated balance is disallowed after retirement, or if the rate of return is disallowed post retirement, the savings from retiring Unit 1 relative to conversion increase substantially, as shown in Table 12. It intuitively makes sense that if the balance is disallowed, savings will increase. But these results show the cost that SPS assumes its ratepayers will be required to pay for the remaining plant balance at Harrington. Specifically, if Unit 1 is retired and the remaining balance for the unit is disallowed post-retirement, SPS ratepayers will save $109 million relative to the cost of converting the unit to operate on gas and paying off the balance prior to retirement. Even if only 50 percent of the balance is disallowed, savings will be around $73 million. And if

the full balance is allowed post-retirement but a rate of return is not permitted, we estimate savings of around $77 million.

Table 12: NPVRR of Synapse runs under alternative financing and plant balance recovery assumptions

	2022–2024		2022–2040	
Cost ($Million)	**Delta**	**NPV**	**Delta**	**NPV**
100% Undepreciated balance disallowed post-retirement				
Convert all Harrington	$0	$2,428	$0	**$11,534**
Retain 2 Gas Harrington / Retire 1	($7)	$2,421	($109)	**$11,424**
50% Undepreciated balance disallowed post-retirement				
Convert all Harrington	$0	$2,428	$0	**$11,534**
Retain 2 Gas Harrington / Retire 1	($7)	$2,421	($73)	**$11,461**
Undepreciated balance allowed, no return post-retirement				
Convert all Harrington	$0	$2,428	$0	**$11,534**
Retain 2 Gas Harrington / Retire 1	($7)	$2,421	($77)	**$11,457**
Financial Load / 100% undepreciated balance disallowed post-retirement				
Convert all Harrington	$0	$2,272	$0	**$10,027**
Retain 2 Gas Harrington / Retire 1	$11	$2,283	($110)	**$9,917**

Source: Synapse results from modeling completed based on SPS Response to SC 1-3(i)(HS)(USB), Encompass Optimize Databased 10.18.21

Q What do you conclude about the reasonableness and cost of SPS's proposal to convert all three Harrington units to operate on gas?

A I find that SPS has not demonstrated that converting Harrington Unit 1 to operate on gas is in the best interest of its ratepayers. As discussed above, SPS's modeling is flawed and based on inaccurate assumptions and its results do not show a meaningful cost difference between many scenarios. Our modeling results, produced based on SPS's modeling files with our own modifications, show that retiring one unit and only converting two units will result in substantially lower costs for ratepayers than converting all three units to operate on gas.

1 **Q** **Does this conclude your testimony?**

2 **A** Yes.

3 **A**