

Docket No. UM _____
Exhibit PAC/400
Witness: Chad A. Teply

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

PACIFICORP

Direct Testimony of Chad A. Teply

September 2018

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ATTACHED EXHIBITS

Exhibit PAC/401—PacifiCorp Estimated Plant Retirement Lives—Steam and Gas

Exhibit PAC/402—Estimated Decommissioning Costs

1 **Q. Please state your name, business address, and present position with PacifiCorp**
2 **d/b/a Pacific Power.**

3 A. My name is Chad A. Teply. My business address is 1407 West North Temple, Suite
4 310, Salt Lake City, Utah. My position is Senior Vice President of Strategy and
5 Development.

6 **QUALIFICATIONS**

7 **Q. Briefly describe your education and professional experience.**

8 A. I have a Bachelor of Science Degree in Mechanical Engineering from South Dakota
9 State University. I joined MidAmerican Energy Company (a Berkshire Hathaway
10 Energy affiliate company) in November 1999, and held positions of increasing
11 responsibility within the generation organization. In April 2008, I moved to Northern
12 Natural Gas Company (a Berkshire Hathaway Energy affiliate company) as Senior
13 Director of Engineering. I joined PacifiCorp in February 2009. In my current role as
14 Senior Vice President of Strategy and Development, my responsibilities encompass
15 strategic planning, regulatory support, stakeholder engagement, development and
16 execution of major generation resource additions, major environmental compliance
17 projects, and major transmission projects.

18 **Q. Please explain the responsibilities of the resource development staff within your**
19 **organization.**

20 A. My resource development staff is responsible for developing generation resource
21 options that the company can potentially implement, if determined to be least cost on
22 a risk-adjusted basis. Resource development staff is also responsible for developing
23 and providing performance and cost information related to supply side resource

1 options used in PacifiCorp's integrated resource planning (IRP) process, and
2 maintaining data on existing resource capacities, performance, and costs. Resource
3 development staff also maintains cost and performance information on current and
4 emerging environmental regulations that may affect the operation of the company's
5 thermal generating assets.

6 **PURPOSE OF TESTIMONY**

7 **Q. What is the purpose of your testimony?**

8 A. My testimony:

- 9 • Describes the process used by PacifiCorp to develop estimated economic lives for
10 the thermal generation resources that are incorporated into the company's new
11 depreciation study submitted with Mr. John J. Spanos's testimony as Exhibit
12 PAC/202 (Depreciation Study) in this filing.
- 13 • Provides an overview of the recommended changes to the depreciable lives of the
14 company's thermal generation resources based on PacifiCorp's assessment of
15 major factors and changes since the 2013 depreciation study.¹
- 16 • Presents PacifiCorp's recommendations on decommissioning costs, which were
17 developed from updated studies and applied on a plant-by-plant basis.

18 **DEVELOPMENT OF DEPRECIABLE PLANT LIFE**

19 **Q. Why is it necessary to estimate the economic life of a generation asset to develop**
20 **depreciation rates?**

21 A. One component of PacifiCorp's cost of service is the recovery of capital investment.

22 This recovery is accomplished through depreciation expense over the life of each

¹ *In the Matter of PacifiCorp dba Pacific Power, Application for Authority to Implement Revised Depreciation Rates*, Docket No. UM 1647.

1 resource. Because depreciation rates spread a certain amount of cost over a certain
2 period of time, it is necessary to have a reasonable estimate of the economic life of a
3 resource at the time it is placed into service to properly calculate its depreciation
4 expense. The estimated plant economic life of a generation asset is the period of time
5 that begins when the asset is placed in service and starts generating electricity and
6 ends when the asset is removed from service. In other words, it is the period of time
7 during which customers benefit from the asset.

8 **Q. Is a plant's estimated economic life permanently set when the plant is placed into**
9 **service?**

10 A. No. For depreciation purposes, all generation asset economic lives are estimates that
11 may be adjusted over time as circumstances warrant. PacifiCorp reevaluates its
12 economic life estimates each time it performs a depreciation study. In this case,
13 PacifiCorp provided estimated generation plant depreciable lives information to Mr.
14 Spanos for his use in preparing the Depreciation Study.

15 **Q. Are you also providing PacifiCorp's estimated thermal generation plant**
16 **economic lives information for this docket?**

17 A. Yes. Exhibit PAC/401 accompanying my testimony contains a complete list of
18 PacifiCorp's thermal generation plants and their recommended depreciable lives.

19 **DEPRECIABLE LIVES FOR THERMAL GENERATION RESOURCES**

20 **Q. Please describe the process PacifiCorp used to assess the depreciable lives of its**
21 **thermal generation resources.**

22 A. PacifiCorp began with the estimated retirement years from the 2013 depreciation
23 study. The company then considered capital expenditures, impacts to ongoing

1 operating and maintenance expenses, and the potential for accelerated timelines for
2 resource planning decisions. These factors were considered in the following context:
3 (1) major equipment condition; (2) fuel cost and availability; (3) environmental
4 compliance obligations; and (4) policy and market drivers.

5 Based on the unique circumstances that affect individual units at a given plant,
6 PacifiCorp also modified its current practice of using a single retirement year for a
7 plant, and instead proposes changes in this study to reflect the depreciable lives of the
8 individual coal-fired generation units at each plant.

9 **Q. Please explain how major equipment condition can affect the depreciable life of**
10 **a thermal generation resource.**

11 A. Major equipment condition is influenced by the planned outage schedule. Thermal
12 resources, including the coal-fired, gas-fired, and geothermal resources involving the
13 production and transport of steam, normally undergo overhauls on four-year cycles,
14 eight-year cycles or 12-year cycles. The company establishes outage schedules for
15 coal-fired resources based on its industry operating experience. It establishes
16 overhaul schedules for gas-fired combustion turbine-based resources based on the
17 number of operating hours and starts of the units and the recommendations of the
18 original equipment manufacturer. Major equipment or component replacements, such
19 as replacing cooling towers, condenser re-tubing, replacing turbine components, re-
20 winding generators, or replacing steam generator components, may be required at
21 these overhaul milestones. These periodic milestone replacements are important to
22 the ongoing operation of the resource, and if capital investment is required, the

1 resource may no longer be economic to operate, depending on the level of investment
2 and expected remaining life.

3 **Q. Please explain how fuel cost and availability can affect the depreciable life of a**
4 **thermal generation resource.**

5 A. Fuel cost, availability, and to an extent, fuel quality can influence the economic life of
6 a thermal generation resource. Significant changes in the cost, availability, or quality
7 of the resource's fuel supply can drive major capital expenditures or result in
8 increased run-rate costs that could make the resource uneconomic to operate. Issues
9 at captive mines that serve PacifiCorp's resources are likely to have more direct
10 impacts, depending upon the availability of alternative competitive market suppliers.
11 Switching to a different fuel source, and procuring and delivery of this alternate fuel,
12 could require major capital expenditures, or result in increased run-rate fuel costs,
13 which can also drive economic life decisions for individual resources.

14 **Q. Please explain how environmental regulations can affect the depreciable life of a**
15 **thermal generation asset.**

16 A. Existing, evolving, and emerging air emissions standards, water intake and effluent
17 discharge standards, and solid waste regulations may have impacts on the economics
18 of operating an asset. New regulations or changes to existing air, water or solid waste
19 regulations influence the timing of capital expenditures for compliance and the
20 subsequent operating and maintenance costs. Capital expenditures include air
21 pollution controls, water intake infrastructure modifications, discharge constraints,
22 cooling system changes, and new or upgraded coal combustion waste infrastructure to
23 transport and store bottom ash, fly ash, and scrubber waste. Capital expenditures,

1 once made, must be recovered over the remaining life of the asset. If a major capital
2 investment is required to meet a new environmental standard and the investment is
3 not feasible or economic over the remaining life of the asset, this could result in the
4 early retirement of the resource.

5 **Q. Have any significant new environmental regulations or compliance obligations**
6 **been implemented since the company's last depreciation study that could affect**
7 **thermal generation resource depreciable lives?**

8 A. Yes. Several environmental regulations and compliance obligations have been
9 implemented since the company's 2013 depreciation study. First, the United States
10 Environmental Protection Agency (EPA) and the states of Arizona, Colorado, Utah,
11 and Wyoming have continued to implement their Regional Haze state and federal
12 implementation plans. Since 2013, the company has taken steps to install emissions
13 control equipment, negotiate alternative compliance outcomes for certain units,² and
14 is currently supporting ongoing requests for reconsideration and, in some instances
15 litigation, of other implementation plan requirements.³ These efforts and outcomes
16 affect several of PacifiCorp's wholly-owned or partially-owned generation resources.
17 The company generally assesses its compliance obligations and alternatives as part of
18 its regular IRP filings, the most recent of which are the 2017 IRP and the 2017 IRP

² In 2014, installation of new low-nitrogen oxides burners, a scrubber upgrade, and new baghouse at Hunter Unit 1. In 2015, installation of selective catalytic reduction (SCR) systems at Jim Bridger Unit 3 and Hayden Unit 1. In 2016, installation of SCR systems at Jim Bridger Unit 4 and Hayden Unit 2. Also in 2016, an SCR alternative for Dave Johnston Unit 3 was approved by EPA. In 2017, an SCR system was installed at Craig Unit 2 and an SCR alternative for Cholla Unit 4 was approved by EPA. In 2018, an SCR alternative for Craig Unit 1 was approved by EPA. The Company is in discussions with the Wyoming Department of Environmental Quality and the EPA regarding an SCR alternative for Jim Bridger Units 1 and 2.

³ The EPA is currently in the process of reconsideration of Utah Regional Haze compliance requirements and litigation of EPA's Regional Haze federal implementation plan requirements for Hunter Units 1 and 2 and Huntington Units 1 and 2. Litigation of EPA's Regional Haze federal implementation plan requirements for Wyodak and Naughton Units 1 and 2 is also still on-going.

1 Update, which are available on PacifiCorp's website. Detailed discussion of
2 PacifiCorp's completed compliance projects and upcoming compliance decisions is
3 included in the referenced IRPs and reflected in the proposed depreciable lives for
4 individual units discussed further in this filing.

5 Second, since 2013 the EPA has initially proposed, partially litigated,
6 rescinded, and now proposed replacement of the Clean Power Plan focused on
7 reduction of carbon dioxide emissions from the United States energy sector. While
8 no specific greenhouse gas compliance expenditures were pursued in response to the
9 Clean Power Plan, PacifiCorp's IRP continues to incorporate assumptions and
10 sensitivities regarding potential greenhouse gas policy outcomes.

11 Finally, since 2013 the EPA has proposed, partially litigated, and modified its
12 Coal Combustion Residual regulations as part of the Resource Conservation and
13 Reclamation Act, as well as its Effluent Limitation Guidelines as part of the Clean
14 Water Act. These regulations require utilities with coal-fired generation facilities to
15 meet certain compliance obligations for ash and coal residue handling, infrastructure,
16 and storage facilities, as well as their process wastewater streams. PacifiCorp's
17 Depreciation Study recommendations consider these environmental regulations as
18 well, but are not significantly impacted at this time by anticipated compliance
19 obligations in these areas.

20 **Q. Was extending thermal generation resources lives the basis for PacifiCorp's**
21 **capital expenditures for environmental compliance?**

22 A. No. While PacifiCorp has made capital additions since 2013 on a number of its coal-
23 fueled generation assets to comply with environmental regulations, the company's

1 analysis and justification of these investments assumed that the plant lives would not
2 be extended, rather the compliance expenditures would allow the individual unit to
3 operate through their respective currently approved depreciable lives.

4 **Q. Please explain how emerging policy and market drivers affect the estimated**
5 **depreciable lives of generation resources.**

6 A. Since PacifiCorp's 2013 depreciation study, policymakers in the company's service
7 territory have continued to propose, consider, and promulgate state-specific policies
8 affecting the company's generation resource planning. PacifiCorp's long-term
9 resource planning and estimated depreciable lives of thermal generation resources are
10 influenced by a variety of policy and market drivers including wholesale power and
11 natural gas prices, public policy and regulatory initiatives and events and trends
12 affecting the economy.

13 One notable public policy example is Oregon Senate Bill 1547-B, which was
14 signed into law by the governor of Oregon on March 8, 2016. Senate Bill 1547-B,
15 the Clean Electricity and Coal Transition Plan, extends and expands the Oregon
16 Renewable Portfolio Standard requirement to 50 percent of electricity from renewable
17 resources by 2040 and requires that coal-fueled resources are eliminated from
18 Oregon's allocation of electricity by January 1, 2030.

19 This and other planning environment drivers are discussed in detail in Chapter
20 3 of PacifiCorp's 2017 IRP, which is publicly available.

21 **Q. Based on these considerations, what major changes does PacifiCorp propose to**
22 **the depreciable lives of its thermal generation resources?**

23 A. PacifiCorp is proposing several changes to its thermal generation depreciable lives

1 based on its analysis of the various factors described earlier in my testimony.

2 First, the company recommends accelerating the depreciable life of Cholla
3 Unit 4 from 2028 to 2025 to align with the unit's approved Regional Haze Rule
4 compliance obligation timeline. This compliance date was established in settlement
5 discussions between the facility joint owners, state and federal agencies, and
6 stakeholders in 2015 and 2016; approvals were received through subsequent state and
7 federal agency public processes in 2017 and 2018. Cholla Unit 4 will be 44 years old
8 in 2025.

9 The second recommended change is to accelerate the depreciable life of Craig
10 Unit 1 from 2026 to 2025 to align with its approved Regional Haze Rule compliance
11 obligation timeline. This compliance date was established in settlement discussions
12 between the facility joint owners, state and federal agencies, and stakeholders in 2015
13 and 2016; approvals were received through subsequent state and federal agency
14 public processes in 2017 and 2018. Craig Unit 1 will be 45 years old in 2025.

15 The third recommended change is to accelerate the depreciable life of Colstrip
16 Units 3 and 4 from 2032 to 2027 to facilitate least-cost, least-risk analysis, decision
17 making, and planning as announced retirements of Colstrip Units 1 and 2 (non-
18 company resources) in 2022 approach, and Colstrip Units 3 and 4 economics and
19 joint owner business planning decisions are made in the interim. The Colstrip Units 3
20 and 4 joint owners and stakeholders have not approved accelerated retirement of
21 those units, nor has formal engagement on that potential outcome been initiated.
22 However, certain joint owners (Avista Corporation – 15 percent and Puget Sound
23 Energy – 25 percent) have reached agreements with their respective regulators to

1 establish 2027 as the new depreciable life for the units. Colstrip Units 3 and 4 will be
2 43 years old and 41 years old, respectively, in 2027.

3 The fourth recommended change is to accelerate the depreciable life of
4 Huntington Units 1 and 2 from 2030 to 2029 to align with Oregon's Senate Bill 1547-
5 B, the Clean Electricity and Coal Transition Plan, which was discussed above.
6 Huntington Units 1 and 2 will be 52 years old and 55 years old, respectively, in 2029.

7 For PacifiCorp's remaining thermal generation resources, I recommend to
8 maintain the current depreciable lives consistent with prior depreciation studies.

9 **Q. Has PacifiCorp changed the depreciable lives for its natural gas-fired simple
10 cycle combustion turbine resources?**

11 A. No. PacifiCorp is not recommending any change to the depreciable lives of its simple
12 cycle natural gas combustion turbines. The simple cycle combustion turbines in the
13 company's fleet are aero-derivative combustion turbines and operate when economic
14 and/or when required for system reliability purposes. Operating profiles and
15 assumptions pertaining to outage schedules and equipment longevity for these units
16 have not materially changed. Moreover, fuel availability for the simple cycle gas
17 combustion turbine units has not changed. The original equipment manufacturer's
18 30-year useful life recommendation has not changed and remains consistent with the
19 2013 depreciation study.

20 **Q. Has PacifiCorp changed the depreciable lives for its natural gas-fired combined
21 cycle combustion turbine resources?**

22 A. No. PacifiCorp is not recommending any change to the depreciable lives of its
23 combined cycle gas combustion turbines. These plants operate when economic

1 and/or when required for system reliability purposes. Since the 2013 study, the
2 operating profiles and assumptions pertaining to outage schedules and equipment
3 longevity for these units have not materially changed. Moreover, fuel availability for
4 the combined cycle gas combustion turbine resources has not changed. The original
5 equipment manufacturer's 40-year useful life recommendation has not changed and
6 remains consistent with the 2013 depreciation study. However, it is feasible with
7 continued maintenance investment and technology advancements that these facilities
8 could operate economically beyond the original equipment manufacturer's 40-year
9 useful life recommendation.

10 **DECOMMISSIONING/DEMOLITION COSTS**

11 **Q. Is PacifiCorp proposing changes to decommissioning costs in the Depreciation**
12 **Study for the company's thermal generation resources?**

13 A. Yes. PacifiCorp performed updated decommissioning cost studies in the 2014 to
14 2016 timeframe on a selection of its coal-fueled and natural-gas-fueled generation
15 resources considered reasonable proxy resources for extrapolation across the fleet.
16 These studies were used as the primary basis for the decommissioning costs in this
17 filing, with certain updates made to reflect plant specific attributes and updated
18 commodity and scrap market costs. As such, PacifiCorp proposes to replace the
19 previously approved decommissioning cost of \$40 per kilowatt for all coal-fueled
20 plants with the plant-by-plant decommissioning costs provided in Exhibit PAC/402.
21 PacifiCorp also proposes to replace the previously approved decommissioning cost of
22 \$15 per kilowatt for all natural gas-fueled plants with an updated decommissioning
23 cost estimate of \$10 per kilowatt.

1 PacifiCorp hired a third-party engineering firm to complete the baseline
2 decommissioning studies. The decommissioning costs in Exhibit PAC/402 include
3 plant demolition, ash pile and ash pond abatement and closure, asbestos and other
4 hazardous materials abatement and remediation, and final site cleanup and restoration
5 as applicable to each plant.

6 **Q. Does this conclude your direct testimony?**

7 A. Yes.