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July 21, 2023

Via Electronic Filing

Public Utility Commission of Oregon
Attn: Filing Center
201 High St. SE, Suite 100
Salem OR 97301

Re: In the Matter of PORTLAND GENERAL ELECTRIC CO.
Request for a General Rate Revision.
Docket No. UE 416

Dear Filing Center:

Please find enclosed the redacted version of the Net Variable Power Cost ("NVPC") Rebuttal Testimony of Bradley G. Mullins (AWEC/400) on behalf of the Alliance of Western Energy Consumers ("AWEC") in the above-referenced docket.

Please note that AWEC's NVPC Rebuttal Testimony contains Protected Information Subject to Modified General Protective Order No. 23-039 and Highly Confidential Information Subject to Modified Order No. 23-138. The confidential portions of AWEC's filing have been encrypted with 7-zip software and are being transmitted electronically to the Commission and qualified persons.

Thank you for your assistance. If you have any questions, please do not hesitate to call.

Sincerely,

/s/ Jesse O. Gorsuch
Jesse O. Gorsuch

Enclosures

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I have this day served the **Confidential and Highly Confidential NVPC Rebuttal Testimony of the Alliance of Western Energy Consumers** upon the parties shown below via electronic mail.

Dated at Portland, Oregon, this 21st day of July, 2023.

Sincerely,

/s/ Jesse O. Gorsuch
Jesse O. Gorsuch

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BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UE 416

In the Matter of	)
	)
Portland General Electric Company,	)
	)
Request For a General Rate Revision.	)
	)

REBUTTAL NET VARIABLE POWER COST ("NVPC") TESTIMONY

OF

BRADLEY G. MULLINS

ON BEHALF OF

THE ALLIANCE OF WESTERN ENERGY CONSUMERS

Protected Information Subject to Modified General Protective Order
(REDACTED)

Highly Confidential Information Subject to Modified Protective Order No. 23-138
(REDACTED)

July 21, 2023

TABLE OF CONTENTS

I. INTRODUCTION AND SUMMARY

Q. ARE YOU THE SAME WITNESS THAT FILED DIRECT TESTIMONY IN THIS MATTER?

A. Yes. I previously filed Opening Net Variable Power Cost ("NVPC") testimony in Exhibit AWEC/100, as well as Opening General Rate Case testimony in Exhibit AWEC/200, both of which were submitted on behalf of the Alliance of Western Energy Consumers ("AWEC").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I respond to the Reply NVPC Testimony of Portland General Electric Company ("PGE") witnesses Outama, Pedersen, and Cristea in Exhibit PGE/1500. On June 14, 2023, parties convened a settlement conference, in which an agreement in principle was reached on several issues. Subsequently, on July 11, 2023, parties convened a second settlement conference and reached a settlement in principle on all remaining issues associated with PGE's NVPC, with the exception of AWEC's issues surrounding load following reserves and California Independent System Operator ("CAISO") Energy Imbalance Market ("EIM") master file thermal plant parameters. Finally, on July 14, 2023, PGE submitted a MONET model update, including updates to forward market prices, planned outage parameters, and other modeling changes. Since the specific terms of the parties' settlement have not yet been submitted, my Rebuttal Testimony does not address those issues and is limited to the two remaining issues identified above, as well as modeling changes that were proposed in PGE's July 14, 2023 update.

Q. PLEASE SUMMARIZE YOUR REBUTTAL RECOMMENDATIONS.

A. My recommendations are summarized in Confidential Table 1, below, followed by brief explanations.

Confidential Table 1
AWEC Rebuttal NVPC Adjustments $

1	**PGE July 14, 2023 Update**	**$ 865,690,846**
2	**Adjustments:**	
3	Flexibility Reserves - Remove Downward Reserves	[redacted]
4	Flexibility Reserves - EIM Diversity Credit	
5	Flexibility Reserves - Remove Residual Spill	
6	Lydia 2.0 Modeling Update	
7	Faraday 6 Outage	
8	Round Butte Outage Timing	
9	Total Adjustments	**(37,658,948)**
10	**Adjusted**	**$ 828,031,898**

1. I continue to recommend an adjustment removing downward flexibility reserves.

2. I recommend flexibility reserve diversity benefits from the EIM be incorporated into MONET reserve requirements.

3. I recommend residual voluntary hydro spill be removed from MONET as an out of model adjustment.

4. I recommend the Commission reject modeling changes to the Lydia 2.0 model included in the July 14th update.

5. I recommend the Commission reject the proposal to incorporate a new, extensive outage at Faraday Unit 6, which has not been demonstrated to be prudent.

6. I recommend an outage related to Round Butte be delayed until October, to lessen the impact of the outage.

II. FLEXIBILITY RESERVES

Q. WHAT ISSUE DID YOU RAISE IN OPENING TESTIMONY REGARDING FLEXIBILITY RESERVES?

A. In Opening Testimony, I discussed the large volume of voluntary hydro spill being modeled in MONET, which was being driven by PGE's reserves modeling.[1] I had attributed this voluntary spill to faulty reserves modeling logic, and specifically to the treatment of downward flexibility reserves. Based on PGE's Response Testimony, however, it is apparent that the faults in the MONET model reserves logic are more pervasive than just downward flexibility reserves, as PGE's modifications which allegedly remove downward reserve requirements still result in significant levels of voluntary hydro spill.

Q. WHAT IS HYDRO SPILL?

A. Hydro spill is lost energy from running water over or through a hydroelectric impoundment without generating electricity. Because the water could otherwise be used to generate electricity, spilling hydro voluntarily is one of the most expensive dispatch decisions that a utility can make.

Q. HOW DOES PGE DEVELOP ITS FORECAST OF HYDRO PRODUCTION?

A. Hydro energy production in MONET is based on historical water flows. PGE forecast hydro production using the Northwest Power Pool's 2017 Headwater Benefits Study, although PGE makes several outboard modifications to that study. The Headwater Benefits Study is a hydrological study that evaluates historical river flows over the 80-year period 1928 to 2008.

[1] AWEC/100, Mullins/8:14-22.

Q. DOES PGE'S HYDRO FORECAST ALREADY INCLUDE OPERATIONAL SPILL?

A. Yes. The Headwater Benefits Study uses river flows to calculate the median hydro energy output expected in the forecast period, including operational hydro spill. The hydrological model applies adjustments for currently effective hydro plant parameters and environmental requirements, such as fish passage requirements. Using these parameters, the hydrological model incorporates operational spill requirements associated with high water, environmental, and other factors.

Q. DOES THE HEADWATER BENEFITS STUDY INCLUDE VOLUNTARY SPILL?

A. No. Notwithstanding, in MONET, PGE forecasts a large volume of voluntary hydro spill, in addition to the spill already assumed in the Headwater Benefits Study. This modeling is being produced through the Visual Basic for Applications ("VBA") script[2] responsible for allocating reserve requirements. In practice, PGE generally does not voluntarily spill hydro for purposes of generating reserves, which demonstrates that the VBA script is erroneous. The VBA scripts are not well documented, so the cause of the excessive spill is not readily apparent.

Q. DOES PGE VOLUNTARILY SPILL HYDRO IN ACTUAL OPERATIONS?

A. No. PGE affirmatively demonstrated in response to AWEC Data Request 93 that it does not voluntarily spill hydro for reserves. For its Mid-Columbia hydro shares, there is a significant amount of operational spill. Operational spill, however, is already considered in the Headwater Benefits Study used to establish the assumed level of hydro production in the test period. Operational spill, for example, is often initiated to provide fish passage or to avoid high levels of dissolved oxygen to protect juvenile salmon. Spill may also be initiated when the turbines

[2] VBA script is a code embedded in an Excel file that can be used to programmatically manipulate Microsoft Excel, as well as other Microsoft products.

are fully loaded due to high water conditions. The Columbia River dam operations are administered by the Army Corps of Engineers. Accordingly, if PGE desires to initiate voluntary spill for the purpose of generating reserves, my understanding is that PGE is required to send a regulation request through the Columbia Basin Telecommunications ("CBT") network. No such spill requests were identified in response to AWEC Data Request 93.

Further, in the response, PGE stated that it does not track hydro spill for Pelton/Round Butte facility. This is a puzzling assertion because to initiate spill for reserves, PGE's trading floor would otherwise need to communicate such a request to its hydro operators. It would be illogical to have no record of any such requests. It is a prudent utility practice to track hydro spill, and it would be imprudent for PGE not to. At a minimum, PGE has the burden of proof to show that it is, in fact, spilling hydro at Pelton/Round Butte consistent with historical operations, a showing which PGE has not made.

Q. DID PGE RESPOND TO YOUR CONCERN REGARDING VOLUNTARY HYDRO SPILL?

A. No. Instead of responding to this issue and demonstrating that the modeled voluntary hydro spill levels are reasonable, PGE takes issue with my supporting analyses. For example, PGE makes statements such as "AWEC was likely not aware that the code inside the MONET model uses 'Uncertainty Down' as the number for both Up and Down reserves."[3] PGE also claims that my adjustment has minimal impact on NVPC based on the analysis it discusses in

[3] PGE/1500, Outama-Pedersen-Cristea/6:17:20.

PGE/1501.[4] Finally, PGE disputes the fact that it receives flexibility reserve diversity benefits from the EIM.[5]

Q. WAS YOUR ANALYSIS OF RESERVES ACCURATE?

A. Yes. Based on PGE's Reply Testimony, I acknowledge that PGE's VBA scripts for reserves were erroneously using "'Uncertainty Down' as the number for both Up and Down reserves." I had assumed that this portion of the VBA script was accurate and functioning as intended. While this may be an error with PGE's model, however, it is not an indication that my analyses were inaccurate. For most hours of the year PGE can satisfy all flexibility up reserves on hydro resources at little to no additional cost. In response to AWEC Data Request 95, for example, PGE provided the actual reserves held by resource over the period 2020 through 2022. That response showed that [redacted]% of those reserves were being held on hydro resources. While I was unaware that PGE's VBA script contained an error, I viewed the modeled results to be consistent with actual practice. Further, as discussed below, I have relied on PGE's updated VBA code identified in Exhibit PGE/1500 and have arrived at a similar result. Therefore, I do not view the modeling presented in my Opening Testimony to be inaccurate, even though it was based on PGE's erroneous VBA scripting.

Q. DOES THE VBA SCRIPTING ERROR CALL INTO QUESTION ITS ACCURACY?

A. Yes. The VBA scripts are nearly impossible to audit, particularly given the ad hoc way they have been written by various analysts over the years. It is fully apparent that they are producing erroneous results, as they assume PGE will voluntarily spill [redacted] MW of hydro

4 *Id.* at 7:20-8:2.
5 *Id.* at 9:15-10:3.

energy to satisfy reserve requirements. This assumption is as illogical as it is imprudent. It is an undisputed fact that PGE has not spilled hydro generation to generate reserves in recent history. While PGE refers to the fact that a VBA script has been used to generate its reserves modeling, it makes no effort to demonstrate that the results are reasonable.

Q. WHAT IS THE COST OF THIS HYDRO SPILL IN PGE'S JULY 14TH UPDATE?

A. The value of the hydro spill in PGE's July 14th update is approximately $[redacted].

Q. IS PGE CORRECT IN HOW RESERVES ARE HANDLED IN THE EIM?

A. No. PGE makes several statements that the type of load following reserves in MONET are different from the load following reserves managed by the EIM. Primarily, PGE relies on the assertion that the EIM is a 15- and 5-minute market, rather than an hourly market. This distinction, however, is not accurate nor relevant. While the EIM manages imbalances on a 15- and 5-minute basis, the market itself is hourly, operating on an hour-ahead basis. PGE submits its schedules for the hour-ahead, and the EIM sends instructions in the various time intervals to redispatch the system in accordance with least cost dispatch for the entire EIM footprint. The flexibility reserve requirements are finalized for all time intervals within the hour ahead at 40-minutes prior to the start of the hour. Prior to the market closing, PGE is provided with two advisory calculations of the expected reserve requirements at 75 and 55 minutes prior to the hour, providing PGE the ability to adjust its schedules in instances where it has excess reserve levels or fails the flexibility reserve test in the advisory window. Thus, all hour ahead reserve requirements are managed by the EIM, and it is not necessary to include additional hour-ahead flexibility reserves in MONET other than those required by the EIM, including consideration of the reserve diversity benefit discussed below.

Q. IS PGE CORRECT THAT IT DOES NOT RECEIVE A DIVERSITY BENEFIT AGAINST ITS FLEXIBILITY RESERVE REQUIREMENTS IN THE EIM?

A. No. Section 29.34 (m) sub-sections (2) and (3) of the CAISO Tariff clearly state the following:

> **Determination of EIM Diversity Benefit.** The CAISO will calculate separately the upward and downward EIM diversity benefit as the difference between the sum of the upward and downward Uncertainty Requirements for all Balancing Authority Areas in the EIM Area, and the Uncertainty Requirement for the EIM Area.
>
> **Effects of EIM Diversity Benefit.** For each Balancing Authority Area in the EIM Area, the CAISO will reduce the upward and downward Uncertainty Requirements by the Balancing Authority Area's pro rata share of the upward and downward EIM diversity benefit in the EIM Area [as limited by transfer capabilities].

Further, the CAISO Business Practice Manual PGE cites in its Rebuttal Testimony provides a calculation for evaluating a BAA's flexible ramping sufficiency test, which makes clear that the flexible ramp up and down uncertainty requirements are subtracted from the cumulative flexible ramp up and down requirements from the previous 15-minute interval, including the EIM diversity benefit.[6] Accordingly, while the calculation starts with PGE resources excluding the EIM diversity benefit, that benefit is then applied to "reduce the upward and downward Uncertainty Requirements."

Q. IS PGE REQUIRED TO PASS THE FLEXIBILITY RAMP SUFFICIENCY TEST ON A STANDALONE BASIS BEFORE RECEIVING THE DIVERSITY BENEFIT?

A. No. PGE states that the EIM reserve requirement is "calculated without diversity benefit," and is "'unlocked' only when an EIM entity has passed EIM resource Flexible Ramping Sufficiency Test."[7] Such statements are not accurate. The flexibility ramping sufficiency test is performed with the diversity benefit. It is not performed on a standalone basis for PGE prior

6 CAISO Business Practice Manual for Energy Imbalance Market at 74-75.

7 PGE/1500, Outama-Pedersen-Cristea/9:15-10:3.

to unlocking the diversity benefit reserves. The business practices manual clearly states that: "[t]he net requirement for the flex ramp sufficiency test includes the effects of WEIM diversity..."[8] Thus, so long as PGE passes the test, inclusive of the reserve diversity benefit, it will receive credit for the reserve diversity benefit.

Q. WHAT HAPPENS IF A UTILITY FAILS THE FLEXIBLE RAMPING SUFFICIENCY TEST?

A. It is only when the flexible ramping sufficiency test is failed that the reserve diversity benefit is lost. If an EIM entity fails to pass the flexibility ramping sufficiency test, inclusive of the reserve diversity benefit, the EIM will impose limits on the amount of EIM transfers into or out of the non-performing EIM entity, without considering the effects of the diversity benefits. In such an instance, the EIM entity will effectively be required to forgo diversity benefits. PGE's testimony, however, mischaracterizes these limits as applying when performing the flexibility ramping sufficiency test, which is not accurate.

Q. HOW SIGNIFICANT ARE THE EIM FLEXIBILITY RESERVES DIVERSITY BENEFITS?

A. The flexibility diversity benefits awarded to each EIM entity are published publicly on the CAISO OASIS website. Table 2, below, details the actual EIM diversity benefits PGE has been allocated over the period June 1, 2022, through May 30, 2023

[8] CAISO Business Practice Manual for Western Energy Imbalance Market at 71.

Table 2
Actual T-40 Flexibility Reserve Diversity Benefits (aMW) Allocated to PGE
June 2022 – May 2023

	Flexibility Up	Flexiblity Down
Jan	59.25	63.99
Feb	58.00	55.49
Mar	60.17	64.25
Apr	64.27	60.85
May	59.58	61.13
Jun	66.32	100.33
Jul	83.51	108.59
Aug	83.18	78.84
Sep	64.27	70.74
Oct	55.52	63.70
Nov	57.88	64.49
Dec	57.01	66.35
Average	**64.14**	**71.66**

Note that I selected this period to correspond to the impact of BPA joining the market, which occurred on May 3, 2022. As can be seen, the actual reserve diversity benefits that PGE is being allocated are significant and material. Thus, by not considering these reserve credits, the reserve requirements that PGE is assuming are misstated.

Q. ARE DAY-AHEAD RESERVES RELEVANT IN MONET?

A. No. MONET is an hourly model, not a day-ahead model. Therefore, any day-ahead flexibility reserves that PGE might hold in addition to the hourly flexibility reserves required by the CAISO are irrelevant in MONET. In the day-ahead, PGE may reserve capacity to respond to day-ahead variability. In the hour-ahead, however, the day-ahead reserves are freed-up, and the system dispatch is recalculated for the coming hour, including any flexibility reserves

required by the EIM for that hour. At that point, PGE won't continue to hold unnecessary day-ahead reserves in the hour-ahead, which is the dispatch that the MONET model represents.

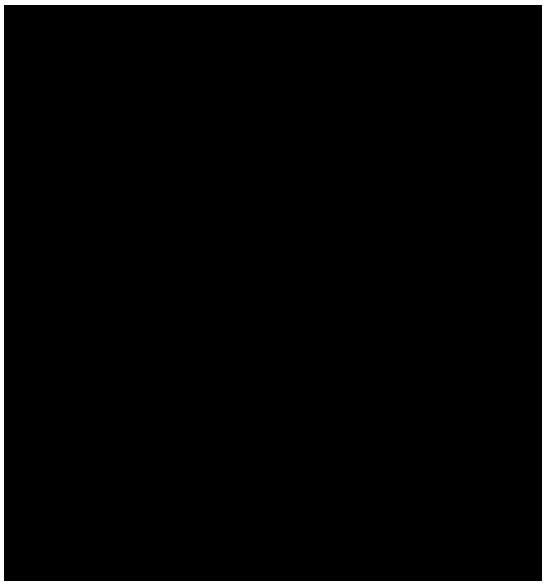
Q. DO YOU AGREE WITH PGE'S ALTERNATIVE STUDY REGARDING RESERVES?

A. No. When preparing the study, along with its technical appendix, PGE acknowledges that its reserves modeling is not functioning as intended. In its work around, however, PGE creates a number of new operating and modeling constraints that effectively result in the same problematic impacts as presented in its Opening Testimony, including [redacted] MW of hydro spill. PGE's approach also does not consider reserve diversity benefits identified in my Opening Testimony and as shown in Table 2, above. Further, the results of PGE's modeling demonstrate that it is still producing significant errors. I had attributed these errors to load following down reserves, although that understanding was based on PGE's erroneous VBA script that was applying load following down reserves to load following up reserves. Following PGE's modifications to the VBA code, it appears that the problems with reserves are more pervasive than just the load following down assumption. The Mid-Columbia dispatch model, for example, is omitting a significant volume of reserves that are otherwise being held on Mid-Columbia resources, which suggests that there is an arithmetic error in the VBA script.

Q. WHAT APPEARS TO BE CAUSING THIS ERROR?

A. It is not entirely clear, although it is apparent that the Mid-Columbia resources can hold materially greater amounts of reserves than the model is giving credit for. This may be observed in Confidential Table 3, below.

Confidential Table 3
Mid-C Hydro Dispatch (MWh)



As can be seen, in Hour 9 of February 20, 2024, the Mid-Columbia resource has a total of [redacted] MW of dispatchable capacity available, which can be used to generate energy or hold reserves. The model allocated [redacted] MW of reserves to regulation reserves and nothing to flexibility reserves. The model subsequently decided to generate the remainder of the capacity as discretionary energy, resulting in total generation of [redacted] MW, prior to any voluntary spill. Notwithstanding, because of this decision to ramp up Mid-C, there was a shortfall in flexibility reserves, which resulted in [redacted] MW of voluntary hydro spill. Thus, the model ramped up generation at Mid-C, which subsequently forced it to spill the generation. Ramping up discretionary energy, only to spill it, is irrational. To avoid this spill, the model likely could have otherwise generated less discretionary energy in that hour, and more discretionary energy in another hour.

Q. HAVE YOU CORRECTED PGE'S STUDY?

A. Yes. I performed a study with the following steps corrected.

1) Remove load following down reserves from the model, consistent with PGE's modeling discussed in Exhibit PGE/1501.

2) Add the EIM reserve diversity credit identified in Table 2, above.

3) Remove all residual hydro spill from the model as an out of model adjustment.

Note that when performing these studies, I did not remove the day-ahead reserves from the modeling. While I disagree with including those reserves, their inclusion has minimal impact when the reserves modeling is corrected.

Q. WHAT IS THE RESULT OF YOUR STUDY?

A. My revised modeling produced an approximate $[redacted] reduction in NVPC. In Table 1, above, I have broken down the impact by each of the steps I discussed above. As can be seen, the inclusion of the EIM reserve diversity credits, based on the actual credits received over the year ending May 2023, had the greatest impact of all the changes. Further, the impact of removing residual hydro spill from my modeling had a smaller impact in my analysis due to the fact that after considering EIM diversity benefits lower levels of hydro spill resulted. These calculations were also based on the March 31, 2023 update, rather than the July 14, 2023 update model. In AWEC Data Request 293, PGE was requested to provide a step-by-step explanation for how it removed load following down reserves from the VBA code. It appears that a large number of additional modifications were made to the modeling other than the changes identified with respect to the "Private Sub DispatchLF()" subroutine PGE identified. Based on its response, I was unable to duplicate the VBA script it used in the July 14, 2023 update.

III. JULY 14TH UPDATE

Q. WHAT WERE THE MAJOR DRIVERS OF THE JULY 14TH UPDATE?

A. In the July 14th update power costs declined by $1,400,000 relative to the March 31, 2023 update. In the update, ratepayers saw material relief from a more favorable forward price curve. Overall, more favorable market prices resulted in an approximate $[redacted] reduction to NVPC.[9] Notwithstanding, PGE included several new modeling changes and alleged corrections in its update, as well as a proposal to conduct a major overhaul at the Faraday and Round Butte hydroelectric facilities. The collective impact of these other changes more than offset the favorable impacts from the lower forward price curve. AWEC is concerned with these updates because modeling changes are not allowed in supplemental updates. Further, the major overhauls at Faraday and Round Butte were not supported by any testimony or evidence that the planned activity is prudent or cost effective for ratepayers.

a. Lydia 2.0 Modeling Update

Q. WHAT WAS THE LYDIA 2.0 MODELING UPDATE THAT PGE PROPOSED IN ITS UPDATE FILING?

A. The Lydia 2.0 model is used to shape monthly prices into hourly prices. In its workpapers PGE explains that it updated the modeling to address the way that daylight savings time was being considered, as well as making other modeling tweaks and changes to its hourly Lydia 2.0 price calculation. While PGE suggests that this change was a correction, the changes were pervasive to the modeling, affecting many of the modeling input worksheets, which AWEC understood to have been already finalized.

[9] *See* ToPUC\#2024GRC-ModelSteps-7-14-23 Filing. This calculation includes the impact of Steps 60 and 61, although several other steps were impacted from the price curve update.

Q. WHAT WAS THE IMPACT OF THE MODELING CHANGE?

A. The Lydia 2.0 modeling change resulted in a $[redacted] increase to NVPC. Thus, contrary to being a ministerial correction, this change resulted in a material increase to NVPC.

Q. DO YOU SUPPORT THE CHANGES?

A. No. No party took issue with the methodology that PGE used for calculating hourly prices in the Lydia 2.0 model in this case. While PGE alleges that its original filing contained errors, I had understood the assumptions to be intentional and did not necessarily view them as errors when originally reviewing the workpapers for Opening Testimony.

Q. DOES SCHEDULE 125 ALLOW PGE TO MAKE MODELING CHANGES SUCH AS THIS IN ITS JULY UPDATE?

A. No. Such an adjustment would be required to be submitted with PGE's initial filing. After then, the only updates that are permissible are "final planned maintenance outages, final load forecast, updated projections of gas and electric prices, power, and fuel contracts."[10] This does not include modeling changes, nor does it include the correction of errors that were not previously identified in the litigation phase of the proceeding.

Q. COULD PGE HAVE IDENTIFIED ALLEGED ERRORS SOONER?

A. Yes. PGE filed an erratum to its NVPC testimony in this docket on April 21, 2023. It could have corrected alleged errors in that filing, which would have given parties the opportunity to evaluate their reasonableness in opening testimony. By including new modeling updates and correcting alleged errors that have material power cost impacts in its July MONET update, PGE has avoided having to testify in support of these changes except in surrebuttal to other parties' final round of testimony. This unfairly prejudices other parties by denying them the

[10] Schedule 125 Sheet No. 125-2 ("Filing and Effective Date").

opportunity to respond to any justifications PGE might have for these changes, which is one of the reasons why the periodic updates that happen in power cost reviews are limited.

Q. ARE THERE OTHER REASONS WHY IT IS ONE-SIDED AND PREJUDICIAL FOR PGE TO INCLUDE NEW MODELING ADJUSTMENTS IN ITS JULY UPDATE?

A. Yes. AWEC and other parties have no opportunity to propose new adjustments in their Rebuttal Testimony. The MONET modeling is detailed and complicated and given time, the model could be revised and refined indefinitely. The procedure for an AUT filing only allows for modeling revisions in PGE's initial filing. This is important because it is not fair for PGE to make modeling adjustments, including those characterized as corrections, without allowing parties the continued opportunity to similarly propose adjustments. If PGE is allowed to continue to make modeling revisions and corrections until the final update, it would be inequitable not to afford parties the same opportunity to propose new modeling revisions and corrections up to and until the final update. It would also be unfair for PGE to be allowed to make one-sided revisions that only increase NVPC while ignoring those that reduce it. This is evident from PGE's update filing, in which it proposes $[redacted] of corrections that increase NVPC and only $[redacted] of corrections that reduce NVPC.

Q. WHAT DO YOU RECOMMEND?

A. I recommend that the modeling changes PGE has proposed be rejected. Alternatively, if further modeling changes are to be permitted, I recommend that parties also be given the opportunity to identify and propose further revisions to PGE's modeling up to and until the final update.

b. Faraday and Round Butte Overhauls

Q. WHAT UPDATE HAS PGE MADE WITH RESPECT TO ITS HYDRO OUTAGE SCHEDULE?

A. As a part of its filing, PGE has proposed a new hydro maintenance schedule, which increases NVPC by $[redacted].

Q. DOES AWEC SUPPORT THE CHANGES PGE IS PROPOSING?

A. No. While submission of a new planned maintenance outage schedule is permissible under Schedule 125 in an update, PGE's update for the Faraday and Round Butte facilities appears to include more than just maintenance. AWEC is concerned that these major outages were not sufficiently documented or demonstrated to be prudent. PGE, for example, did not submit a cost benefit analysis to support these outages. Accordingly, AWEC opposes the inclusion of the Faraday Unit 6 outage, and requests that the Round Butte outage be delayed until October. If PGE is going to ask customers to pay the costs of these overhauls, including potential capital costs, it is necessary for PGE to demonstrate that they provide some benefit to customers, which has not occurred in this case.

Q. WHAT ARE THE OVERHAULS PGE IS PROPOSING IN ITS UPDATE?

A. For Faraday Unit 6, PGE is proposing an outage lasting for [redacted] days and resulting in the loss of approximately [redacted] MWh of generation. The reason for this outage was not specified. For Round Butte, PGE is proposing a [redacted] resulting in a loss of [redacted] MWh.

Q. DO YOU HAVE ANY CONCERNS WITH THE FARADAY OUTAGE?

A. Yes. Faraday has been subject to extensive outages for many years while new Units 7 and 8 were placed into service. PGE has stated that "Faraday Unit 6 is still in good condition and no

upgrade was necessary."[11] Yet, in its update, PGE is now proposing to take Faraday Unit 6 out of service for almost the entire test period to perform unspecified maintenance activities. Since it is unknown what this overhaul entails, I recommend it be removed from NVPC. PGE had the opportunity to perform maintenance on Faraday Unit 6 while the facility was shut down to construct units 7 and 8, and imposing another significant constraint on the plant's operations now is not reasonable. Further, to the extent this type of major outage is required, it was PGE's obligation to discuss it in Opening Testimony in conjunction with the testimony discussing Faraday Units 7 and 8. Since PGE has not demonstrated that this overhaul is prudent, I recommend it be removed from NVPC.

Q. HAVE YOU IDENTIFIED ANY ERRORS IN PGE'S CALCULATION OF THE FARADAY OUTAGE?

A. Yes. First, when calculating the impact of the outage, PGE inadvertently used the old capacity for Faraday Units 1-5 of 16.2 MW, rather than the new capacity of 18.8 MW for Units 7-8. With the new capacity, the impact of the outage will be lower since more residual capacity is available to generate from the available water flows. The impact of this correction is an approximate $[redacted] reduction to NVPC. Second, PGE adjusted the amount of PTCs that will be available from Units 7-8 even though the outage had no impact on Units 7-8, which understated the amount of PTCs by $[redacted].

Q. WHAT IS YOUR CONCERN WITH THE ROUND BUTTE OUTAGE?

A. The Round Butte outage is being scheduled in [redacted], when power prices are the highest and when river flows are high. Scheduling an outage at that time is not economic. I recommend

[11] PGE/800, Jenkins–Bekkedahl/16:9.

the outage be rescheduled for a lower price period, such as October, when it will have a lower impact on NVPC. The impact of this change is an approximate $[redacted] reduction to NVPC.

IV. THERMAL PLANT PARAMETERS

Q. DO YOU ACCEPT PGE'S RESPONSE REGARDING THE CAISO MASTER FILE PARAMETERS?

A Yes. In its Reply Testimony, PGE stated that the plant capacity values reported in its master file submissions were not adjusted for ambient temperatures. The master file submission PGE provided in discovery was submitted in December, and I had assumed that the values coincided with December ambient temperatures, which was then adjusted based on the ambient temperature ranges of the other months. Upon further review of the CAISO business practices, I confirmed that the ambient temperature adjustments are not made in the master file submissions but are submitted separately through the CAISO outage management tool, which was not captured in the December master file values in my model. Accordingly, I accept PGE's explanation with respect to the master file data. Notwithstanding, in the future, better coordination between the ambient temperature ranges submitted to the CAISO and the parameters included in MONET should be undertaken.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.