

BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON  
UM 1355

In the Matter of

THE PUBLIC UTILITY COMMISSION OF  
OREGON Investigation into Forecasting Forced  
Outage Rates for Electric Generating Units

PORTLAND GENERAL ELECTRIC  
COMPANY'S OPENING BRIEF

Portland General Electric Company ("PGE") hereby submits its opening brief. For the reasons stated below, the Commission should either (i) continue to use the traditional four-year rolling average, with adjustments as necessary, to forecast forced outage rates or (ii) adopt the forced outage rate collar and the outlier replacement methodology proposed in the PGE all-party Stipulation (dated August 17, 2009). The Commission should decline to adopt the (i) modification suggested in Commission Order Nos. 09-479 and 10-157 and (ii) the truncated 20-year or 10-year plant averages as replacement values.

**I. The Rolling Four-Year Average Is Still the Best Forecasting Option Available to the Commission.**

PGE's initial testimony stated that we perceived this as a policy docket. After years of testimony, crunching numbers, data request, workshops, and settlement negotiations, we still view this as a policy docket. The Commission has used a rolling four-year average adjusted on a case-by-case basis for well over 20 years to forecast forced outage rates. It adopted this approach for good policy reasons that are outlined in Staff's 1984 memo. After reviewing multiple alternative approaches during the long history of this docket, PGE is

convinced that there is no superior forecasting method before the Commission today. In fact, the alternative methodologies are more complex, more likely to lead to wasteful disputes, and offer no improvement in forecasting performance. Accordingly, we urge the Commission to continue to use the four-year rolling average adjusted as appropriate on a case-by-case basis.

In its opening testimony in this docket, the Staff proposed the use of industry data provided by the North American Electric Reliability Counsel ("NERC") to determine whether a plant has experienced an extreme forced outage rate. If the plant's annual forced outage rate fell outside of the 10th or 90th percentile values for comparable generating facilities based on NERC data, Staff recommended adjustment of the plant's annual forced outage rate back to the NERC 10th or 90th percentile value for the applicable year.

Staff/200, Brown/8-15.

In our initial testimony, PGE proposed that the Commission continue to use the traditional, tested, and well-established four-year rolling average methodology for the following reasons:

- The four-year rolling average works well and is flexible enough for specific adjustments as necessary and appropriate;
- The methodology complements other regulatory mechanisms such as PGE's annual power cost update tariff and power cost adjustment mechanism; and
- The regulatory mechanisms work well together to promote the goal of accurately forecasting forced outage rates.

PGE/100, Hager-Tinker/5.

PGE expressed concerns regarding Staff's proposed forced outage rate collar and replacement methodology. In particular, Staff's proposed methodology was biased and unreasonably lowered the forecast forced outage rate. PGE/200, Niman-Hager-Tinker/14. PGE's analysis showed that Staff's proposed NERC collar and replacement methodology consistently lowered the forecasted forced outage rates, sometimes substantially. *Id.*/20. In

addition, Staff offered no evidence or rationale for the choice of the 90th and 10th percentile as the boundaries for the forced outage rate collar. *Id.*/15. The more common statistical test of 95/5 would be more appropriate. *Id.*

Finally, PGE was concerned that Staff's proposed methodology offered no improvements over the Commission's traditional practice in which parties address the appropriate treatment of an extreme event on a case-by-case basis. PGE submitted that such individualized analysis was appropriate given that such extreme events are by their very nature unique. *Id.*

Nothing that has transpired in this docket has changed our view. After all the statistical analyses described below, Staff's proposed methodology still has significant shortcomings and is not as good as the rolling four-year average. As described in more detail below, the proposed modifications to Staff's methodology offer no demonstrable improvements in forecasting accuracy.

## **II. PGE Was Willing to Support Staff's Proposal as a Consensus Settlement Alternative**

Despite PGE's concerns, PGE entered into an all-party Stipulation that resolved all issues in this docket and adopted Staff's proposed forced outage rate collar and replacement methodology. As noted above, Staff's proposed methodology had two key features: (1) a forced outage rate collar that was triggered if the actual forced outage rate for the facility in the given year is above the 90th percentile or below the 10th percentile for comparable generating facilities using NERC data; and (2) a replacement methodology according to which if the forced outage rate collar is triggered, the actual forced outage rate for the generating facility will be replaced with the 90th or 10th percentile of the NERC data, as appropriate for that year. Staff-ICNU-CUB-PGE/100, Brown- Falkenberg-Jenks-Hager/5-6. This combination of forced outage rate collar and replacement methodology will be referred to below as the "Staff-Stipulated Methodology."

The parties to the Stipulation submitted that a "four-year average continues to be the best method to forecast forced outage rates. However, the parties also believe that actual forced outage results outside of a range of outcomes experienced nationally by thermal plants of the same fuel type and general size may not be indicative of future forced outage performance." *Id.* No parties submitted objections to the all-party Stipulation.

We still support the Staff-Stipulated Methodology as a reasonable consensus approach. The traditional four-year rolling average remains our preferred approach but we recognize that it no longer enjoys the support of all parties. Accordingly, we support this alternative as an approach that garnered a consensus among all the parties and offers a reasonable forecasting tool to the Commission.

### **III. ICNU's Analysis Has Fundamental Methodological Problems and Offers No Support for A Hybrid Approach.**

After the PGE all-party Stipulation was submitted and in what was anticipated to be the last round of testimony, ICNU proposed an alternative collar and replacement methodology in the portion of this docket addressing PacifiCorp's proposed forced outage rate methodology. ICNU/300, Falkenberg/11-13. In particular, ICNU performed an analysis that used the generating plant's operating history and not NERC data to determine whether the 10th percentile or 90th percentile collar was triggered. Furthermore, ICNU proposed that if the collar was triggered, the extreme event should be replaced with the 20-year average forced outage rate for the applicable plant (as opposed to the 10th or 90th percentile forced outage rate for comparable generating facilities using NERC data). *Id.*/13

On October 7, 2009, the Administrative Law Judge issued a Notice of Intent to Modify Stipulations and Establish Rate Calculation in which the Commission found that the Stipulations were "reasonable and in the public interest with one exception." Notice at 3. In particular, the Commission adopted the stipulated 90/10 NERC collar but proposed the following adjustment to the replacement methodology:

The Parties agree that for each year in which a coal fired unit's annual FOR falls outside a 10th or 90th percentile of comparable NERC coal units, the methodology for calculating the forced outage rate shall be as set forth in Staff /200, Brown 8/15, except that, instead of adjusting the FOR to the 10th or 90th percentile values for the calendar year, the mean annual FOR from the unit's entire historical data shall be substituted.

*Id./3.*

The Notice also provided parties an opportunity to notify the Commission if they intended to reject the proposed modification and to assert their rights to a hearing pursuant to OAR 860-014-0085(6). On October 19, 2009, PGE notified the Commission that it did not accept the proposed changes to the Stipulation and exercised its right to request additional process, including the ability to submit written testimony and participate in a hearing, to address Stipulation issues. In Order No. 10-157 the Commission allowed PGE to file "additional testimony to address ICNU's FOR collar proposal." *Id./5.*

The evidence in Phase II of this docket focuses on ICNU's proposal and supporting analysis, as Commission Order No. 10-157 directed. This evidence is not probative or directly applicable to the Commission's hybrid suggested approach. The Staff-Stipulated Methodology used a NERC data-based 10th percentile or 90th percentile collar to determine outliers and NERC 10th percentile or 90th percentile replacement values for those outliers. ICNU's analysis used data from a plant's historic operation both for calculating the forced outage rate collar trigger and for calculating a mean replacement value. However, the Commissions proposed adjustment to the Stipulation did not adopt ICNU's collar and replacement approach. Rather, the Commission proposed a hybrid methodology that used the 90/10 NERC collar and a replacement methodology that used historic plant operation data. Indeed, ICNU openly acknowledges that it has not analyzed the proposed hybrid approach or any other NERC collar approach. ICNU/400, Falkenberg/40-41 (trying to explain why "none of your analysis deals with the OPUC collar or other collars that depend

on the NERC data"). Instead, ICNU's analysis concerns its own methodology, which the Commission did not adopt.

Moreover, when ICNU claims that its analysis shows that the mean replacement strategy is superior to the Staff-Stipulated Methodology, it fails to mention that it is using a proxy and not the real Staff-Stipulated Methodology, which used as replacement values the 90/10 percentiles from applicable NERC data. ICNU eschews using any NERC data for either the collar or as replacement values, adopting instead a plant's historic data when calculating the 90/10 percentile replacement values. ICNU is therefore attacking a straw man. The Staff-Stipulated Methodology has never endorsed the use of a plant's historic 90/10 percentiles as replacement values, which is what ICNU models for comparison against its mean replacement strategy. Accordingly, any supposed superiority in methods applies only to the comparison of two ICNU methods and not as a true comparison between the Staff-Stipulated Methodology and ICNU's approach.

Finally, ICNU used 20-year averages to generate forecasts. These 20-year averages included information that would not have been available at the time the forecast was made. For example, if the outlier year was 2005 for Boardman, Mr. Falkenberg's methodology would replace the outage with a 20-year average of 1989-2008. This would include future information that would not have been available in 2006 or 2007 when the Commission would establish rates using the forced outage rate forecast. This violates fundamental forecasting principles. Forecasts can only use information available at the point in time when the forecast is being made. PGE/300, Tinker-Weitzel/7.

Staff agreed that this reflected a fundamental methodological flaw:

Q. Please describe the methodological errors PGE claims are found in Mr. Falkenberg's testimony?

A. In addition to the mean reversion issue, PGE points out that ICNU used the full 20-year average for replacement of all outlier years that occurred throughout the 20-year data set. For example, if an outlier

occurred in 1997, Mr. Falkenberg replaced that outage with the 20-year outage of the 1989/2007. This is what PGE is referring to when it states that Mr. Falkenberg was "omniscient."

Q. Is it possible to use future information in forecasting?

A. No. If it were possible to know the future, we would have no reason to come up with such complex methods for trying to predict it.

Q. Is it reasonable to use future information in the replacement as a means of checking the accuracy of a forecast?

A. No. The method employed by ICNU to test the accuracy of its forecast seems counter-intuitive.

Staff/400, Brown/8-9.

#### **IV. ICNU Offers No Evidence that Its Methodology Is Superior to the Staff-Stipulated Methodology.**

PGE presented statistical analyses addressing ICNU's assertion that the ICNU methodology was superior in predicting forced outage rates. PGE showed that the differences in forecasting accuracy between ICNU's method and the Staff-Stipulated Methodology were not statistically significant. PGE's analysis included "P-values," which measure the likelihood that observed differences in predictive accuracy are the result of real differences or simply reflect random differences from two methods that are equivalent in their forecasting accuracy. The accepted standard for statistical significance is a P-value of 5% or less. In other words, P-values greater than 5% are not considered evidence of an actual difference in predictive accuracy. PGE/300, Tinker-Weitzel/11. Mr. Falkenberg's initial analysis yielded P-values of approximately 40%, well above the 5% standard for statistical significance. "The probability of observing the difference reported by Mr. Falkenberg when the two methods are equivalent is close to a coin flip." *Id.*/11.

ICNU subsequently adjusted its analysis to remove some or all of the data not available at the time the forecast was made. However, even with these adjustments, the P-values that ICNU reports still demonstrated that its "corrected methodology" is not

superior. In the first adjusted analysis, Mr. Falkenberg removed only one year of the data not available at the time of forecasting, *i.e.* failed to remove all but one year of such future data. ICNU/400, Falkenberg/24, Row 3 of Table 1. Even using this very incomplete correction method, the data demonstrate that the ICNU mean replacement strategy is not superior to the Staff-Stipulated Methodology "proxy" Mr. Falkenberg modeled. The P-values reported by ICNU are 10.2% and 12.5%, much higher than the 5% standard needed to confirm a meaningful improvement in forecasting performance.

ICNU also provided another analysis that removed all future data. With this analytically correct procedure, the results show more strongly that the Staff-Stipulated Methodology proxy and the ICNU mean replacement method do not perform differently in a meaningful statistical sense. The P-values reported by ICNU are 18.2% and 20%, both far above a 5% standard for statistical significance. ICNU/400, Falkenberg/24, Row 4 of Table 1.

Given that ICNU's own analysis contradicted the alleged superiority of its method, Mr. Falkenberg then performed a series of analyses based on forecasting forced outage rates adjusted to remove portions of any outage lasting longer than 28 days. ICNU/400, Falkenberg/32-35. Such adjustments make little sense except as fishing expeditions with the hope of better results. Forced outage rate methodologies should be evaluated against what they are attempting to forecast, namely actual forced outage rates, not some adjusted forced outage rate. For example, PGE's power cost adjustment mechanism compares a net variable power cost forecast, which includes forced outage rate forecasts, with actual net variable power costs, which include actual forced outage rates, not adjusted forced outage rates. Accordingly, these analyses should not be given any weight.

Moreover, bias is an important evaluation criterion for assessing the forecasting accuracy of a replacement strategy. The Staff-Stipulated Methodology underestimates forced outage rates, but ICNU's approach introduces a greater degree of downward bias. Staff's stipulated collar replacement approach, "has a bias of approximately negative 0.9%; the data



to date mean replacement approach has a bias of approximately negative 1.5%. Both strategies appear to under-forecast forced outage rates, with the bias greater for the mean replacement approach." PGE/300, Tinker-Weitzel/13. Accordingly, on this additional measure, ICNU's approach is inferior to the Staff-Stipulated Methodology.

**V. Evidence in Phase II and Sound Policy Considerations Demonstrate that the Commission Should Adopt the Staff-Stipulated Methodology.**

As shown above, statistical analyses reveal that the ICNU forced outage rate collar offers no improvement over the Staff-Stipulated Methodology. Indeed, the Staff-Stipulated Methodology proxy ICNU modeled and the mean replacing strategy are statistically equivalent in terms of their predictive accuracy. Accordingly, the Commission should reject the ICNU adjustment and adopt the methodology proposed in the PGE all-party Stipulation for the following policy reasons.

First, as the Commission acknowledged, it "favors the settlement of the disputes among the parties by Stipulation and will approve such agreed-upon provisions, provided that the parties fairly represent the broad interests of the public and that the terms and conditions of the settlement are in the public interest." Notice at 3. The Stipulation satisfied these principles in all respects. Representatives of the industrial customers, residential customers, Commission Staff and the utility entered into the Stipulation after engaging in an intensive informal workshop process, filing written testimony, and negotiating an all-party, all-issue settlement agreement, all in compliance with the Commission's Order opening this docket. Order No. 07-015. Based on these facts and principles, the Commission should adopt the Staff-Stipulated Methodology.

The evidence submitted in this second phase of the docket, which has centered on ICNU's proposal, reinforces this conclusion. ICNU's methodology provides no improvement in predictive accuracy and in any event is substantially different than the Commission's

hybrid alternative set forth in Order Nos. 09-479 and 10-157. Accordingly, the evidence in Phase II offers no basis for modifying the Staff-Stipulated Methodology.

Moreover, the use of historical plant data may lead to wasteful disputes and litigation. In the distant past, the categorization of an outage as forced or maintenance had a limited impact given the relative coal and electricity prices. In many cases, limited evidence exists supporting the categorization of outages as forced or part of regular maintenance. In these circumstances the use of long-term averages will cause disputes and litigation that will likely consume time and resources without any demonstrated improvement in predictive performance.<sup>1</sup>

**VI. Staff's New Alternative Should Not Be Considered or, If It Is Considered, It Should Be Rejected.**

In its final round of testimony, Staff suggested as an alternative replacement methodology the use of 10-year averages that exclude outliers. The Commission should decline to consider this alternative. The parameters of the approach were never defined in written testimony. Moreover, Staff conducted *no* statistical analysis regarding this alternative. In other words, there is no record evidence regarding the predictive accuracy of this approach and how it compares with the Staff-Stipulated Methodology. No record evidence exists regarding the possible bias of such a 10-year average approach. Because this approach was first introduced in Staff's final round of testimony, no party including PGE has had sufficient time to review the proposal in detail or conduct a statistical analysis.

Accordingly, the Commission should not consider this approach and, if it does, it should reject it based on the utter lack of evidence supporting it. The entire purpose of this Phase II was to provide parties with an opportunity to present evidence and conduct a hearing

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<sup>1</sup> If the Commission determines that use of a long-term average is appropriate, the Commission should adopt the life-of-the-plant long term average and not the 20-year average initially proposed by ICNU. ICNU/300, Falkenberg/13. The evidence presented in this phase II by ICNU has not been limited to 20-year averages. It includes 30 years of data for some plants and appears to include life-of-the-plant averages for others. To the extent the Commission determines, based on the evidence in phase II, that long-term averages provide a better replacement methodology, the Commission should use the entire plant history, to the extent available.

regarding ICNU's proposed modification given that PGE and Idaho Power had no such opportunity in Phase I. Order No. 10-157 at 5-7. Accordingly, it would be entirely inappropriate for the Commission to consider and adopt a new 10-year average proposal when the parties have once again had no opportunity to present responsive written testimony or conduct the necessary substantive analysis.

## **VII. Conclusion.**

For the reasons stated above, the four-year rolling average adjusted as appropriate offers the Commission the best forecasting alternative. However, if the Commission determines that a change to the forced outage rate methodology is appropriate, it should adopt the Staff-Stipulated Methodology.

This Phase II has afforded the parties the opportunity to conduct substantial statistical analyses regarding ICNU's proposed alternative to the Staff-Stipulated Methodology. The evidence shows that ICNU's approach offers no improvement in predictive accuracy. ICNU's flawed comparisons reflect at best that "it is a statistical tie." Staff/400, Brown/9. ICNU's approach also has a greater bias than the Staff-Stipulated Methodology. Finally, the use of vintage operational data is unreliable and may lead to wasteful disputes and litigation. All these factors amply demonstrate the absence of any basis for the Commission to depart from its general policy of favoring "the settlement of the disputes among the parties by Stipulation" and approving "such agreed-upon provisions, provided that the parties fairly represent the broad interests of the public and that the terms and conditions of the settlement are in the public interest."

If however the Commission determines that an historic average is appropriate for replacement values, PGE submits that the full plant history should be used instead of the

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truncated approaches contained in ICNU's 20-year average (ICNU/300, Falkenberg) and the 10-year alternative Staff described.

DATED this 8th day of September, 2010.

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## CERTIFICATE OF SERVICE

I hereby certify that on this day I served the foregoing **PORTLAND GENERAL ELECTRIC COMPANY'S OPENING BRIEF** by e-mail and/or mailing a copy thereof, to each party that has not waived paper service, in a sealed, first-class postage prepaid envelope, addressed to each party listed below and depositing in the US mail at Portland, Oregon

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