CONFIDENTIAL PER WAC 480-07-160

Exh. RJM-11C
Docket UE-25____
Witness: Ramon J. Mitchell

BEFORE THE WASHINGTON

UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PACIFICORP dba PACIFIC POWER & LIGHT COMPANY Respondent.	Docket UE-25_____

PACIFICORP

REDACTED EXHIBIT OF RAMON J. MITCHELL

DA/RT Percentile and DA/RT Volume Correction

April 2025

V. DA/RT ADJUSTMENT

Q. Please describe the DA/RT adjustment.

A. PacifiCorp incurs system balancing costs that are not reflected in the Company's OFPC nor modeled in the Company's NPC production cost model. To address this deficiency, in the 2016 TAM, the Company proposed the DA/RT adjustment to more accurately model system balancing transaction prices and volumes.

In the 2016 TAM, Staff, CUB, and the Industrial Customers of Northwest Utilities (ICNU) (the predecessor to AWEC) objected to the DA/RT adjustment. The Commission, however, rejected their arguments and approved the adjustment after concluding that it more accurately reflected the costs of system balancing transactions in the Company's NPC forecast.[10]

In the 2017 TAM, Staff, CUB, and ICNU again objected. The Commission again affirmed the DA/RT adjustment, concluding that it "reasonably addresses a deficiency of the GRID model and is likely to more fully capture PacifiCorp's net variable power costs."[11] The GRID model was the Company's production cost model at that time.

In the 2018 TAM, Staff, CUB, and AWEC again objected to the DA/RT adjustment. The Commission again affirmed the adjustment but adopted a modification to use only post-EIM years.[12]

[10] *In the Matter of PacifiCorp, dba Pacific Power, 2016 Transition Adjustment Mechanism*, Docket No. UE 296, Order No. 15-394, at 4 (Dec. 11, 2015).
[11] Order No. 16-482, at 13.
[12] *In the Matter of PacifiCorp, dba Pacific Power, 2018 Transition Adjustment Mechanism*, Docket No. UE 323, Order No. 17-444 at 8-9 (Nov. 1, 2017).

The Company then included the DA/RT adjustment in the 2019, 2020, 2021, and 2022 TAMs without modification.

In the 2023 TAM, the Company proposed a refinement to the *price component* of the DA/RT adjustment to change it from a flat value to a percentage of market price, which results in a DA/RT adjustment that is more reflective of actual operations. The 2023 TAM was resolved by a settlement that allowed the Company to implement the refined DA/RT adjustment on a non-precedential basis.[13]

Q. Please explain how the *price component* of the DA/RT adjustment operates.

A. The price component of the DA/RT adjustment addresses the costs incurred by the Company as a result of multiple variables within a dynamic system in which the Company has historically bought more during higher-than-average price periods and sold more during lower-than-average price periods.

To better reflect the market prices available to the Company when it transacts in the real-time market, PacifiCorp includes separate prices for forecast system balancing sales and purchases in Aurora. Aurora is the Company's current production cost model. These prices account for the historical price differences between the Company's purchases and sales compared to the monthly average market-indexed prices. Previously these prices were calculated by adding or subtracting a flat dollar amount to the hourly scaled prices from the OFPC.

[13] *In the Matter of PacifiCorp, dba Pacific Power, Transition Adjustment Mechanism*, Docket No. UE 400, Order No. 22-389, App'x A at 8 (Oct. 25, 2022).

Q. Please describe the *volume component* of the DA/RT adjustment.

A. The Company reflects additional volumes to account for the use of monthly, daily, and hourly products. In actual operations, the Company continually balances its market position—first with monthly products, then with daily products, and finally with hourly products. The products used to balance the Company's forward position in the wholesale market are available in flat 25 megawatt (MW) blocks. The Company's load and resource balance, however, varies continuously each hour in quantities that may vary widely from a flat 25 MW block. Thus, in real world operations, the Company must continuously purchase or sell additional volumes to keep the system in balance.

In contrast, Aurora has perfect foresight and can model wholesale market transactions at whatever volume is necessary to balance the system. Because of Aurora's perfect foresight, it can balance the system with far fewer transactions. The DA/RT adjustment adds additional volumes and associated cost to NPC to more accurately model the transactions necessary to balance the Company's system.

Q. Has the Company proposed a refinement to the *price component* of the DA/RT in this case?

A. Yes. The Company proposes to maintain the refinement that was implemented in the 2023 TAM on a non-precedential basis. This refinement changes the DA/RT adjustment's price component from a flat value to a percentage of market price.

Q. Please explain how changing the DA/RT adjustment's price component from a flat value to a percentage of market price results in a DA/RT adjustment that is more reflective of actual operations.

A. Changing the price calculation to a percentage of the market prices aids in accounting for the volatility caused by prices and system conditions not captured in day-ahead transactions. Take, for example, a $5 price adder in an hour when the market price is $25. This resolves to a 20 percent price adder. But using the $5 price adder when market prices are $75 would fail to account for the system and market conditions during that hour. Using a 20 percent price adder during hours when market price is $75 would yield in a $15 price adder, which is more reflective of the system conditions. A key benefit of using a percentage adder is that it allows the modeling to capture intra-monthly variability. Subsequently, this is a significantly more accurate representation of real operating conditions experienced by the Company.

Q. Why has the transition to Aurora not resolved the need for a DA/RT price component?

A. As noted above, the basis of the DA/RT price component is founded in the historical price differences between the Company's purchases and sales as compared to the monthly average market prices. The fact that there are historical price differences between the Company's purchases and sales as compared to the monthly average market prices is agnostic to the model used to forecast Company purchases and sales. Therefore, the transition to Aurora has not resolved the basis for the DA/RT price component.

A. Reply to Staff

Q. Does Staff recommend modifications to the DA/RT *price component* in this case?

A. Yes. Staff recommends that the Commission reject the Company's proposed refinement to the DA/RT price component because there is not enough information in the record that the proposed changes better reflect intra-month market volatility.[14]

Q. How does a percentage adjustment better capture intra-month price variability as compared to a flat dollar adjustment?

A. In the testimony below, I provide analysis on the drivers of the DA/RT price component, including a discussion of historical hourly scaled monthly average market prices as compared to historical hourly scaled Company purchases and associated purchase prices across four years of historical data from 2019 to 2022. This analysis shows that the refinement proposed by the Company more accurately accounts for intra-month price variability in the context of the historical data.

Q. Why is it important to focus on Company purchases instead of Company sales?

A. Across the historical period, the total net peak expense incurred from Company purchases is approximately 5.8 times greater than the total net peak revenues gained from Company sales. Confidential Figure 4 provides an illustration of this along with the average four-year historical hourly shape of purchase volumes, sales volumes, purchase expenses and sales revenues. This data, along with the observation that throughout the historical period the Company is a net purchaser (importer) on a dollar and volume basis and that Aurora has no market caps on purchases highlights the outsized importance of purchased power and its attendant costs.

[14] Staff/200, Jent/8.

Confidential Figure 4

Q. What does the historical data show when comparing market prices to the Company's purchases?

A. Confidential Figure 5 uses data from 2019 to 2022 to create two curves—one illustrating hourly scaled average market-indexed prices and one illustrating hourly scaled average Company purchase prices. The difference between the curves is an illustration of the DA/RT price component. The concept of intra-month price variability is exhibited by the change in price levels across the day for the hourly scaled average market-indexed prices as compared to the hourly scaled average

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Company purchase prices. This price variability is set forth numerically in Confidential Table 4, which shows the numeric difference between the two curves.

Confidential Figure 5

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Confidential Table 4

Hour Ending	Average Historical DA/RT *Price Component's* Adder ($/MWh)
1	[redacted]
2	[redacted]
3	[redacted]
4	[redacted]
5	[redacted]
6	[redacted]
7	[redacted]
8	[redacted]
9	[redacted]
10	[redacted]
11	[redacted]
12	[redacted]
13	[redacted]
14	[redacted]
15	[redacted]
16	[redacted]
17	[redacted]
18	[redacted]
19	[redacted]
20	[redacted]
21	[redacted]
22	[redacted]
23	[redacted]
24	[redacted]

Q. Why do you refer to the variability as "intra-month" when the data appears to focus on variability within a day?

A. It is important to recall that the OFPC uses monthly prices, which are then scaled down to hourly prices. So intra-month price variability is exhibited as hourly price variability within each day of the month. In my testimony above and as illustrated in Confidential Figure 5, this intra-month price variability is presented as average hourly price variability across the four-year historical period for the average day.

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Q. The DA/RT price component has historically been a flat dollar amount applied to the purchase and sales price. Does the historical data support this approach?

A. No. The historical data in Confidential Figure 5 and Confidential Table 4 shows intra-month variability in the DA/RT price component (i.e., the variability between the hourly scaled average market-indexed prices and the hourly scaled average Company purchase prices) is not constant across the day; the difference is generally greater as the price increases. If historical market prices supported the DA/RT price component as a flat dollar amount, then the historical values in Confidential Table 4 would not exhibit variability across the day but rather show consistency.

Confidential Figure 6 illustrates this variability in the actual historical DA/RT price component as compared to an illustration of a flat adder.

Confidential Figure 6

Q. Is Confidential Figure 6 a visual of historical market price curves in comparison to a flat DA/RT price component?

A. No. Confidential Figure 6 is a visual of what the historical DA/RT price component is, based solely on the historical relationship between actual market prices and actual Company purchases along with a comparison to a hypothetical flat adder that is separated into high load hour (HLH) and low load hour (LLH) components. That is to say, Confidential Figure 6 is a visual of Confidential Table 4 along with a comparison to a hypothetical flat adder that is separated into HLH and LLH components. Confidential Figure 6 is not a visual of a market price curve, even though it looks similar.

Q. Does the historical data support the usage of a percentage adder to more accurately account for intra-month price variability?

A. Yes. As illustrated in Confidential Figure 5 and in Confidential Figure 6, as the historical average market-indexed price increases, the spread between the historical average market-indexed price and the historical average buy price increases as well. This suggests that a percentage adder is more suitable for capturing the historical interplay between monthly average market prices and Company purchase prices. As illustrated in Confidential Table 4, the historical data definitively does not suggest that a flat adder is appropriate for capturing this intra-month dynamic. This means that the Company's refinement to the DA/RT price component is a more accurate representation of the difference between average market prices and the Company's transaction prices. Because the purpose of the DA/RT price component is to reflect this difference, the Company's refinement is consistent with the Commission's

rationale for adopting the DA/RT adjustment in the 2016 TAM and repeatedly approving its use in the TAM forecast during the last seven years.

Q. Does Staff include any other recommendations related to the DA/RT adjustment?

A. Yes. Staff recommends that the "inherent issues with the DA/RT be addressed holistically with the Company's perceived shortcomings of its market cap methodology[.]"[15] The "inherent issues" Staff identifies relate to the price component of the DA/RT adjustment.

Q What is the basis for Staff's recommendation that both the DA/RT adjustment and market caps be addressed together?

A. Staff claims that both refinements relate to "market hub activity" so it is "intuitive that these two adjustments should be viewed together rather than analyzing them individually."[16]

Q. How do you respond to Staff's recommendation?

A. First, the Company disagrees that there are "inherent issues with the DA/RT" price component. The price component has worked well since it was adopted by the Commission nearly ten years ago and appropriately includes costs in the NPC forecast that were previously excluded. Although the adjustment is not perfect and has been refined over time, it has no inherent flaws, as I discuss in more detail below.

[15] Staff/200, Jent/9.
[16] Staff/300, Dlouhy/10.

Second, there is no relevant connection between the DA/RT adjustment and market caps that supports Staff's proposal to address both together because all cost components of the NPC forecast[17] relate to each other.

Q. What is Staff's "inherent issue" with the DA/RT adjustment?

A. Staff claims that the DA/RT price component is an "ad hoc adjustment that distorts market prices by making sales prices lower and purchase prices higher in the model than the Company faces in reality" and therefore the DA/RT price component improperly creates "artificial losses" for the Company that are then used to increase forecast NPC.[18]

Q. Does Staff's testimony consider both the *price* and the *volume* component of the DA/RT adjustment?

A. No. Staff does not consider that the DA/RT adjustment has two components—a *price component* and a *volume component*. Staff's testimony focuses solely on the *price component* in their discussion on "artificial losses" without reconciling Staff's recommendation with how the entirety of the DA/RT adjustment operates. Specifically, by design the DA/RT *volume component* used since the 2016 TAM adds into the NPC forecast a measure of historical arbitrage revenue to offset the impact of using a single price adjustment in the DA/RT *price component* when the sales price exceeds the purchase price (which is the single price adjustment that Staff characterizes as "making sales prices lower and purchase prices higher in the model than the Company faces in reality."). I discuss this *volume component* in more detail

[17] 'Wholesale Sales Revenue', 'Purchased Power Expense', 'Fuel Expense' and 'Wheeling and Other Expense'.
[18] Staff/300, Dlouhy/9.

below and demonstrate that when viewed holistically, the DA/RT adjustment operates as intended and does not create the "artificial losses" Staff describes.

Q. Does Staff explain how the DA/RT adjustment creates the "artificial losses"?

A. No. Staff instead points to testimony it filed in the 2023 TAM.[19] In that case, Staff explained, "if PAC's buy price is lower than its sale price, [the DA/RT price component] calculates an amount that creates an artificial loss for the Company."[20] This happens because the DA/RT price component increases the purchase price and decreases the sales price thereby increasing overall NPC by increasing costs to purchase and decreasing revenues from sales. Staff calls this increase an "artificial loss," which Staff claims is an inherent flaw in the DA/RT price component.

Q. Has Staff raised this same concern before?

A. Yes. In the 2017 TAM, Staff objected to the DA/RT adjustment for the exact same reason:

> For some periods, PacifiCorp applies a different Price Adder than that suggested by the four-year history. Actual historic data indicates that in some months, purchases are on average less expensive than sales. This would result in a GRID purchase price below the GRID sale price within a single trading hub. At these prices, GRID would optimize by arbitraging within the same trading hub, maximizing both sales and purchases within the hub. PacifiCorp prevents GRID from performing this arbitrage by overriding the Price Adder calculation formula for these specific occurrences.[21]

[19] Staff/200, Jent/10.
[20] *In the Matter of Pacificorp, dba Pacific Power, Transition Adjustment Mechanism,* Docket No. UE 400, Staff/200, Cohen/11.
[21] *In re of Pacificorp, dba Pacific Power, 2017 Transition Adjustment Mechanism,* Docket No. UE 307, Staff/200, Kaufman/6 (Jul. 8, 2016).

Q. How did the Commission resolve Staff's identical objection to the DA/RT adjustment in the 2017 TAM?

A. As noted above, the Commission affirmed the DA/RT adjustment and rejected Staff's argument.

Q. Do you agree that the DA/RT price component improperly creates artificial losses?

A. No. The feature of the DA/RT price component Staff disputes has been a critical component of the DA/RT since it was first adopted by the Commission in the 2016 TAM. Without the adjustment that Staff disputes, the DA/RT price component could result in a scenario where the buy price at a particular hub is lower than the sales price at the same hub. If the inputs to Aurora for a single market showed a purchase price that was less than the sales price, then Aurora would buy and sell arbitrarily (arbitrage) large volumes of power under this situation, but in reality, the volumes in question would be very limited. In the event that this rare situation occurred in reality, all rational market participants would take advantage of this free profit arbitrage opportunity until market prices reached equilibrium and the purchase price was greater than or equal to the sales price. Within the Aurora model no equilibrium can ever be reached, as increasing demand does not impact price.

Given the Aurora model's inability to handle this circumstance, when the average monthly sales price exceeds the monthly purchase price in the same market, a single price adjustment is used for both sales and purchases based on the volume-weighted average of the historical sales and purchases. This ensures the modeled price component of the DA/RT adjustment better reflects market reality.

Q. Can you provide a quantitative example demonstrating why the adjustment Staff disputes is necessary?

A. Yes. For simplicity, assume that the DA/RT adjusted Mid-Columbia sales price is $2.00 per MWh and the DA/RT-adjusted purchase price at Mid-Columbia is $1.00 per MWh for the same time period. If these are the price inputs in Aurora, then the model will purchase energy at Mid-Columbia for $1.00 and sell that same energy at Mid-Columbia for $2.00 creating a $1.00 profit per MWh bought and sold. Because the model would require no generation to support its ability to arbitrage in this way, it would make this simultaneous purchase and sale repeatedly until it hit the market capacity on sales (market caps). This cycle of repeated arbitrage behavior does not reflect market realities and would lead to absurd results.

Q. How does the DA/RT adjustment address the fact that it reduces the purchase price to prevent excessive and unrealistic arbitrage in the model?

A. The NPC increase from the DA/RT *price component's* adder resulting from an adjustment to reduce artificial arbitrage is remedied in the DA/RT *volume component*, which re-introduces revenue into the NPC forecast to offset that price component's decrease to revenues. In this case, the volume component added in historically supported arbitrage revenue of $7.4 million, total-company. When the DA/RT adjustment is viewed holistically, both price component and volume component together, there are no artificial losses that result from the price component's adders.

Q. How does the volume component re-introduce the revenue that is lost when the price component's sales price is reduced to equal the purchase price?

A. The volume component of the DA/RT adjustment includes historical arbitrage

revenues, which are the revenues that Staff claims are artificially removed by the price component of the DA/RT adjustment.

Q. Has the Commission previously recognized that the DA/RT adjustment appropriately includes arbitrage revenues?

A. Yes. In the 2017 TAM where Staff raised the same issue around the so-called "artificial losses," Staff argued that the "DART price adders eliminate the value of arbitrage transactions."[22] The Commission rejected Staff's argument and found PacifiCorp's explanation persuasive that because arbitrage transactions are included in the historic DA/RT data, the benefits from arbitrage are incorporated into the volume component of the adjustment.[23] In that case, the Commission affirmed the DA/RT adjustment, which it had approved the previous year.

Q. Did Staff resurrect its argument that the DA/RT adjustment improperly excludes arbitrage revenues in any other TAMs?

A. Yes. In the 2018 TAM, Staff again argued that the DA/RT adjustment improperly excluded arbitrage revenues but focused on arbitrage across two market hubs, rather than arbitrage at a single hub.[24] Nonetheless, the Commission again affirmed the DA/RT adjustment and rejected Staff's argument that the adjustment improperly excluded arbitrage revenue.

[22] Order No. 16-482, at 12.
[23] Order No. 16-482 at 12 ("PacifiCorp respond[ed] that the adjustment properly includes arbitrage transactions."); *see also In the Matter of PacifiCorp, dba Pacific Power, 2017 Transition Adjustment Mechanism*, Docket No. UE 307, PAC/400, Dickman/32 (Aug. 1, 2016).
[24] *In the Matter of PacifiCorp, dba Pacific Power, 2018 Transition Adjustment Mechanism*, Docket No. UE 323, Staff/200, Kaufman/12 (Jun. 9, 2017).

Q. Turning back to the relationship between the DA/RT price component and market caps, Staff claims that the "artificial losses" created by the DA/RT price component has an opposite effect "on the same general subcategory of the total TAM forecast" as the market caps and therefore "Staff believes that they can be paired together to help the AURORA model match up better to reality."[25] Do you agree?

A. No. The fact that both adjustments impact market sales does not mean that they can be paired together and addressed holistically—particularly because the supposed flaw in the DA/RT price component underlying Staff's recommendation does not actually exist. That is, because the DA/RT adjustment includes historical arbitrage revenues in the volume component, there is no flaw that needs to be offset by an increase in market caps.

Q. Has the Commission previously addressed the relationship between the DA/RT adjustment and market caps?

A. Yes. When PacifiCorp first introduced the DA/RT adjustment in the 2016 TAM, AWEC witness Mullins, on behalf of ICNU, recommended that the Commission eliminate market caps if it approved the DA/RT adjustment.[26] The Commission rejected ICNU's adjustment in that case.

B. Reply to Vitesse

Q. Please describe Vitesse's position on the DA/RT adjustment.

A. Vitesse recommends that the Commission not adopt the Company's proposed

[25] Staff/200, Jent/10.
[26] Order No. 15-394 at 3.

refinement to the DA/RT price component on a precedential basis in this case to allow the parties additional time to review the adjustment.[27] Vitesse also identifies two concerns and proposed changes to the DA/RT price component.[28] However, Vitesse does not recommend that the Commission approve Vitesse's proposed modifications in this case, consistent with its primary recommendation that the Commission make no change to the DA/RT price component in this case to allow the parties additional time to review.[29]

Q. How do you respond to Vitesse's overall recommendation to defer adopting of the percentage price adder to allow additional time for review?

A. The Company disagrees that the parties require additional time to review the Company's refinement to the price component of the DA/RT adjustment. The Company first proposed and implemented the refinement in the 2023 TAM, so the parties have had more than a year to review. Moreover, when the Company first proposed the DA/RT adjustment in the 2016 TAM, Staff's primary objection was that there was insufficient time to review, similar to Vitesse's position here. The Commission rejected that argument, concluding that "[p]arties have had sufficient time and opportunity to review and assess the proposal."[30] Given that the parties here have had even more time to review the refinement here and the fact that the refinement is limited in scope, there is no basis to delay approval pending additional review.

[27] Vitesse/100, Johnson/7.
[28] Vitesse/100, Johnson/7–8.
[29] Vitesse/100, Johnson/7–8.
[30] Order No. 15-394 at 4.

Q. Please describe Vitesse's first recommended modification to the price component of the DA/RT adjustment.

A. Vitesse recommends that the calculation of the percent price adders be volume weighted by the volume of balancing purchases made each month.[31]

Q. How do you respond to Vitesse's recommendation?

A. The Company agrees that Vitesse's recommendation is reasonable and proposes to adopt this recommendation.

Q. Please describe Vitesse's second recommended modification to the DA/RT price component.

A. Vitesse describes the same "artificial losses" scenario identified by Staff and explained above.[32] Vitesse acknowledges that Aurora cannot function when the purchase price is lower than the sales price and therefore some adjustment is necessary but claims that the use of a flattened price artificially decreases the volume of purchases and sales modeled in Aurora.[33] Vitesse proposed no "long-term" solution to this issue but instead provides an interim recommendation—when calculating the dollar impact of the DA/RT price component, Vitesse recommends that the Company make an out-of-model adjustment that multiplies the volume of purchases and sales made in Aurora by the purchase and sales price, rather than by the flattened average of the two. Although Vitesse does not recommend that the Commission implement this modification in this case, Vitesse has roughly estimated

[31] Vitesse/100, Johnson/11.
[32] Vitesse/100, Johnson/12–13.
[33] Vitesse/100, Johnson/14–15.

the impact as a decrease to NPC of approximately $10 million total-company.[34] However, as I explain above, this is a double count of the $7.4 million total-company decrease to the NPC forecast through the DA/RT volume component's introduction of historical arbitrage revenue.

Q. How do you respond to Vitesse's second recommendation?

A. Vitesse's recommendation should be rejected. As an initial matter, and as discussed above in response to Staff, the issue of "artificial losses" identified by Vitesse and the attendant remedy in the DA/RT volume component has been a part of the DA/RT adjustment since it was first approved in the 2016 TAM. There is nothing new about these elements of the DA/RT adjustment. More importantly, as discussed above, the increased NPC resulting from the use of an average purchase and sales price when those prices are inverted is offset by the volume component of the DA/RT adjustment, which decreases NPC to account for historical arbitrage revenues. Vitesse's adjustment here is therefore double-counting arbitrage revenues.

Q. Vitesse is also concerned that the data set used to calculate the DA/RT adjustment includes trading hubs with very small volumes of system balancing transactions.[35] How do you respond?

A. As an initial matter Vitesse does not identify these "trading hubs with very small volume" or quantify the volume of transactions that Vitesse considers small. However, from the data set in the Initial Filing, the total annual dollars transacted at individual trading hubs range from $2.42 million to $75.7 million total-company.

[34] This $9.96 million total-company also includes the impact of Vitesse's volume weighted adjustment. See Vitesse/100, Johnson/16.
[35] Vitesse/100, Johnson/17.

The Company does not find these values to be small and parties have contested the TAM NPC forecast over far less.

Q. Finally, Vitesse is concerned that because the DA/RT adjustment is based on historical price and volume data, it "embeds" historical forecasting performance in future rates.[36] How do you respond?

A. As an initial matter, it is important to clarify the type of forecasting Vitesse discusses to avoid confusion. Vitesse claims that the Company is embedding its "historic forecasting performance in future rates" and then goes on to express concern about the Company not demonstrating that its "forecasting is reasonably accurate or to improve its forecasts."[37] However Vitesse is not referring to the prior NPC forecasts. Rather, Vitesse is referring to the reality of load service in actual operations where, for example, in the day-ahead horizon the Company must forecast the amount of customer load needing to be served on the next day.

Vitesse is concerned that the Company has not demonstrated that its forecasts made in actual operations are accurate and therefore it is concerning to Vitesse that the Company's NPC forecast is based on historical data that is partly based on those forecasts made in actual operations.[38]

Q. Does Vitesse's concern have merit?

A. No, not in its context. Vitesse's concern is not specifically related to the DA/RT price component. Vitesse's concern is related to the fundamental nature of power costs forecasts in the TAM and their use in ratemaking. Within the power cost

[36] Vitesse/100, Johnson/17.
[37] Vitesse/100, Johnson/17.
[38] Vitesse/100, Johnson/17.

forecasting mechanism itself, Vitesse is essentially arguing that the volatility in prices and other system conditions are increasing and then Vitesse uses that argument to have a discussion on holding the utility accountable for its forecasts in actual operations. This discussion has no immediate relevance to the merit of the DA/RT price component.

C. Reply to AWEC

Q. Please describe AWEC's position on the DA/RT adjustment.

A. AWEC recommends that the Company eliminate the price component of the DA/RT adjustment but retain the volume component of the DA/RT adjustment.[39]

Q. As an initial matter, AWEC claims that the DA/RT adjustment in its entirety is unnecessary now that the Company is using Aurora instead of GRID.[40] Do you agree?

A. No. The *price component* modifies the OFPC, which is an input to Aurora, just like the OFPC was an input to GRID. The DA/RT adjustment's price component exists because the OFPC is a single price but: (1) the Company faces different prices when purchasing energy as compared to when selling energy; and (2) those prices are on average unfavorable relative to the OFPC as the Company typically purchases at prices above the OFPC and sells at prices below the OFPC. Because neither GRID nor Aurora internally account for the historical differences between purchase and sales prices, the DA/RT adjustment's price component is critical to ensuring a more

[39] AWEC/100, Mullins/9.
[40] AWEC/100, Mullins/8.

accurate NPC forecast and agnostic to the production cost model used to create the NPC forecast.

The DA/RT adjustment's *volume component* exists because there are multiple time horizons in actual operations (month-ahead, day-ahead, hour-ahead, etc.) and energy is traded in multi-hour blocks in many of these horizons. Aurora, however, is a single stage model that simulates hourly dispatch all at once, with no segregation of time horizons, and executes transactions to within a fraction of a MW. The DA/RT adjustment's volume component introduces the inefficiencies and associated costs that come with these multiple time horizons and multi-hour block products into the NPC forecast.

Q. AWEC claims that the DA/RT adjustment is unnecessary because Aurora and GRID use "entirely different approaches to calculate dispatch" and Aurora's dispatch is not as optimized as GRID.[41] Do you agree?

A. No. Limitations in GRID were primarily a lack of co-optimization between energy and ancillary services, unit commitment logic that was decades out of date, an inability to constrain fuel usage on thermal resources, and no concept of storage resources or GHG emissions. Aurora improves on all these aspects. Aurora calculates a transmission-constrained, least-cost dispatch using effectively simultaneous unit commitment and economic dispatch processes, which are driven by an advanced hourly mixed integer program and linear program, respectively. Furthermore, Aurora co-optimizes both energy and ancillary services as opposed to the inefficient sequential optimization employed by GRID, and additionally, allows

[41] AWEC/100, Mullins/8.

for the application of a myriad of constraints inclusive of ramp rate constraints, GHG emissions constraints and fuel constraints, all of which were either not present in GRID, or of limited functionality.

AWEC's description of Aurora is incorrect and provides no basis to reject the DA/RT price component.

Q. Was AWEC able to provide any documentation from Aurora verifying its description of Aurora's optimization?

A. No. It appears that AWEC's only basis for claiming that Aurora may not produce a least-cost optimization is the result of AWEC's own Aurora modeling that removed a small amount of short-term firm transmission from the model and resulted in an increase in overall NPC of roughly 0.0017 percent.[42] Based on this result, AWEC claims Aurora is not a least-cost optimized model. However, as I explain below in Section XV of my testimony, the 0.0017 percent variance is: (1) based on flawed analysis; (2) lacking recognition of the difference between NPC in the TAM as compared to *all* variable power costs; and (3) "noise" in the model and in no way suggests that Aurora does not produce an optimized dispatch.

Q. Is AWEC's criticism of Aurora's imperfect optimization contrary to AWEC witness Mullins' prior testimony?

A. Yes. In the 2022 TAM, AWEC testified that the "AURORA model contains a more sophisticated commitment and dispatch logic than the GRID model, which better mimics the actual operation of PacifiCorp's gas plants."[43] This prior testimony

[42] This percentage was calculated based on an NPC increase of approximately $45,000 total-company relative to an overall NPC of $2.642 billion total-company in the Initial Filing. See AWEC/100, Mullins/8–9.
[43] *In the Matter of PacifiCorp, dba Pacific Power, 2022 Transition Adjustment Mechanism*, Docket No. UE 390, AWEC/200, Mullins/4 (Aug. 26, 2021).

cannot be squared with AWEC's current claim that Aurora has less optimized dispatch than GRID.

Q. AWEC further claims that using the DA/RT adjustment in Aurora is producing the opposite effect that it did with GRID.[44] What is the basis for this claim?

A. AWEC ran Aurora with and without the DA/RT price component and concluded that the DA/RT adjustment from the Aurora run without the price component is closer to the historical DA/RT adjustment.[45] From this comparison AWEC concludes that eliminating the DA/RT price component produces a more accurate forecast because it is closer to the historical averages. However, AWEC's simplistic comparison is merely observing that there is a substantial increase (a paradigm shift) in reliance on purchased power in the Initial Filing's NPC forecast resulting from the combination of coal supply limitations, the OTR, the Jim Bridger gas conversion, the removal of the Klamath dams, and the Washington Cap and Invest Program. AWEC conflates the purpose of the two components of the DA/RT adjustment and AWEC's conclusions stem from this misunderstanding that I explain in more detail below.

Q. Turning to AWEC's specific recommendation, why does AWEC recommend removing only the price component of the DA/RT adjustment?

A. AWEC claims that volume component of the DA/RT adjustment renders the price component "perfunctory, except to the extent that [the price component] modified the way thermal plants were dispatched."[46]

[44] AWEC/100, Mullins/8.
[45] AWEC/100, Mullins/8.
[46] AWEC/100, Mullins/7.

Q. Do you agree?

A. No. AWEC mischaracterizes the two components of the DA/RT adjustment. As discussed above, the purpose of the DA/RT adjustment is to more accurately capture the true cost of balancing the Company's system in the short-term markets by: (1) adjusting forward market prices (the OFPC) to reflect historical variations between the average market-indexed prices over each month and actual realized prices for the Company's day-ahead and real-time transactions in that month (***price component***); and (2) adjusting system balancing transaction volumes to reflect the inefficiencies and associated costs of the operational practice of transacting on a monthly basis using, as an example**,** standard 25 MW increment, 16-hour block products, rebalancing on a daily basis using standard 25 MW increment eight-hour block products, and finally closing the remaining position on an hourly basis in real-time markets (***volume component***). These two steps are designed to accomplish two different tasks and accounting for the inefficiencies associated with trading in multi-hour block products in actual operations (i.e., a MWh (volume) trading inefficiency) does nothing to change the persistent deviation between an indexed market price and the Company's real market prices faced in actual operations (i.e., a $/MWh (price) inefficiency).

Q. Is AWEC's testimony here consistent with its prior positions on the DA/RT?

A. No. Just last year in the 2023 TAM, AWEC witness Mullins testified that the DA/RT *volumes* are "a perfunctory feature of the DA/RT adjustment, and have zero impact

on NPC."[47] In other words, this year, the price component is "perfunctory" while last year the volume component was "perfunctory."

Q. Has the Commission ever addressed recommendations to eliminate only one component of the DA/RT adjustment?

A. Yes. In the 2017 TAM and 2018 TAM, Staff argued the opposite of AWEC and recommended that the Commission eliminate the volume component of the DA/RT adjustment.[48] In the 2018 TAM, AWEC witness Mullins made the same argument he makes here:

> The Company characterizes the DA/RT adjustment as having two components: 1) a price component; and 2) a volume component. I, however, disagree that it is appropriate to characterize the adjustment in such a manner. Based on the way that the adjustment is calculated, the complicated mechanics underlying the price and volume components are irrelevant. As a final step in the Company's implementation of the DA/RT adjustment, the Company applies a plug, outside of the GRID model, to force the total impact of the DA/RT adjustment to tie to the historical average, which in this case the Company has proposed as the 60 months ending in June 2016. Accordingly, it is more appropriate to view the Company's adjustment as a single adjustment based solely on the historical averages, rather than viewing it as two, largely arbitrary, components.[49]

In both the 2017 and 2018 TAMs (and in all others where it was litigated), the Commission retained both components of the DA/RT adjustment, recognizing that they work together to reflect costs that are incurred in actual operations but that are not inherently present within the Company's production cost model.[50]

[47] *In the Matter of PacifiCorp, dba Pacific Power, 2023 Transition Adjustment Mechanism*, Docket No. UE 400, AWEC/100, Mullins/17 (May 25, 2022).
[48] Order No. 16-482 at 12; Order No. 17-444 at 6.
[49] *In the Matter of PacifiCorp, dba Pacific Power, 2018 Transition Adjustment Mechanism*, Docket No. UE 323, ICNU/100, Mullins/9–10 (Jun. 9, 2017).
[50] Order No. 16-482, at 13–14.

Q. Did AWEC's recommendation cause the Company to further investigate the modeling of the DA/RT adjustment in this year's TAM?

A. Yes. AWEC's recommendation raised a concern because in this case the price component of the DA/RT adjustment increases NPC, while the volume component reflected in the Initial Filing decreases NPC. So AWEC's recommendation effectively cherry-picked the benefits of the DA/RT adjustment without having accounted for the attendant costs.

However, on further investigation spurred by AWEC's testimony, the Company discovered that the volume component of the DA/RT adjustment was not functioning as the Commission intended when the adjustment was approved. In this TAM, the volume component was substantially *decreasing* NPC (by $97 million total-company in the Initial Filing), even though the volume component is designed to capture inefficiencies and attendant *costs* in actual operations that are not captured in Aurora, as discussed above. Real-world inefficiencies in trading cannot produce such substantial revenue (lowers NPC) when compared to Aurora's perfectly efficient optimized system dispatch.

Q. How is the DA/RT adjustment's volume component implemented in Aurora?

A. Identical to the prior implementation in GRID approved by the Commission, the volumetric component of system balancing transactions within the NPC forecast is increased, as an out of model adjustment, to account for the use of multi-hour block products in actual operations. System balancing purchase volumes are increased by an equal and offsetting amount to system balancing sales volumes so that the net volumetric position of the NPC forecast is unchanged.

Q. How does the increase in system balancing volumes impact revenues and costs within the context of the NPC forecast?

A. Because the volumes of Aurora's system balancing transactions are increased, the incremental volumes must be associated with prices otherwise they would represent free energy (i.e., no revenues received or costs incurred for market sales or purchases). These volumes are priced by comparing historical system balancing transactions to forecast system balancing transactions using 48 months of historical transaction history as a proxy for the increased costs associated with the operational practice of trading in multi-hour block products.

Q. With this background in mind, why is the DA/RT adjustment's volume component functioning incorrectly?

A. As the incremental increase in sale volumes is identical to the incremental increase in purchase volumes, the revenues from the sales volume was allowed to be greater than the costs from the purchase volumes producing artificial arbitrage within the NPC forecast. Specifically, the DA/RT volume component bought a certain volume of energy at a low price and then sold the same volume of energy at a high price in the same time period. Because the DA/RT adjustment is meant to mimic actual operations, this result meant the use of inefficient multi-hour block products in actual operations created substantial efficiencies within the NPC forecast that lowered NPC, contrary to the impacts of these multi-hour block products in actual operations, which increase NPC, as explained here and in prior TAM testimony and Commission orders.

Q. Has the Company accounted for this artificial arbitrage so that the DA/RT adjustment functions properly?

A. Yes. Whenever the monthly sales revenue from an incremental volume adjustment at a trading hub exceeds the monthly purchase cost for the same amount of volume in the same time period: 1) a single price adjustment is made such that both the monthly sales revenue and the monthly purchase cost offset for no net impact to the NPC forecast; and 2) the monthly sales revenue is adjusted upwards to re-introduce arbitrage revenues from the historical data into the NPC forecast. This averaging to create a single price adjustment for both sales and purchases to remove *artificial* arbitrage opportunity is identical to the adjustment calculated in the DA/RT price component since its inception in the 2016 TAM as explained in further detail above in my testimony. Furthermore, this single price adjustment retains the arbitrage revenues that offset losses in the DA/RT price component.

Q. Does the DA/RT volume component still include historical arbitrage revenues?

A. Yes. Within the 48-month historical average that supports the pricing of the incremental DA/RT volumes, the Company continues with the DA/RT adjustment volume component's precedent of including historical arbitrage transactions. Furthermore, within the error correction these arbitrage benefits are explicitly retained. This reduces the cost of the DA/RT volume component and is realistic because it reflects the historical availability of such opportunities. The removal of artificial arbitrage discussed above is a correction for the artificial arbitrage *created by* the DA/RT volume component within the 2024 TAM NPC forecast and separate from the real historical arbitrages that are normalized into the NPC forecast.

Q. Does the corrected DA/RT volume component now accurately reflect the Company's actual operations?

A. Yes. Arbitrage opportunities are no longer *artificially* created in the NPC forecast. This is true for both the volume component as well as the price component.

VI. MARKET CAPACITY LIMITS

Q. As background, please explain why Aurora requires market caps.

A. Like GRID, Aurora operates with perfect foresight and assumes unlimited market depth and full liquidity for the markets in which PacifiCorp makes off-system sales, unless informed otherwise. Aurora would therefore allow unlimited off-system sales at every market at any time of the day or night—an assumption that is very different from PacifiCorp's actual, historical experience.

To more realistically model actual market conditions, PacifiCorp has included market caps for sales since it introduced the GRID model in 2002.[51]

Q. How were market caps first implemented in GRID?

A. PacifiCorp originally modeled market caps in graveyard hours only. In the 2012 TAM, docket UE 227, PacifiCorp refined its market caps to specify market depth for sales during all hours based on historical average sales from the most recent 48-month period for each trading hub, each month, segregated by HLH and LLH periods.[52] This refined approach, known as the "average of averages" method, allowed for additional sales and reduced NPC compared to PacifiCorp's original graveyard market caps. At PacifiCorp's suggestion, the Commission adopted the

[51] *In the Matter of PacifiCorp dba Pacific Power, 2013 Transition Adjustment Mechanism*, Docket No. UE 245, Order No. 12-409 at 3–4 (Oct. 29, 2012).
[52] *In the Matter of PacifiCorp, dba Pacific Power, 2012 Transition Adjustment Mechanism*, Docket No. UE 227, Order No. 11-435 at 21 (Nov. 4, 2011).