

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: December 18, 2018

REGULAR X CONSENT _____ EFFECTIVE DATE _____ N/A _____

DATE: December 5, 2018

TO: Public Utility Commission

FROM: ^{RA} Rose Anderson and ^{LS} Lauren Slawsky

THROUGH: ^{JPS for JE} Jason Eisdorfer and ^{JPB} JP Batmale

SUBJECT: PACIFICORP (Docket No. LC 70) Integrated Resource Plan: Staff and PacifiCorp report on updated coal analysis process and results.

STAFF RECOMMENDATION:

The Commission should direct PacifiCorp (PAC) to continue with its analysis of coal retirement dates, including the following actions:

- Evaluate additional stacked retirement scenarios for consideration as part of a reliable, least-cost resource strategy in the 2019 IRP.
- Continue to investigate the impacts of early retirements on system reliability and the least cost and risk remedies.
- Assess potential frequency-response shortfalls for priority cases.
- Evaluate potential operational adjustments or resource alternatives to address modeled capacity shortfalls.
- Evaluate sensitivities that restrict the selection of natural gas resources.
- Report to the Commission on coal analysis progress at a Special Public Meeting in the first two months of 2019. Provide workpapers and modeling inputs and outputs for any new analysis in LC 70 two weeks in advance of the meeting.

DISCUSSION:

Issue

Whether the Commission should approve Staff's recommendation and direct PacifiCorp to continue the coal analysis and further investigate the economics and reliability implications of coal unit retirements.

Applicable Rule or Law

In Order No. 07-002, the Commission adopted guidelines to govern the IRP process, and in Order No. 07-047 the Commission corrected the IRP guidelines. The IRP guidelines require that all resources be evaluated on a consistent and comparable basis, that risk and uncertainty be considered, that the primary goal be the selection of a portfolio of resources with the best combination of expected costs and risks/uncertainties for the utility and its customers, and that the plan be consistent with the long-run public interest as expressed in Oregon and federal energy policies.¹

Additionally, the IRP guidelines require the "Construction of a representative set of resource portfolios to test various operating characteristics, resource types, fuels and sources, technologies, lead times, in-service dates, durations and general locations," and the "selection of a portfolio that represents the best combination of cost and risk for the utility and its customers."²

OAR 860-027-0400 sets forth the requirements for filing an IRP with the Commission.

In Order No. 18-138, the Commission reported that PacifiCorp agreed to perform an analysis of coal unit retirements in System Optimizer. In Order No. 18-360, the Commission approved Staff's "Next Steps, Objectives, and Other Considerations for Coal Analysis for the 2019 IRP," including the proposed calendar of near-term events and the main objectives of stakeholder engagement, transparency, and achieving reasonable agreement about the usefulness and appropriateness of the analysis for planning least-cost, least-risk portfolios.

Order No. 18-424 approved PacifiCorp's request to move the reporting of coal analysis results four weeks later, from mid-November to December 18.

Analysis

Coal Analysis Process

At the Public Input Meetings on November 1, PacifiCorp presented stakeholders with the basic structure of its proposed analysis. PacifiCorp also shared some changes in general IRP methodology that would be incorporated into the portfolio analysis in the coal study, including the ability to select transmission upgrades endogenously using System Optimizer and the addition of a \$50/kw-year adjustment applied to resources that are highly flexible.

PacifiCorp analyzed over 40 resource portfolios and presented the results at the December 3-4, 2018 Public Input Meeting. The resource portfolios were developed

¹ *In re Public Utility Commission of Oregon*, OPUC Docket No. UM 1056, Order No. 07-047 (Feb.9, 2007).

² Order No. 07-047.

using the System Optimizer (SO) model and further analyzed in Planning and Risk (PaR).

PAC also hosted an Oregon-specific stakeholder meeting on December 7, 2018 to present the results of the coal analysis and acquire additional feedback. Stakeholders in attendance included Staff, CUB, Sierra Club, AWEC, Renewable Energy Coalition, National Grid, Oregon Department of Energy, and Renewable Northwest. PacifiCorp engaged in discussion with Stakeholders, responded to questions, and committed to continued analysis, including additional portfolios not yet modeled. PacifiCorp has also filed workpapers in LC 70, as requested in Order No. 18-360.

Coal Analysis Results

The first portfolio in the coal analysis is a Benchmark portfolio used as a point of comparison for each other portfolio. The analysis contains 22 individual retirement portfolios to examine the effects of retiring each of PacifiCorp's coal units individually in 2022. Table 1 below provides the results of the Company's analysis in SO and PaR for the unit-by-unit 2022 retirement cases.

Table 1. System Optimizer Unit-by-Unit Results

Study	System Optimizer		PaR (Base power and carbon prices)	
	PVRR (\$m)	PVRR(d) (Benefit)/Cost of Retirement (\$m)	PVRR (\$m)	PVRR(d) (Benefit)/Cost of Retirement (\$m)
C-01 (Benchmark)	\$21,897	n/a	\$23,310	n/a
C-02 (Colstrip 3)	\$21,906	\$9	\$23,317	\$7
C-03 (Colstrip 4)	\$21,902	\$5	\$23,302	(\$8)
C-04 (Craig 1)	\$21,897	\$0	\$23,304	(\$6)
C-05 (Craig 2)	\$21,875	(\$22)	\$23,281	(\$29)
C-06 (Dave J. 1)	\$21,903	\$6	\$23,305	(\$5)
C-07 (Dave J. 2)	\$21,905	\$8	\$23,363	\$53
C-08 (Dave J. 3)	\$21,895	(\$2)	\$23,273	(\$37)
C-09 (Dave J. 4)	\$21,916	\$19	\$23,304	(\$6)
C-10 (Hayden 1)	\$21,885	(\$12)	\$23,252	(\$58)
C-11 (Hayden 2)	\$21,893	(\$4)	\$23,287	(\$23)
C-12 (Hunter 1)	\$21,816	(\$81)	\$23,341	\$31
C-13 (Hunter 2)	\$21,878	(\$19)	\$23,334	\$24
C-14 (Hunter 3)	\$21,853	(\$44)	\$23,438	\$128
C-15 (Huntington 1)	\$21,808	(\$89)	\$23,326	\$17
C-16 (Huntington 2)	\$21,794	(\$103)	\$23,310	\$0
C-17 (Jim Bridger 1)	\$21,690	(\$207)	\$23,197	(\$113)
C-18 (Jim Bridger 2)	\$21,748	(\$149)	\$23,257	(\$53)
C-19 (Jim Bridger 3)	\$21,800	(\$97)	\$23,283	(\$27)
C-20 (Jim Bridger 4)	\$21,797	(\$100)	\$23,349	\$39
C-21 (Naughton 1)	\$21,794	(\$102)	\$23,187	(\$123)
C-22 (Naughton 2)	\$21,801	(\$96)	\$23,212	(\$98)
C-23 (Wyokdak)	\$21,880	(\$17)	\$23,323	\$13

The Company explained that it used results of the unit-by-unit retirement portfolios to select additional portfolios for analysis, including alternate-retirement-year portfolios and stacked-retirement portfolios. To ensure studies were prepared in advance of the

December workshops, PacifiCorp selected units for alternate-retirement-year cases based on the SO model results (before PaR studies were completed). Naughton units 1 and 2, Jim Bridger 1, and Hayden 1 were selected for alternative retirement year analysis because they showed the greatest benefit from 2022 retirement in SO on a levelized, \$/kW-yr basis. Out of the retirement years analyzed, 2022 was found to be the most beneficial retirement year for each of these four units.

The Company states that it assumed 2022 retirement for any unit analyzed in the stacked retirement cases, presented in Table 2:

Table 2. PaR Stacked Retirement Results (Base Power and Carbon Prices)

Study	Units Retired	PVRR (\$m)	PVRR(d) (Benefit)/Cost of Retirement (\$m)
C-01 (Benchmark)		\$23,310	n/a
C-34 (Stacked 1: 357 MW)	• Naughton 1-2	\$23,180	(\$130)
C-35 (Stacked 2: 711 MW)	• Naughton 1-2 • Jim Bridger 1	\$23,009	(\$301)
C-36 (Stacked 3: 510 MW)	• Naughton 1 • Jim Bridger 1	\$23,286	(\$24)
C-37 (Stacked 4: 554 MW)	• Naughton 1 • Jim Bridger 1 • Hayden 1	\$23,288	(\$22)
C-38 (Stacked 5: 755 MW)	• Naughton 1-2 • Jim Bridger 1 • Hayden 1	\$23,002	(\$307)
C-39 (Stacked 6: 834 MW)	• Naughton 1-2 • Jim Bridger 1 • Hayden 1 • Craig 2	\$23,993	(\$317)
C-40 (Stacked 7: 1,193 MW)	• Naughton 1-2 • Jim Bridger 1-2 • Hayden 1 • Craig 2	\$23,483	\$173
C-41 (Stacked 8: 1,529 MW)	• Naughton 1-2 • Jim Bridger 1-2 • Hayden 1-2 • Craig 1-2 • Dave Johnston 3	\$23,600	\$290

As reported by PacifiCorp, the stacked portfolios showing the largest benefits in PaR are Cases C-35, C-38, and C-39. Case C-39 retires 834 MW of coal earlier than the benchmark portfolio over the planning horizon.

In addition to presenting results for the above cases, PAC also assessed hourly reliability for the Benchmark case and three stacked retirement cases. PAC indicated that further analysis is still needed to fully evaluate potential reliability challenges and to assess potential costs to remedy these challenges. PAC also expressed willingness to

look into evaluating stacked retirement scenarios with staggered retirement dates, instead of assuming all units retire in 2022.

Stakeholder Engagement

Staff is appreciative of the ample work PAC has done to provide the foundation for a comprehensive analysis of coal unit retirement dates. The Company provided figures and tables ahead of the updated coal analysis presentation, and provided presentations that included detailed charts as well as summary key takeaways. These materials were provided in Docket LC 70 and as part of publicly available materials on the Company's IRP website within the public input meeting process.

Additionally, PacifiCorp was generally responsive to stakeholder feedback. For example, the intra-hour dispatch credit was removed from the modeled analysis in response to stakeholder feedback. PacifiCorp did not explicitly detail which assumptions or cases were included in an attempt to address stakeholder feedback, however Staff notes the Company touched on a range of concerns that had been raised both at Public Input Meetings and in feedback forms including:

- Interest in analysis of varying carbon price policy assumptions including a no price case.
- Stacked retirement cases in addition to those initially proposed by the Company, such as one retiring at least 1,500 megawatts of coal capacity, as well as cases the Company believed might result in the greatest net benefit to the system.

Staff has contacted stakeholders to gain insight regarding the extent to which stakeholders, Staff, and PacifiCorp are in agreement about the usefulness and appropriateness of the analysis.

CUB is generally supportive of the steps PAC has taken thus far in its analysis and believes the Company has incorporated stakeholder feedback through their analysis which includes a variety of retirement scenarios.

NWEC finds the stacked retirement cases presented to be useful and a good start. NWEC suggests that a broader range of options across different unit combinations should also be analyzed in order to provide a more comprehensive portfolio of options and to further investigate the impacts through a broader range of assumptions.

NWEC is also interested in further reserves analysis around potential reliance on new natural gas as was presented in the results, and has concerns regarding the regulatory process, customer risk exposure, and ensuring a diverse new resource mix.

Sierra Club is generally supportive of the methodology and appreciates the openness and transparency in the coal analysis thus far. However, Sierra Club notes that the late arrival of workpapers precluded critical and necessary substantive discussions on the validity of the December results. Sierra Club encourages the Commission to continue a

substantive investigation into PacifiCorp's coal plants through the development of the 2019 IRP.

Renewable Northwest appreciates PacifiCorp's stacked coal plant analysis and looks forward to further results. In particular, Renewable Northwest is paying attention to the analysis of non-fossil fuel solutions to the reliability challenges of the largest stacked scenarios (eg C-41) that could potentially avoid reserve penalties and make the scenarios more economic. In addition, Renewable Northwest welcomes the sensitivities that will explore avoiding gas as replacement power.

Oregon Department of Energy is also supportive of PAC's approach, finding the Company to be running scenarios through SO and PaR in an effort to determine the most economic combinations and potential retirement scenarios, while considering reliability and capacity needs.

Next Steps

It is still unclear how PacifiCorp will apply key information learned from the coal analysis in the 2019 IRP so that coal retirement is a fully explored resource option, though this is part of ongoing discussions.

The Company is interested in conducting additional reliability studies for stacked retirement scenarios in order to evaluate potential operational adjustments or resource alternatives to remedy identified capacity shortfalls. PacifiCorp would also like to assess potential frequency-response shortfalls for priority cases, and evaluate sensitivities restricting the selection of natural gas resources in stacked retirement cases.

In several individual-unit and stacked retirement cases, System Optimizer deferred the Gateway South transmission upgrade by one year compared to the Benchmark case, and accelerated the Yakima to Southern Oregon line upgrade by two years. PacifiCorp stated interest in conducting a study of the Benchmark case where the transmission upgrades for these lines are defined exogenously in order to match the results of the majority of the 2022 retirement cases and compare a select number of cases to the updated Benchmark case in an effort to investigate the impact of removing this difference in transmission timing on revenue requirement.

PacifiCorp expressed interest in running an Alternative Benchmarking case consistent with the Company's recently filed depreciation study in order to better understand how the economics change with this proposed change in depreciation. The Company clarified that an Alternative Benchmark case would not result in redoing the comparative analysis of this case to all retirement cases, but rather focus on comparison to a handful of priority cases.

At the December 4, 2018 Public Input Meeting PacifiCorp mentioned the possibility of seeking a later filing date for the 2019 IRP. This decision would allow the Company to

more fully analyze the impacts of the coal study for planning purposes. The Company may seek filing extensions from other states and Commissions. In Oregon, under OAR 860-027-0400(3), the IRP must be filed within two years of the previous acknowledgment order or as otherwise directed by the Commission. Staff is supportive of PAC's interest in filing the 2019 IRP at a later date, given stakeholder and Company interest in continuing the coal analysis. Staff also welcomes the opportunity for stakeholders to gain a deeper understanding of new modeling assumptions in the coal analysis.³

Staff appreciates the intense effort from PacifiCorp in beginning a robust analysis of its coal fleet to incorporate into the IRP. Staff is generally supportive of the work already done, but would like to work with PacifiCorp to better understand the analysis and the reasoning behind some of the additional analysis PacifiCorp has proposed going forward. For example, Staff would like to better understand the reasoning behind PacifiCorp's proposed exogenous transmission investment analysis and updated depreciation schedule analysis.

Conclusion

Staff is supportive of the Company's interest in continuing to analyze the economics and reliability implications of coal retirement dates. Staff encourages PacifiCorp to move forward with analysis that seeks to plan for the most cost-effective, reliable system moving forward. Additionally, Staff is encouraged by the degree that PacifiCorp has listened and been responsive to stakeholder feedback. Staff and PacifiCorp will coordinate on scheduling an additional public meeting in the first two months of 2019 to report on the results of the continuing analysis.

PROPOSED COMMISSION MOTION:

The Commission should direct PacifiCorp to continue with its analysis of coal retirement dates, including the following actions:

- Evaluate additional stacked retirement scenarios for consideration as part of a reliable, least-cost resource strategy in the 2019 IRP.
- Continue to investigate the impacts of early retirements on system reliability and the least cost and risk remedies.
- Assess potential frequency-response shortfalls for priority cases.
- Evaluate potential operational adjustments or resource alternatives to address modeled capacity shortfalls.
- Evaluate sensitivities that restrict the selection of natural gas resources.

³ At the November 1, 2018 Public Input Meeting, PAC presented a new "operational reserves" credit applied in System Optimized. Staff has been working to gain a better understanding of the assumptions behind this credit value and also other stakeholder positions on it.

- Report to the Commission on coal analysis progress at a Special Public Meeting in the first two months of 2019. Provide workpapers and modeling inputs and outputs for any new analysis in LC 70 two weeks in advance of the meeting.

LC 70