PacifiCorp - Stakeholder Feedback Form

2019 Integrated Resource Plan

PacifiCorp (the Company) requests that stakeholders provide feedback to the Company upon the conclusion of each public input meeting and/or stakeholder conference calls, as scheduled. PacifiCorp values the input of its active and engaged stakeholder group, and stakeholder feedback is critical to the IRP public input process. PacifiCorp requests that stakeholders provide comments using this form, which will allow the Company to more easily review and summarize comments by topic and to readily identify specific recommendations, if any, being provided. Information collected will be used to better inform issues included in the 2019 IRP, including, but not limited to the process, assumptions, and analysis. In order to maintain open communication and provide the broader Stakeholder community with useful information, the Company will generally post all appropriate feedback on the IRP website unless you request otherwise, below.

Date of Submittal 1/8/2019

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Public Meeting Date comments address: Click here to enter date. ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Coal unit analysis next steps

☐ Check here if any of the following information being submitted is copyrighted or confidential.

☐ Check here if you do **not** want your Stakeholder feedback and accompanying materials posted to the IRP website.

*__Respondent Comment:__ Please provide your feedback for each IRP topic listed above.
Please see Exhibit A. Please note that the confidential version of this document was filed with the Public Utility Commission of Oregon and served on eligible parties pursuant to Protective Order No. 18-216.

Data Support: If applicable, provide any documents, hyper-links, etc. in support of comments. (i.e. gas forecast is too high - this forecast from EIA is more appropriate). If electronic attachments are provided with your comments, please list those attachment names here.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

Please submit your completed Stakeholder Feedback Form via email to IRP@Pacificorp.com

Thank you for participating.

* Required fields

Exhibit A

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BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

In the Matter of PACIFICORP, dba PACIFIC POWER, 2019 Integrated Resource Plan	Docket LC 70

SIERRA CLUB'S COMMENTS ON PACIFICORP COAL ANALYSIS NEXT STEPS

REDACTED

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SIERRA CLUB COMMENTS ON PACIFICORP COAL ANALYSIS NEXT STEP

1. INTRODUCTION AND SUMMARY

During the week of December 4, 2018, PacifiCorp presented to stakeholders the initial results of its economic analyses of alternative retirement dates for existing coal units. PacifiCorp also provided the workpapers underlying these initial results and discussed its planned next steps for its coal unit analyses. These comments provide Sierra Club's input regarding those planned next steps. They were prepared with technical assistance from Synapse Energy Economics.

Overall, Sierra Club recognizes and appreciates the extensive coal economic analyses PacifiCorp has conducted thus far. Sierra Club also supports several of PacifiCorp's planned next steps, including plans to address any modeled reliability issues in the least-cost manner possible, conduct a retirement scenario in which no construction of new natural gas plants is permitted, and review the current analysis for errors. However, Sierra Club is concerned about some elements of PacifiCorp's analysis to date and plans for future analyses. Sierra Club therefore offers the following comments and recommendations:

- **If PacifiCorp updates its benchmark scenario, it must re-run <u>all or most of</u> its retirement scenarios.** The proposed new benchmark may substantially alter the assessed economics of individual coal plants, and is different enough from the initial benchmark scenario that PacifiCorp cannot assume that the relative rankings of early coal plant retirements still hold.

- **PacifiCorp's Benchmark Case includes a basic error that results in PacifiCorp understating the benefits of multi-unit retirement cases.** The Benchmark Case workpapers contain a clear error that leads to the under-counting of 2038 fixed power plant costs. This error affects nearly all of PacifiCorp's comparative analyses, but is particularly substantial in the Company's stacked retirement assessments. PacifiCorp must correct this and any other errors. Given the anomalous out-year results in PacifiCorp's stacked retirement cases, the Company should also verify that no other errors are distorting its results.

- **PacifiCorp should ensure that all non-essential coal unit expenditures are excluded from retirement cases.** Sierra Club appreciates that PacifiCorp is already excluding some coal unit ongoing capital expenditures from its retirement scenarios but is concerned that some large expenditures are still unnecessarily included in these scenarios.

- **PacifiCorp's fuel price projections for the Jim Bridger plant assume that the closure of one or more units drives up the cost of coal**. PacifiCorp has not adequately explained or justified this use of inconsistent coal price assumptions across different retirement cases that share the same "price-policy" scenario label.

2. PACIFICORP MUST RUN SUFFICIENT RETIREMENT ALTERNATIVES TO ITS NEW BENCHMARK SCENARIO TO ENSURE THAT ITS INITIAL FINDINGS STILL HOLD

In recent stakeholder presentations, PacifiCorp has indicated that it plans to update its benchmark scenario to incorporate retirement dates based on its recently filed depreciation study. Sierra Club's understanding is that the new benchmark scenario would include retirement dates tied to the newly proposed Utah depreciable lives.

As an initial matter, any new benchmark should be compared only to retirement scenarios in which all inputs are the same other than the assumed retirement date of the coal unit or set of units being evaluated. PacifiCorp has acknowledged and agreed with this position. However, the Company has also stated that it plans to run only a limited set of retirement scenarios evaluating "priority units" relative to the new benchmark. Given the nature of the differences between the new and old benchmark scenarios, PacifiCorp must not limit its updated analysis to just the handful of units previously identified as highest priority for retirement.

Specifically, Table 1 compares PacifiCorp's coal unit retirement dates under its initial benchmark scenario to the retirement dates associated with the Company's recent Utah depreciation filing. This table indicates substantial differences in assumed retirement dates for several of the units found to be least economic under PacifiCorp's initial set of coal retirement analyses. For example, Craig Unit 2, Bridger Unit 1, and Bridger Unit 2 were each selected for inclusion in PacifiCorp's stacked retirement analyses based on the high degree of economic benefits from early retirement under their unit-specific analyses. Under the new benchmark scenario, the assumed retirement date is at least five years earlier than under the original benchmark scenario for each of those units.

Table 1. Initial and Proposed Benchmark Scenario Retirement Dates

Plant/Unit	Initial Benchmark Retirement Date	Proposed Utah Depreciable Life
Cholla - 4	2020	2025
Colstrip - 3	**2046**	**2027**
Colstrip - 4	**2046**	**2027**
Craig - 1	2025	2025
Craig - 2	**2034**	**2026**
Dave Johnston - 1	2027	2027
Dave Johnston - 2	2027	2027
Dave Johnston - 3	2027	2027
Dave Johnston - 4	2027	2027
Hayden - 1	2030	2030
Hayden - 2	2030	2030
Hunter - 1	2042	2042
Hunter - 2	2042	2042
Hunter - 3	2042	2042
Huntington - 1	2036	2036
Huntington - 2	2036	2036
Jim Bridger - 1	**2037**	**2028**
Jim Bridger - 2	**2037**	**2032**
Jim Bridger - 3	2037	2037
Jim Bridger - 4	2037	2037
Naughton - 1	2029	2029
Naughton - 2	2029	2029
Naughton - 3	2019	2019
Wyodak - 1	2039	2039

Given these differences, PacifiCorp should not assume that the set of early retirements found to be most beneficial compared to the initial benchmark will continue to be the highest-priority retirements relative to the new benchmark. For example, the benefit of retiring Craig Unit 2 in 2022 will be lower relative to a 2026 retirement baseline than relative to a 2034 retirement baseline. This lower benefit may make the early retirement of Craig Unit 2 a lower priority relative to the new baseline, and may result in other units becoming relatively higher priorities for retirement. In addition, earlier benchmark retirement dates for units such as Colstrip Units 3 and 4 may change PacifiCorp's system in ways that affect the relative economics of unit retirements.

Sierra Club recognizes the extensive effort involved in PacifiCorp's initial set of retirement analysis model runs and understands the Company's reluctance to re-run every single scenario. However, the Company should at least re-run each scenario in which a retirement was found to

be beneficial relative to the initial benchmark. This set of model runs should be sufficient to determine whether the set of highest-priority retirements has changed. If it has, then PacifiCorp should explore additional stacked retirement scenarios beyond what it has evaluated to date.

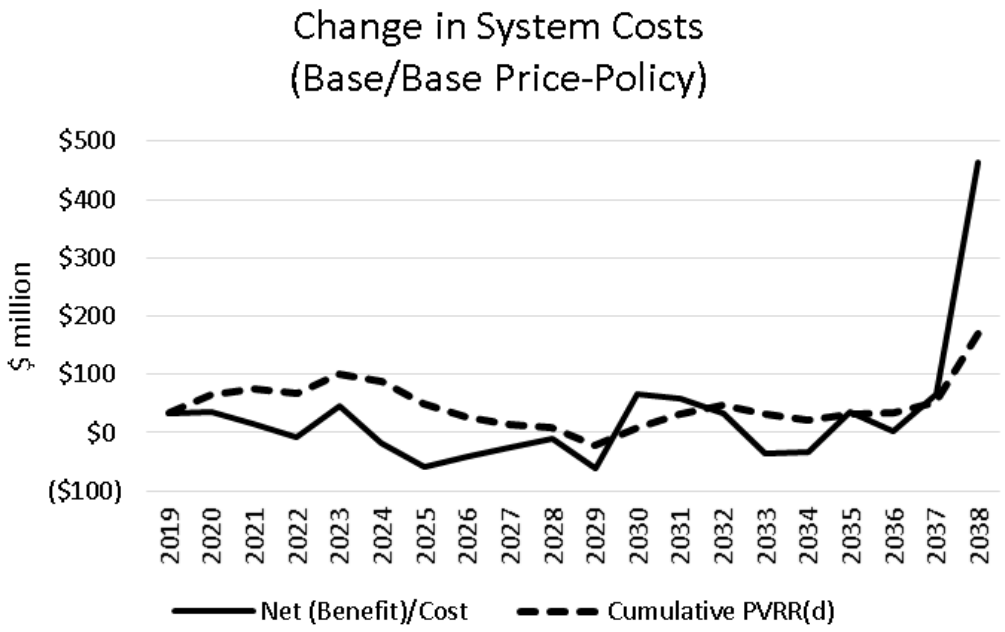
3. PACIFICORP'S STACKED CASES INCLUDE BASIC ERRORS THAT MAKE ADDITIONAL RETIREMENTS LOOK LESS BENEFICIAL THAN THEY ARE

PacifiCorp's stacked retirement cases consistently show a large incremental cost relative to the benchmark case in 2038, the final year of the analysis. In each stacked retirement case, the large 2038 cost differential is dramatically different from the annual result for any prior year, and is at least in part the result of at least one error found in PacifiCorp's Benchmark Case. This error is large in magnitude and must be corrected; PacifiCorp must verify that the assessments contain no other similar errors.

To take one assessment as an example, in the summary slide deck presented to stakeholders and the Commission, PacifiCorp showed the differential in system costs between its "Stacked Case C-40" and the Benchmark case.[1] This comparison showed a major increase in system costs under Case C-40 relative to the Benchmark Case in the year 2038 (see Figure 1, below). This cost spike of $463 million in the C-40 case (relative to the benchmark) **only** occurs in 2038. At the Company's discount rate, this single out-year spike has a $121 million impact on the net present value (NPV) of the retirement scenario – accounting for 70 percent of the scenario cost increase relative to the benchmark case. In other words, the vast majority of the "benefit" of not pursuing C-40 can be traced to the very last year of the analysis, 2038.

[1] December 3-4 Public Input Meeting Stakeholder materials, Stacked Case C-40 Overview, Slide 76.

Figure 1. Figure from PacifiCorp presentation on coal analysis results: change in system costs for Stacked Retirement Case C-40.



This spike in the relative cost of Case C-40 is a result of a variety of factors, but one of the primary factors is an error in the Benchmark Case post-processing workpapers that causes PacifiCorp to understate that case's 2038 fixed costs by [redacted]. Since the same error does not appear in the workpapers for Case C-40, PacifiCorp's comparison of Case C-40 to the Benchmark Case overstates the relative cost of Case C-40 by [redacted] in 2038, or [redacted] on an present value basis (2018$).

Details on how to trace this error can be found in **Appendix A** following these comments.

In Case C-40, the jump in 2038 retirement case costs relative to the Benchmark Case results from several other surprising factors in addition to the fixed cost error described above. Overall, the year 2038 should look nearly identical across cases: in the Benchmark, relatively few coal units remain in 2038, meaning that decisions to have retired units in 2022 versus a later year should make very little difference in that out-year. The fact that the Benchmark is substantially cheaper in 2038 than the stacked retirement cases is a red flag for modelers. Two other notable anomalies stand out:

- Case C-40 includes a **$1.5 billion** transmission upgrade in 2038 that does not take place in any year under the Benchmark Case.[2] This is an odd finding given that

[2] December 3-4 Public Input Meeting Stakeholder materials, Stacked Case C-40 Overview, Slide 76.

the operational status of PacifiCorp coal units is the exact same in 2038 for these two cases.

- PacifiCorp finds that Case C-40 results in [redacted] additional market purchases and [redacted] fewer market sales relative to the Benchmark Case in 2038, despite Case C-40 involving greater fuel costs, variable O&M costs, emission costs, and demand-side management costs in that year.[3]

This confluence of greater production costs and substantially greater net energy market costs from a similar system warrants further investigation by PacifiCorp, especially in light of the error discussed in Appendix A.

4. PACIFICORP SHOULD ENSURE THAT ALL NON-ESSENTIAL COAL UNIT EXPENDITURES ARE EXCLUDED FROM RETIREMENT CASES

Sierra Club has previously commented on the importance of ensuring that all non-essential coal unit capital expenditures are excluded from retirement cases. Sierra Club understands that in its analyses to date PacifiCorp has excluded some incremental amount of coal unit expenditures from each of its retirement scenarios. Specifically, it appears that in most retirement cases PacifiCorp has excluded [redacted]

This is a positive first step. However, PacifiCorp's analyses still appear to include substantial costs at retiring units in certain cases. For example, company workpapers show that Jim Bridger Unit 3 is assumed to incur nearly [redacted] in capital costs in 2019,[4] just three years prior to its retirement, in its "early retirement" case and a savings of only [redacted] relative to its "benchmark" spending in that year.[5] As a point of comparison, PacifiCorp assumes that Jim Bridger 3 typically incurs about [redacted] in "runrate" capital per year. The large capital spike in 2019 arises from an assumption that Bridger 3 would still [redacted] just three years before its retirement.[6] In addition, PacifiCorp still assumes that Bridger 3 would incur the full operations and maintenance ("O&M") costs of [redacted] in 2019, incurring an extra [redacted] above its typical fixed O&M costs in 2019. Sierra Club does not advocate for unsafe working conditions, or an unsafe generator - but a reasonable assessment would avoid all

[3] Workpaper "C-40_N1-N2-J1-J2-H1-C2_MM.xlsx," column AB.
[4] OPUC MktUpdate Coal Stdy JB3.xlsx, tab 7 –Runrate Plant CapEx, cell E26
[5] OPUC MktUpdate Coal Stdy Ref Case.xlsx, tab 7 – Runrate CapeEx, cell E26
[6] OPUC MktUpdate Coal Stdy Ref Case.xlsx, tab 1d – Overhaul (HiConf), cell D58; Update Planned MaintenanceInputs – JB3 Case 20180927.xlsx, tab Maintenance Days, cell D29

unnecessary capital spending prior to retirement. In this case, Jim Bridger 3 alone should be able to avoid, conservatively, an additional [redacted] beyond that assumed by PacifiCorp.[7]

Similarly, in its retirement case, Hunter Unit 3 is assumed to incur capital costs of nearly [redacted] in 2020, [redacted] above its baseline spending. Hunter 3 could therefore reasonably avoid at least an incremental [redacted] in the retirement assessment. Similar issues occur – and at a similar order of magnitude – for Huntington 2, Jim Bridger 4, and Naughton 2.

Sierra Club cannot see any justification for substantial life-extending capital expenditures or [redacted] just two or three years prior to a unit's retirement. Sierra Club requests that PacifiCorp either specifically explain these major expenditures in retiring units, or adjust its assumed capital expenditure schedules in its coal retirement cases.

Sierra Club notes that neither capital cost assumptions nor fixed O&M for existing units have any selection role in PacifiCorp's System Optimizer and Planning and Risk modeling. PacifiCorp can therefore easily adjust these assumptions without having to re-run any models.

5. PACIFICORP'S FUEL PRICE PROJECTION FOR JIM BRIDGER PLANT ASSUMES CLOSURE OF ONE OR MORE UNITS DRIVES UP THE COST OF COAL.

PacifiCorp's coal retirement analysis makes the assumption that retiring coal units at Jim Bridger drives up the delivered cost of coal to that power plant. This assumption is derived from the Company's 2012/2013 assessment of the economics of installing selective catalytic reduction (SCR) at Jim Bridger 3 & 4, as conducted for the Utah and Wyoming pre-approval proceedings. At the time, the Company assumed that the closure of one or two units would drive different decisions about the use of the Jim Bridger mine, and the differential procurement of coal from the underground or surface mine at the site, which in turn could change the cost of coal delivered to the plant. That same erroneous approach re-appeared in this assessment, only in a shortcut manner and without an explanation, causing an overstatement of the impact on overall coal prices from the closure of one or two units at the site.

Confidential Figure 2, below, shows PacifiCorp's assumed coal price under the benchmark, single unit retirement, and two-unit retirement (Case 40) scenarios. A single unit retirement drives up the cost of coal by [redacted] on a nominal levelized basis, while a two-unit retirement drives up the cost of coal by [redacted] on a nominal levelized basis. As the figure below shows, the two-unit retirement scenario uses a much rougher estimate of the cost increase, even driving up costs [redacted].

[7] [redacted]

Confidential Figure 2. Coal prices at Jim Bridger in the retirement assessment. No early retirement, one-unit early retirement, and two-unit early retirement (C40)

While the overall price increase is relatively small, the impact of this assumption on final results is substantial. Substituting in the benchmark coal price in the two-unit retirement assessment (Case 40) reduces the cost of that scenario by over [redacted][8] or [redacted] the PVRR(d) differential of that case relative to the benchmark.

PacifiCorp has not yet explained the basis of the increased fuel cost delivered to Jim Bridger plant resulting from the closure of individual Jim Bridger units, and must provide specificity and justification with respect to this important assumption.

Dated: January 8, 2019

Respectfully submitted,

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[8] Derived by multiplying the annual fuel cost from the C40 PaR results for Jim Bridger units by the fractional difference between the Benchmark and C40 fuel costs for Jim Bridger, and reviewing the final difference in PacifiCorp's reporting structure.

APPENDIX A: DECOMMISSIONING COST ERROR

The error in the Benchmark Case results is evident from a review of that case's Planning and Risk model summary report.[9] In that report, the total fixed costs associated with existing plants is calculated as the sum of all individual plants' fixed costs less the sum of all plants' decommissioning costs for each year.[10] The subtraction of decommissioning costs is evidently done to avoid double-counting those costs. This approach makes sense in principle. However, in the Benchmark Case there is a discrepancy between the 2038 decommissioning costs included in the initial summation of fixed costs and the decommissioning costs subtracted out from that sum. In fact, the initial summation of fixed costs includes *zero* decommissioning costs in 2038, likely due to a transcription error.[11] In contrast, the decommissioning costs subtracted out in the net fixed cost calculation amount to [redacted].[12] The result is an under-counting of Benchmark Case 2038 costs by [redacted], or a [redacted] NPV error when discounted. Ultimately, PacifiCorp accounts for less than [redacted] million in existing station fixed costs in 2038.[13] Yet PacifiCorp's underlying data indicate that the Hunter plant alone will incur [redacted] million in fixed costs in 2038 – exclusive of any decommissioning costs.[14]

This error does not occur in the Case C-40 workpapers, as the amount of decommissioning costs subtracted out of station fixed costs is the same as the amount included in the initial summation of fixed costs.[15] The error also does not occur in any of the other stacked retirement cases (Cases C-34 through C-41) or any of the multi-year test cases (C-25 through C-33). Thus, **each of these assessments under-states the benefit (or over-states the cost) of the retirement case by an NPV of [redacted].** The error *does* occur in the workpapers for single-unit retirement analysis Cases C-01 through C-23. However, in several of those cases the magnitude of the error is lower than under the Benchmark Case, as units retire earlier and fewer decommissioning costs are incurred in 2038. In such cases, PacifiCorp's comparison still underestimates the benefits of the retirement case relative to the benchmark, despite the presence of similar errors across cases. PacifiCorp therefore must make sure to check for and correct this error in all its analyses and comparisons.

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[9] Workpaper "Data Report Template_2018 11 23 C01 Benckmark MM.xlsm."
[10] Workpaper "Data Report Template_2018 11 23 C01 Benckmark MM.xlsm," tab "SO Summary," Row 9.
[11] Workpaper "Data Report Template_2018 11 23 C01 Benckmark MM.xlsm," tab "PVRRByStation," Cell X811.
[12] Workpaper "Data Report Template_2018 11 23 C01 Benckmark MM.xlsm," tab "SO Summary," Cells X9 and X11; tab "DecomCost," cell G21.
[13] Workpaper "Data Report Template_2018 11 23 C01 Benckmark MM.xlsm," tab "SO Summary," Cell X9; tab "PaR Report (New)," cell W40.
[14] Workpaper "Data Report Template_2018 11 23 C01 Benckmark MM.xlsm," tab "PVRRByStation," Cells X370:X384.
[15] Workpaper "Data Report Template_2018 11 29 C40N12J12H1C2MM.xlsm," tab "SO Summary," Cells X9 and X11; tab "PVRRByStation," Cell X811.