

**BEFORE THE
COLORADO PUBLIC UTILITIES COMMISSION**

IN THE MATTER OF THE APPLICATION
OF PUBLIC SERVICE COMPANY OF
COLORADO FOR APPROVAL OF ITS
2021 ELECTRIC RESOURCE PLAN AND
CLEAN ENERGY PLAN

Proceeding No. 21A-0141E

**Cross-Answer Testimony of
Tyler Comings**

Notice of Confidentiality

**A Portion of the Testimony and Attachments Have Been Filed Under Seal
Confidential material redacted on pages 1, 6-8**

**On Behalf of
Conservation Coalition**

November 12, 2021

TABLE OF CONTENTS

I. Introduction and Qualifications 4
II. Response to CEO Regarding Comanche 3 Retirement7
II. Response to UCA Regarding Comanche 3 and Pawnee..... 12
III. Response to Staff Regarding the Timing of the Comanche 3 decision 19
IV. Response to City of Pueblo on the Economic Impacts of Comanche 321
V. Conclusion and Recommendations..... 26

List of Attachments

Attachment TC-19	CEO Response to CC 1-8
Attachment TC-20	CEO Response to CC 1-9
Attachment TC-21	UCA Response to CC 1-7
Attachment TC-22	UCA Response to CC 1-17
Attachment TC-23	UCA Response to CC 1-20
Attachment TC-24	PSCo Response to OCC 5-1
Attachment TC-25	City of Pueblo Response to CC 2-1
Attachment TC-26	City of Pueblo Response to WRA 1-2
Attachment TC-27	PSCo Response to CC 1-6

1 **I. INTRODUCTION AND QUALIFICATIONS**

2 **Q. Please state your name, business address, and position.**

3 A. My name is Tyler Comings. I am a Senior Researcher at Applied Economics Clinic,
4 located at 1012 Massachusetts Avenue, Arlington, Massachusetts.

5 **Q. Are you the same Tyler Comings who submitted answer testimony in this case?**

6 A. Yes.

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

8 A. My cross-answer testimony addresses aspects of the Colorado Energy Office
9 (CEO), Colorado Office of Utility Consumer Advocate (UCA), the City of Pueblo,
10 and Staff of the Colorado Public Utilities Commission (Staff) testimonies related to
11 the decisions for the Comanche Unit 3 and Pawnee coal units. I also discuss how
12 certain recommendations of CEO, Staff, and UCA should be applied to the
13 Company's other coal units at issue in this case, Craig 2 and Hayden 1 and 2. Please
14 summarize your responses to these parties.

15 A. My responses to parties' answer testimony include the following:

16 **1. The CEO has not made a compelling case for 2039 retirement of**
17 **Comanche 3.** One of the CEO's proposed solutions is to [REDACTED] the
18 operations at Comanche 3 from 2025 through 2039, leading the unit to
19 [REDACTED] operate if carbon emissions are considered in dispatch decisions. But
20 CEO's modeling shows that even under these operating conditions that
21 retiring Comanche 3 in 2029 is lower-cost—whether including or excluding

1 carbon costs—and has lower emissions than retiring the unit in 2039. (CEO
2 did not model retirement of the unit prior to 2029.) In addition to CEO not
3 having made the economic case for 2039 retirement of Comanche 3, I am
4 concerned the CEO’s proposal relies on the unit operating as a capacity
5 resource to achieve the emissions reductions inherent in CEO’s modeling
6 results. CEO has not provided any evidence that a coal unit like Comanche 3
7 could technically operate at the extremely low capacity factors in CEO’s
8 modeling.

9 **2. The UCA has not tested earlier retirement of Comanche or Pawnee and**
10 **has a flawed view of coal economics.** The UCA argues for 2039 retirement
11 of Comanche 3 and continued coal operation at Pawnee, paired with
12 economic dispatch of both units. But UCA did not model retiring Comanche
13 3 prior to 2039—unlike PSCO, CEO, and CC. UCA’s modeling framework
14 cannot be used as a basis for determining Comanche 3 and Pawnee’s future
15 because many inputs assumptions were changed in UCA’s plan but not
16 made to PSCo’s plan, which was the only point of comparison. UCA’s
17 arguments against earlier retirement also rest on flawed logic, primarily the
18 false claim that earlier retirement of coal units is always more expensive—
19 which does not explain why so many coal units have retired or are planned
20 to retire. Indeed, there are modeling results in this case showing savings
21 from earlier retirement or conversion of Comanche 3 and Pawnee.

22 **3. Staff’s proposal to delay deciding whether to retire Comanche 3 prior**
23 **to 2030 is concerning.** Staff proposes to delay to the next ERP proceeding

1 (potentially in 2025) the decision about retiring Comanche 3 prior to 2030.
2 But there is ample evidence in this case that retiring Comanche 3 prior to
3 2030 is cost-effective. Dr. Roumpani’s modeling in answer testimony
4 showed that 2027 retirement is the best option, saving \$64 million in
5 customer costs excluding carbon costs¹, \$249 million when including
6 carbon costs, and over 4.5 million fewer tons of carbon dioxide emissions—
7 all relative to 2029 retirement.² Dr. Roumpani’s cross-answer modeling,
8 which tested economic cycling of coal units, also showed savings of \$46
9 million in customer costs excluding carbon costs, \$160 million in savings
10 including carbon costs, and 3.4 million tons of carbon dioxide for 2027
11 versus 2029 retirement of Comanche 3.³ Due to the lengthy process for
12 resource decisions in Colorado, a delay of the decision to a 2025 ERP
13 docket would make it likely infeasible to retire Comanche 3 prior to 2029—
14 forgoing the substantial savings in emissions and customer costs in the
15 process.

16 **4. The City of Pueblo’s economic impact estimate lacks basic rigor and**
17 **should be ignored.** The City of Pueblo submitted a study, sponsored by Dr.
18 Wakefield, that purports to estimate the economic impact of Comanche 3.
19 The study is so thoroughly flawed that it cannot be relied upon for any

¹ Dr. Roumpani shows the PVRR results with and without securitization benefits. Throughout my testimony, I report the savings without securitization savings but one can view the PVRR both with and without securitization savings in Table 6 of Dr. Roumpani’s Cross Answer testimony, Hearing Exhibit 1409.
² Hearing Exhibit 1401, Rev. 1 at 21 (Table 2, comparing plans CC3 and CC6).
³ Hearing Exhibit 1409 at Table 1 (comparing plans CC3 and CC6).

1 purpose. One of the study’s many flaws is that it does not account for any
2 actions that would reduce the economic impact of retiring Comanche 3,
3 including if: 1) the units’ workers are relocated elsewhere in PSCo
4 operations, as PSCo has promised to do; 2) transition funding is spent in
5 Pueblo; 3) new resources are built to replace the unit’s capacity in the
6 surrounding area, leading to new jobs; or 4) any combination of those
7 events. Apart from that lack of rigor, the study’s methodology was also
8 highly flawed by using stock data from the economic impact model
9 (IMPLAN) leading to non-sensical results including: 1) that the Comanche 3
10 coal unit supports substantial economic activity in pipeline and gas and oil
11 drilling industries, despite Comanche 3 being a coal unit; and 2) that the unit
12 supports coal mining jobs in Colorado, despite the fact all of the unit’s coal
13 comes from Wyoming.

14 **II. RESPONSE TO CEO REGARDING COMANCHE 3 RETIREMENT**

15 **Q. What is CEO’s proposal for the future of the Comanche 3 unit?**

16 A. The CEO proposes two recommended portfolios that have different retirement dates
17 for Comanche 3: 2029 or 2039. The portfolio in which Comanche 3 retires in 2039
18 follows PSCO’s recommended 2039 retirement date, but the unit would be operated
19 on a “least-cost, lowest emissions basis” starting in 2025 which would limit the
20 unit’s operations.⁴ CEO Witness Keith Hay proposes two ways of doing this: 1) that
21 the Commission direct PSCO to impose the social cost of carbon (SCC) as a

⁴ Hearing Exhibit 1200 at 64: 12.

1 dispatch cost at the unit; or 2) that the Commission direct PSCo to meet a
2 cumulative CO2 emissions limit at the unit.⁵ CEO Witness Divita Bhandari
3 conducted modeling in support of these recommendations.

4 **Q. Does the CEO’s modeling show that, with its proposed operational constraints,**
5 **that 2029 retirement of Comanche 3 is lower-cost than 2039?**

6 A. Yes. The “CEO 5” plan retires Comanche 3 in 2029 while portfolio “CEO 4” retires
7 the unit in 2039. CEO’s modeling results show that CEO 5 (2029 retirement) is
8 cheaper than CEO 4 (2039 retirement) by roughly \$200 million in terms of PVRR
9 with carbon costs or roughly \$100 million cheaper without carbon costs.⁶

10 **Q. Does the CEO modeling show that, with its proposed operational constraints,**
11 **2029 retirement of Comanche 3 produces lower emissions than 2039**
12 **retirement?**

13 A. Yes. CEO’s modeling shows that 2039 retirement of Comanche 3 is both more
14 expensive and emits more carbon dioxide than 2029 retirement. Portfolio CEO 4, in
15 which Comanche 3 retires in 2039, produces roughly 3 million more tons of carbon
16 dioxide by 2050 than CEO 5, where the unit retires in 2029.⁷

17 **Q. Did the CEO model the retirement of Comanche 3 before 2029?**

18 A. No. The Conservation Coalition tested 2027 retirement of Comanche 3 (as shown in
19 the Answer and Cross-Answer Testimony of Dr. Maria Roumpani) which resulted
20 in additional cost savings and avoided carbon emissions relative to 2029 and 2039

⁵ *Id.* at 64: 19 to 65: 4; *see also* Hearing Exhibit 1408, Attachment TC-19 (CEO Response to CC 1-8).

⁶ Hearing Exhibit 1200 at 59 (Figure KMH-9); Hearing Exhibit 1201, PUBLIC Attachment DB-1 at 37 (Table 15).

⁷ Hearing Exhibit 1201, PUBLIC Attachment DB-1 at Table 18.

1 retirement. To my knowledge, no party other than the Conservation Coalition has
2 modeled retiring Comanche 3 prior to 2029.

3 **Q. Do you have concerns with the ability to operate Comanche 3 at the extremely**
4 **low capacity factors proposed by CEO?**

5 A. Yes. The CEO's proposal rests on the assumption that Comanche 3 can be operated
6 as a capacity resource that runs extremely infrequently. In the CEO's modeling
7 results for portfolio CEO 4, Comanche 3 operates between [REDACTED] percent in every
8 year that the operational constraints are imposed (2026 through 2039); on average,
9 the unit runs at a [REDACTED] percent capacity factor.⁸ In most of these years, the unit does
10 [REDACTED].⁹

11 **Q. What is concerning about CEO's proposal to maintain Comanche 3 through**
12 **2039 but [REDACTED]?**

13 A. I am not an engineer, but in my experience reviewing many coal units' operations
14 around the U.S., I am unaware of any utility ever planning on running a coal unit at
15 an average capacity factor of less [REDACTED] for 15 consecutive years. The CEO was
16 not able to identify any coal units that have run for at these levels over a 15-year
17 period.¹⁰ While the average capacity factor at coal units has decreased in the past

⁸ "CEO Comanche and Pawnee Synapse Report Analysis," Comparison Summary tab, row 76. Synapse stated that these were highly confidential.

⁹ *Id.*

¹⁰ Hearing Exhibit 1408, Attachment TC-20 (CEO Response to CC 1-9(b)).

1 decade to around 40 percent in 2020, I am not aware of coal units that were
2 designed to operate as infrequently as the CEO has proposed for Comanche 3.¹¹

3 **Q. Has CEO produced any evidence that a coal unit such as Comanche 3 could**
4 **reliably operate at an average annual capacity factor [REDACTED]**
5 **[REDACTED]?**

6 A. No. CEO admitted in discovery that it did not analyze whether the unit could
7 technically operate at such low capacity factors over a 15-year period.¹² This is a
8 critical flaw in CEO's proposal to operate Comanche 3 through 2039. CEO's
9 modeling assumes that Comanche 3 is available as a capacity resource that is
10 [REDACTED] for years at a time and then restarted when there is a critical capacity need
11 during a reliability event. But this is an unjustified assumption, given that CEO
12 admitted that no coal unit in the entire country operates this way, and given that
13 CEO provided no evidence that Comanche 3 could operate this way for sustained
14 periods of time.

15 **Q. In general, must a coal operator choose between imposing operational**
16 **constraints—e.g. seasonal dispatch or economic dispatch—and retiring the**
17 **unit?**

18 A. No. Imposing operational constraints and retiring a unit early are not mutually
19 exclusive pathways. PSCo could seasonally or economically operate Comanche 3
20 and still retire the unit in 2027 or 2029. One concern I have with the CEO's
21 proposal in particular, however, is that it presents the imposition of operational

¹¹ EIA, Electric Power Monthly, Table 6.07.A. Capacity Factors for Utility Scale Generators Primarily Using Fossil Fuels. Available at: https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_07_a

¹² Hearing Exhibit 1408, Attachment TC-20 (CEO Response to CC 1-9(c)).

1 constraints at the unit as an alternative to early retirement.¹³ But there is good
2 reason that the CEO cannot produce an example of a utility choosing to operate a
3 coal unit as a capacity resource over a long period of time as an alternative to
4 retiring the unit: keeping a coal unit on-line that requires high fixed costs but would
5 [REDACTED] is not a reasonable resource decision compared to retiring it or
6 converting it to gas.

7 The CEO's portfolio in which Comanche 3 retires in 2029 was both cheaper and
8 emitted less carbon dioxide than their portfolio in which Comanche 3 retires in
9 2039. Because of this result and that CEO has not provided evidence that
10 Comanche 3 would be a reliable source of capacity when operating at the low levels
11 CEO is proposing, CEO's proposal to retire Comanche 3 in 2039 should not be
12 considered in lieu of retiring Comanche 3 in 2027 or 2029.

13 **Q. Did Dr. Roumpani conduct new modeling to test CEO's proposal?**

14 A. Yes. Dr. Roumpani conducted updated modeling in her cross-answer testimony that
15 applied economic dispatch to the coal actions she had modeled in her answer
16 testimony to compare to CEO's, UCA's, and PSCo's actions for Comanche 3 and
17 Pawnee. As part of this analysis, she modeled a portfolio approximating CEO's
18 proposal for operating Comanche 3 through 2039 and found that the Conservation
19 Coalition's preferred plan (CC 6), where Comanche 3 retires in 2027 and Pawnee

¹³ Hearing Exhibit 1200 at 63: 18-21.

1 converts to gas in 2024, results in lower customer costs without carbon costs, and
2 substantial savings with carbon costs compared to CEO’s plan.¹⁴

3 **II. RESPONSE TO UCA REGARDING COMANCHE 3 AND PAWNEE**

4 **Q. What is UCA’s proposal for the Comanche 3 and Pawnee units?**

5 A. UCA proposes to retire Comanche 3 in 2039, keep operating Pawnee on coal until
6 2041 (instead of converting to gas), and operate both units with “economic
7 dispatch” starting in 2025.¹⁵ UCA preformed modeling of this plan (which included
8 many adjustments to modeling assumptions) and compared it to the Company’s
9 preferred plan result.¹⁶

10 **Q. Did the UCA model retirement of Comanche 3 before 2039?**

11 A. No. The UCA has not modeled whether its plan is more economic than one which
12 retires Comanche 3 prior to 2039.¹⁷ UCA compared its plan for “economic
13 dispatch” to only the PSCo preferred plan, which retires the unit in 2039. But, as
14 explained in detail in Dr. Roumpani’s cross-answer testimony, UCA did not model
15 PSCo’s preferred portfolio with the same input assumptions as the UCA plan;
16 therefore, this does not provide a useful framework for evaluating the futures of
17 Comanche 3 and Pawnee. As explained below, I do not believe that UCA has made
18 an economic case for its proposed actions for Comanche 3 and Pawnee.

¹⁴ Hearing Exhibit 1409 at Table 6.

¹⁵ Hearing Exhibit 500 at 6: 6-10.

¹⁶ Hearing Exhibit 503C at 25 (Table CH-6).

¹⁷ Hearing Exhibit 1408, Attachment TC-21 (UCA response to SC 1-7(a)).

1 **Q. Does the UCA proposal, like CEO’s proposal, also rely on reduced operations**
2 **at Comanche 3 and Pawnee rather than retiring the units earlier or converting**
3 **to gas?**

4 A. Yes. At a broad level, the UCA’s proposal is similar to the CEO’s proposal for
5 Comanche 3, in that the UCA relies on reduced operations at the coal units to
6 achieve its goals. However, UCA’s and CEO’s proposals differ in the level at which
7 Comanche 3 would operate.

8 **Q. Can the savings and emission reductions that UCA claims from its preferred**
9 **portfolio be attributed solely to its proposal on how to operate the coal units?**

10 A. No. The UCA modeling compares the PSCo preferred plan to the UCA plan.
11 However, in addition to changing the coal actions for Pawnee and Comanche, UCA
12 also changed many significant modeling inputs and constraints for the UCA plan—
13 but not for PSCo’s plan. For example, for the UCA plan, UCA’s modeling
14 increased the ELCC for batteries, relaxed the renewable build constraint, and
15 reduced the cost of unserved energy (among others).¹⁸ Because the UCA’s
16 modeling makes these input changes for only the UCA plan and not PSCo’s plan,
17 the cost and emission differences between the UCA and PSCo plans are in large
18 part due to the changes in the modeling assumptions.

19 **Q. Does Dr. Roumpani’s modeling indicate that UCA’s proposal for Pawnee and**
20 **Comanche 3 is unlikely to achieve significant direct cost savings to customers,**
21 **and would emit far more carbon dioxide than other proposals?**

22 A. Yes. To address the issue described above, Dr. Roumpani conducted modeling that
23 compares UCA’s proposed actions for Comanche 3 and Pawnee to the coal actions

¹⁸ Hearing Exhibit 503C at 22 (Table CH-5); Hearing Exhibit 1408, Attachment TC-22 (UCA response to CC 1-17).

1 proposed by PSCo and the Conservation Coalition, using a consistent set of
2 modeling assumptions. When this apples-to-apples comparison is conducted, the
3 cost savings from UCA’s portfolio are erased, confirming that savings from UCA’s
4 portfolio would come largely from its changed modeling assumptions and not from
5 its proposal for Pawnee and Comanche 3. In addition, UCA’s portfolio emits far
6 more carbon dioxide than portfolios in which Comanche 3 retires in 2027 or 2029
7 and Pawnee converts to gas in 2024 or 2027.¹⁹

8 **Q. Can the UCA’s proposal for “economic dispatch” also be applied if the units**
9 **are retired earlier than UCA proposes?**

10 A. Yes. As I stated before in discussing the CEO proposal, changes to the operational
11 constraints at the coal units, however warranted they may be, are not a substitute for
12 selecting the optimal retirement date. The Commission could impose UCA’s
13 recommendation for economic dispatch and retire Comanche 3 in 2027 and convert
14 Pawnee to gas in 2024. UCA’s modeling shows that its proposed modifications to
15 modeling inputs and constraints (such as the ELCC for batteries and renewable
16 build limits) would collectively save ratepayers, compared to the modeling inputs
17 and constraints used in PSCo’s modeling; but UCA has not made the case that its
18 proposal for Comanche 3 to operate through 2039 and Pawnee to continue burning
19 coal until 2041 will save ratepayers any money.

¹⁹ Hearing Exhibit 1409 at Table 3.

1 **Q. Does the UCA make a convincing case for continuing to operate Pawnee as a**
2 **coal unit until 2041?**

3 A. No, for several reasons. First, as I mentioned above, UCA has not shown that
4 operating Pawnee as a coal unit until 2041 is cost-effective because of UCA's
5 modeling approach that did not isolate the impact of UCA's proposed coal actions.
6 In UCA's modeling, many different input assumptions change, but UCA did not re-
7 run PSCo's proposed coal actions with UCA's modeling assumptions. As a result, it
8 is impossible to use UCA's modeling to draw any conclusions about the cost
9 impacts of UCA's proposed coal actions.

10 Dr. Roumpani's modeling presented in her cross-answer testimony
11 addresses this shortcoming in UCA's modeling. Under Conservation Coalition's
12 assumptions (e.g. CC's recommended ELCC value for battery storage), retiring
13 Comanche 3 in 2027 and converting Pawnee to gas in 2024 would save \$65 million
14 in customer costs excluding carbon costs, \$1.4 billion when including carbon costs,
15 and avoid 9.5 million tons of carbon dioxide relative to UCA's proposed coal
16 actions.

17 Dr. Roumpani also modeled both plans using UCA's input assumptions,
18 showing that the CC and UCA coal actions have costs that are very similar when
19 carbon costs are excluded. However, UCA's proposed coal actions are much more
20 expensive than the Conservation Coalition's coal actions when carbon costs are
21 included. In addition, UCA's coal actions result in significantly higher cumulative
22 carbon emissions compared to the Conservation Coalition's coal actions.

23

1 **Q. Does UCA focus on the capital cost to convert Pawnee to gas, without**
2 **considering the cost savings associated with not burning coal at Pawnee?**

3 A. Yes. A significant flaw in UCA’s analysis of Pawnee is that UCA focuses on the
4 capital costs of the Pawnee gas conversion without considering the avoided costs of
5 from ceasing coal operations at Pawnee. UCA witness Neil states that “not
6 converting Pawnee is a significant cost savings,”²⁰ citing the capital costs of the gas
7 conversion. But Mr. Neil does not discuss the costs associated with continued coal
8 operations that would be saved by converting Pawnee from coal to gas.²¹ An
9 apples-to-apples analysis that compares different choices at the unit under the same
10 input assumptions provides a basis for making a resource decision—but UCA failed
11 to do this.

12 **Q. Does UCA’s analysis of Pawnee also suffer from the sunk cost fallacy?**

13 A. Yes, another flaw in UCA’s analysis of Pawnee is that UCA focuses on the
14 treatment of the unit’s book value, which should not influence a forward-looking
15 resource decision. UCA witness England discusses the treatment of the remaining
16 book value of the unit at length but ultimately refers to Witness Neil’s “cost-saving
17 rationale of not converting Pawnee to natural gas.”²² While I understand concerns
18 with how the book value is treated, it should not determine whether and when a unit
19 retires. If there is an economic case for the unit to retire, then the decision for how
20 to handle the remaining book value can be handled after that—otherwise it is “the
21 cart before the horse.” Moreover, the longer a coal unit operates, the more capital

²⁰ Hearing Exhibit 504 at 8: 10-11.

²¹ *Id.* at 8: 7-11.

²² Hearing Exhibit 501 at 11-16.

1 spending is required and will thus be added to the unit's book value. The book
2 value today is unavoidable or "sunk;" the focus of the retirement decision should be
3 on the forward-going costs of the potential pathways of that unit.

4 **Q. Is the UCA correct that earlier retirement always increases costs?**

5 A. No. In discussing Comanche 3's future, Dr. England states that "any earlier
6 retirement will increase the net present value costs to ratepayers."²³ This statement
7 is false.

8 **Q. Please explain the multiple flaws in Dr. England's statement that retiring a
9 generating unit always increases costs.**

10 A. The fundamental flaw in Dr. England's statement is that he ignores the avoided
11 costs from retiring or converting a unit. Dr. England focuses on the treatment of the
12 book value of the unit and gas conversion costs. But there is a glaring omission: the
13 costs avoided from retiring or converting a coal unit. It is possible for the capital
14 and operating costs of replacement resources to be lower than the capital and
15 operating costs of the unit to be retired, thus resulting in lower net costs from
16 retiring and replacing a unit. This is a basic precept of resource planning; otherwise,
17 utilities would never retire any generating unit for economic reasons.

18 **Q. Did Dr. England contradict his answer testimony in his discovery response?**

19 A. Yes. When asked to back up this false statement, Dr. England first contradicted his
20 conclusion but then offered another false statement in explaining it. Dr. England
21 claimed that:

²³ Hearing Exhibit 501 at 18: 6-7.

1 Mathematically, the only way accelerated retirements can lower the
2 net present value is if the overall annual costs are reduced
3 sufficiently enough in the earlier years to offset any potential
4 increase in overall annual costs in later years.²⁴

5 The first part of Dr. England’s response indicates that it is possible that the net
6 present value can be lower with earlier retirement of a generating unit—which
7 contradicts his statement in answer testimony that retiring a unit always increases
8 costs.

9 The second part of Dr. England’s response, however, is a new falsehood because
10 earlier retirement can of course be cheaper if there are cost savings in later years
11 and not the early years. The point of a net present value is to collapse a multi-year
12 analysis into one result by discounting the future years accordingly. The savings
13 from early retirement do not need to occur in “the earlier years,” as Dr. England
14 suggests; instead, the savings need only be sufficient to reduce the overall NPV for
15 the whole analysis period. Dr. England’s arguments against earlier coal retirement
16 should be completely ignored because they betray a misunderstanding of basic
17 resource planning analysis.

18 **Q. Does Dr. England’s statement that retiring generating units always increase**
19 **costs make sense, in light of PSCo’s and other utility’s retirement of coal units?**

20 A. Dr. England’s contention that retiring generating units always increases costs begs
21 the question: why then have so many coal units in the U.S. retired earlier than
22 originally planned, especially in the past decade? The answer of course is that they
23 retired (or will retire) largely for economic reasons, as lower-cost gas plants and
24 renewables have rendered many coal units uneconomic and uncompetitive. Indeed,

²⁴ Hearing Exhibit 1408, Attachment TC-23 (UCA response to SC 1-20(b)).

1 many coal units have been retired in competitive wholesale markets such as
2 ERCOT, PJM, SPP, and MISO. In Colorado, in PSCo's last ERP, this Commission
3 approved the early retirement of Comanche 1 and 2 precisely because of evidence
4 that the early closures would lower the net present value and save customers
5 money.

6 **Q. Should the Commission consider requiring economic dispatch of coal units?**

7 A. Yes, but not as a substitution for early retirement or gas conversion. In this case, Dr.
8 Roumpani's modeling has shown that UCA's proposal for economic cycling with
9 continued coal operations is more costly when carbon costs are considered and
10 carbon-emitting than economic cycling in combination with ceasing coal operations
11 earlier.

12 **III. RESPONSE TO STAFF REGARDING THE TIMING OF THE COMANCHE 3 DECISION**

13 **Q. What is Staff's proposal for the handling of the Comanche 3 decision?**

14 A. Staff Witness Steven Dahlke proposes that the Commission delay any decision
15 about whether Comanche 3 should retire before 2030 until a future ERP docket,
16 which he expects may be filed in 2025.²⁵

17 **Q. What are your concerns with Staff's proposed timeline for the Comanche 3**
18 **decision?**

19 A. I am concerned that Staff's proposed timeline forecloses the option of a 2027 or
20 2028 retirement of Comanche 3 and could even make it difficult to close the unit in
21 2029. The ERP process is a lengthy one, with a final Phase II decision from the

²⁵ Hearing Exhibit 2700 at 59: 7-8.

1 Commission coming roughly two years after the Company’s initial filing in Phase I.
2 After the Commission issues its final Phase II order, approved resources need to be
3 contracted for, designed, permitted, and built—which can take two to three years,
4 depending on several factors, including the type of new resource. Thus, it can take
5 four to five years between the date PSCo files a Phase I application and the date that
6 a new resource comes online.

7 With that timeline in mind, Staff’s proposal would effectively eliminate the PUC’s
8 ability to decide that closing Comanche 3 in 2027 or 2028 is appropriate. Even
9 retiring and replacing Comanche 3 in 2029 could be difficult to achieve under
10 Staff’s proposal if a final Phase II decision came from the Commission in 2027.

11 Even assuming a 2029 retirement were achievable under Staff’s proposal, delaying
12 until the next ERP the decision to close Comanche 3 before 2030 would likely
13 increase customer costs and emissions, by foreclosing the ability to close Comanche
14 3 in 2027. Dr. Roumpani’s modeling in answer testimony showed that 2027
15 retirement is the best option, saving \$64 million in customer costs excluding carbon
16 costs, \$249 million when including carbon costs, and over 4.5 million tons of
17 carbon dioxide—all relative to 2029 retirement.²⁶ Dr. Roumpani’s cross-answer
18 modeling, which tested economic cycling of coal units in all portfolios, also showed
19 savings of \$46 million customer costs excluding carbon costs, \$160 million in
20 savings including carbon costs, and 3.4 million tons of carbon dioxide for 2027

²⁶ Hearing Exhibit 1401, Rev. 1 at Table 2 (comparing plans CC3 and CC6).

1 versus 2029 retirement of Comanche 3.²⁷ These cost and emissions savings would
2 not be achievable under Staff's proposed timeline.

3 **Q. What do you propose if the Commission does not decide in this docket whether**
4 **to close Comanche 3 before 2030?**

5 A. To be clear, I strongly urge the Commission, in this docket, to approve retiring
6 Comanche 3 at the end of 2027, or by the end of 2029 at the latest. There is strong
7 evidence for 2027 or at the latest 2029 retirement of the unit in this case, in the
8 modeling results from the Conservation Coalition, CEO, and the Company itself.
9 However, if the Commission does not decide whether to close Comanche 3 before
10 2030 in this case, then I recommend that the Commission require PSCo to file a
11 new ERP by December 31, 2023 at the latest. In addition, if Staff's proposal is
12 adopted, I urge the Commission to require PSCo to model retirement of Comanche
13 3 at the end of 2027, 2028, and 2029, and to fix the errors in its modeling of
14 Comanche 3 that I identified in my Answer Testimony. The Commission should
15 also consider requiring economic cycling at all of PSCo's units—not just Pawnee
16 and Comanche 3.

17 **IV. RESPONSE TO CITY OF PUEBLO ON THE ECONOMIC IMPACTS OF COMANCHE 3**

18 **Q. Did the City of Pueblo produce an economic impact study of Comanche 3?**

19 A. Yes. Pueblo witness Dr. Wakefield presented a study that claims to show the
20 economic impact of Comanche 3 on the state of Colorado.²⁸

²⁷ Hearing Exhibit 1409 at Table 1 (comparing plans CC3 and CC6).

²⁸ Hearing Exhibit 1602, Attachment MWW-2 (PSCo - Comanche 3 Economic Impact Analysis).

1 **Q. Does the study accurately reflect the economic activity lost if the unit were to**
2 **retire?**

3 A. No, the study sponsored by Dr. Wakefield is so thoroughly flawed that it should not
4 be relied upon for this purpose. The study commits the following errors:

- 5 • The study does not account for likely actions that will reduce the
6 economic impacts from closing Comanche 3, such as retaining workers
7 within PSCo, siting replacement resources in Colorado, etc.;
- 8 • The study used the default model setting in which Comanche 3 is treated
9 as a generic “fossil fuel” unit which is a mix of coal, natural gas, and oil
10 operations—when in fact Comanche 3 burns primarily coal;
- 11 • The study assumes that a portion of coal burned at Comanche 3 is mined
12 from Colorado and therefore closing Comanche 3 results in lost mining
13 jobs and revenues in Colorado—when in fact 100 percent of the coal
14 burned at Comanche 3 comes from Wyoming.

15 For these reasons, Dr. Wakefield’s study should not be considered an indicator of
16 lost economic activity with Comanche 3’s retirement, and should be ignored in this
17 case.

18 **Q. Have you conducted economic impact analyses using the same model that was**
19 **used in Dr. Wakefield’s study?**

20 A. Yes, many times. I have conducted economic impact studies since 2007. I have co-
21 authored over 25 economic impact studies and testified on economic impacts in 5

1 PUC dockets.²⁹ Almost all of my analyses involved IMPLAN, the same model used
2 in Dr. Wakefield’s study of Comanche 3.

3 **Q. Does Dr. Wakefield’s study of Comanche 3 account for economic activity that**
4 **would occur if the unit were retired?**

5 A. No. Dr. Wakefield’s study models the impacts of closing Comanche 3 in isolation,
6 meaning that Dr. Wakefield did not consider any scenarios in which Comanche 3
7 retires but some or all workers are retained or relocated by PSCo and new resources
8 are built anywhere in Colorado to replace Comanche 3. The study should not be
9 used as a measure of the impact from retiring Comanche 3, for several reasons.
10 First, PSCo has stated multiple times that all of the workers at Comanche 3 will be
11 offered other positions within PSCo when Comanche 3 retires.³⁰ PSCo has stated
12 that past coal retirements have had “little to no payroll impact” and that it is
13 “committed to a similar outcome” in this case.³¹ Second, whenever Comanche 3
14 retires, the unit’s capacity will be replaced with other resources in Colorado that
15 will require labor and materials to construct and operate. These activities will
16 produce multiplier effects in Colorado. Moreover, as Conservation Coalition
17 witness Noah Long has advocated, Pueblo and the surrounding area could be
18 prioritized for locating these new resources in Pueblo. Third, if Comanche 3 is
19 closed, PSCo has stated that it will file a community transition plan for the city, as
20 is required under the Clean Energy Plan provisions of SB 19-236. (CC witness

²⁹ Hearing Exhibit 1402, Attachment TC-1.

³⁰ Hearing Exhibit 1400, Attachment NL-9 (PSCo Response to CPUC 3-24) and NL-10 (PSCo Response to CC 1-36); *see also* Hearing Exhibit 1408, Attachment TC-26 (City of Pueblo response to WRA 1-2(d), Attachment).

³¹ Hearing Exhibit 1408, Attachment TC-24 (PSCo response to OCC 5-1).

1 Noah Long discusses this concept in more detail.) PSCo’s commitment to retain the
2 workforce at Comanche 3 after the unit closes, and to produce a community
3 transition plan, would produce their own positive economic impacts, as would
4 investment in new replacement resources. But Dr. Wakefield’s study does not
5 include any of these actions that would offset economic impacts from closing
6 Comanche 3.

7 **Q. Does the Pueblo study accurately depict Comanche 3’s operations?**

8 A. No. The default industry in IMPLAN is an amalgam of all fossil fuel generation in
9 Colorado, including coal, natural gas and oil. If the IMPLAN user merely takes this
10 default setting, without any customization for Comanche 3 specifically, the model
11 produces impacts that are indicative of a generic unit that burns a mix of coal,
12 natural gas, and oil. Here, Dr. Wakefield’s study used this generic fossil fuel
13 generation industry in IMPLAN when modeling Comanche 3, which led to non-
14 sensical economic impact results.³² The breakdown of commodities purchased by
15 this generic fossil fuel industry in Pueblo’s model shows that this industry assumes
16 that more natural gas and petroleum is purchased than coal.³³
17 As a result of this flaw, Dr. Wakefield’s study shows that two of the top five “most
18 impacted industries” from Comanche 3 are “oil and gas extraction” and “pipeline
19 transportation.”³⁴ On its face, this result makes no sense—how would closing a

³² Hearing Exhibit 1602, Attachment MWW-2 at 3; Hearing Exhibit 1408, Attachment TC-25 (City of Pueblo response to CC 2-1 (d) and “commodity_demand.xls” which shows the commodity inputs bought by the fossil fuel generation industry in Pueblo’s IMPLAN model--provided through email).

³³ *Id.*

³⁴ Hearing Exhibit 1602, Attachment MWW-2 at 4.

1 coal unit lead to significant economic impacts on the oil and gas extraction industry
2 and pipeline transportation? In reality, Comanche 3 does not burn appreciable
3 amounts of gas or oil, and therefore Comanche 3 should not have a significant
4 effect on those industries. It is possible to customize industries in IMPLAN to better
5 capture the specific resource one is studying—e.g. remove oil and gas purchases—
6 but the authors neglected to do that. As a result, the study produced results that defy
7 reality.

8 **Q. Does Dr. Wakefield’s study assume that a portion of coal burned at Comanche**
9 **3 comes from mines in Colorado?**

10 A. Yes. The study also assumed a portion of the coal burned at Comanche 3 was from
11 mines in Colorado,³⁵ leading the study to conclude that there would be indirect
12 economic impacts to coal mining in Colorado from closing Comanche 3. But this is
13 inaccurate because all of Comanche’s coal comes from Wyoming.³⁶ Therefore,
14 there would be no jobs, income or GDP lost at Colorado coal mines if Comanche 3
15 retired.

16 **Q. Should Dr. Wakefield’s economic impact study be ignored in this case?**

17 A. Yes. The study is highly flawed and lacks the basic rigor that is necessary for a
18 useful economic impact analysis.

³⁵ Attachment TC-25 at 4 includes the “commodity_demand.xls” file provided by the City of Pueblo, showing the regional purchase coefficient (“RPC”) for coal as 23%. This means the assumed amount of coal purchased from Colorado mines is 23%; but this is a statewide modeling assumption for all coal bought in the state, and not specific to Comanche 3. See <https://www.eia.gov/electricity/data/eia923/> for detail on fuel purchases at the Comanche plant.

³⁶ Hearing Exhibit 1408, Attachment TC-27 at 2 (PSCo response to CC 1-6(b)). The table on page 2 shows that all of the coal that currently supplies Comanche 3 comes from mines located in Wyoming.

1 **V. CONCLUSION AND RECOMMENDATIONS**

2 **Q. Have your conclusions regarding the future of Comanche 3 and Pawnee**
3 **changed since your answer testimony was filed?**

4 A. No. I continue to find that Comanche 3 should be retired in 2027 and Pawnee
5 converted to natural gas in 2024. Dr. Roumpani's answer and cross-answer
6 modeling supports that decision on both a cost and emissions basis.

7 **Q. Please explain how Dr. Roumpani's revisions to her answer testimony affected**
8 **your conclusions.**

9 A. Dr. Roumpani's revisions were primarily to the Company's preferred plan's costs
10 (not the other portfolios) and they did not change the fact that in the base scenario,
11 the CC6 plan provided substantial cost savings with carbon costs included (which I
12 argued was the most important cost metric) and substantially lower carbon
13 emissions.

14 **Q. Please explain how Dr. Roumpani's modeling presented in cross-answer that**
15 **compares the coal actions proposed by PSCo, CEO, UCA, and the**
16 **Conservation Coalition supports your recommendations.**

17 A. Dr. Roumpani's updated modeling tests applying economic dispatch in combination
18 with the retirement and conversion actions she modeled in her answer testimony.
19 Dr. Roumpani's modeling results in her cross-answer testimony continue to support
20 retirement of Comanche 3 in 2027 and conversion of Pawnee in 2024, even when
21 combined with economic dispatch, because at worst the customer costs without
22 carbon costs are similar, but her modeling shows significant savings when carbon
23 costs are included, and significantly lower carbon emissions.

1 Q. Does this conclude your cross-answer testimony?

2 A. Yes.

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO**

**IN THE MATTER OF THE
APPLICATION OF PUBLIC SERVICE
COMPANY OF COLORADO FOR
APPROVAL OF ITS 2021 ELECTRIC
RESOURCE PLAN AND CLEAN
ENERGY PLAN**

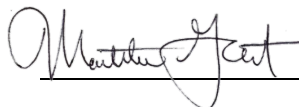
PROCEEDING NO. 21A-0141E

AFFIDAVIT OF TYLER COMINGS

I, Tyler Comings, state that the above Cross-Answer Testimony in Proceeding No. 21A-0141E was prepared by me or under my supervision and control. The testimony is true and correct to the best of my knowledge and belief. I would give the same testimony orally and would present the same attachments if asked under oath before the Commission.



Tyler Comings
Senior Researcher
Applied Economics Clinic
1012 Massachusetts Ave.
Arlington, MA 02476



Signature of Counsel