Exhibit ___ (YKGM-3)
Docket Nos. UE-040640, et al.
Witness: Yohannes K.G. Mariam

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PUGET SOUND ENERGY, INC. Respondent.	DOCKET NO. UG-040640 DOCKET NO. UE-040641 *(consolidated)*

EXHIBIT TO TESTIMONY OF

Yohannes K.G. Mariam

STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

Staff Electric Weather Normalization Recommendations
(Docket No. UE-031725)

September 23, 2004

Exhibit__(YKGM-3)
Docket No. UE-040641

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMISSION, Complainant, v. PUGET SOUND ENERGY, INC., Respondents.	DOCKET NO. UE-031725

DIRECT TESTIMONY OF

Yohannes K.G. Mariam

STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

Weather Normalization Adjustment

January 30, 2004

Q. You have described Staff's recommended changes to PSE's weather normalization model and estimation technique for this case. Are there changes to PSE's weather normalization method that Staff suggests the Company implement for future cases?

A. Yes. Staff suggests that the Company implement the following changes to its weather normalization procedure for use in future general rate case filings:[1]

i. PSE should develop daily electricity usage data by rate schedule for at least 10 years including the test year.[2]

ii. PSE's service territory covers several counties. Service territories that are near the Canadian border (e.g., Whatcom County) exhibit temperature that is about 2 degrees Fahrenheit colder than the temperature recorded at Sea-Tac. These temperature differences should take into account the impact of insulation per the requirements of the Washington State housing code. Thus, Staff proposes that the Company analyze the relationship between weather and electricity usage in a manner that takes into account differences in temperature of its service territories.

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[1] Of these recommended changes, only changes in model and estimation method are implemented by Staff in this proceeding.

[2] Meteorologists argue that most climatic changes are observed every ten years. That is why NOAA revises estimates of normal temperature every ten years. Ten-year data allows normalization procedure to capture the impacts of decadal climatic changes.

iii. PSE should develop appropriate sample size for use in its weather normalization study. The sample should be selected such that it: (a) replicates the major attributes of the customers from which it is drawn; and (b) is large enough to perform not only sound statistical analysis, but also enables inferences about all ratepayers in a rate schedule. The Company should develop sampling plan(s) that ensure that the selected sample meets the above features.

iv. PSE should implement robust statistical models and estimation techniques that correct for the presence of serial correction and other statistical attributes pertaining to time-series data. And, a separate statistical analysis should be implemented for each rate schedule.

v. PSE should use consistent models, estimation method and data to normalize test and rate year electricity load.

vi. PSE should remove "redundant" variables. For instance, it is not necessary to include hourly and daily, or daily and monthly variables in the same model, unless empirical findings suggest significant variation in hourly or daily consumption of electricity. Inclusion of redundant variables may create a statistical problem known as multicollinearity.[3] On the other hand, Staff

[3] In fact, it would not have been possible to implement statistical analysis if an intercept term was included in the present model because it contains dummy variables for days of the week. It would create a statistical problem known as multicollinearity.

proposes that the Company include variables that could capture the impacts of prices of competing fuels such as natural gas, seasonality and yearly variability, trends in new housing developments, and penetration of energy efficient appliances.

vii. The NOAA produces weather normals (heating and cooling degree-days) for thirty years, every ten years. The methodology used by NOAA accounts for the impact of factors that may influence normal temperature observed over several years. These include adjustments for missing data, for time of observation bias, instruments used, abnormal temperature, and so on. The objective of these adjustments is to ensure that the impacts of external factors on temperature are taken into account, and that the data become homogenous and representative. Therefore, Staff recommends that PSE use data developed by NOAA.

The implementation of Staff's suggested changes would improve the accuracy of estimates of weather sensitive heating and cooling loads by rate schedule. And, it will permit PSE to seek revenue requirements and pricing of electricity usage that appropriately reflects the impact of changes in temperature.