Exhibit No. __ (BR-1T)
Docket No. UG-17____
Witness: Brian Robertson

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. CASCADE NATURAL GAS CORPORATION, Respondent.	DOCKET UG-17_____

CASCADE NATURAL GAS CORPORATION

DIRECT TESTIMONY OF BRIAN ROBERTSON

August 31, 2017

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I. INTRODUCTION AND SUMMARY

Q. Please state your name and address for the record.

A. Brian Robertson, 8113 W Grandridge Blvd., Kennewick, WA 99336.

Q. By whom are you employed and what is your title?

A. I am employed by Cascade Natural Gas Corporation ("Cascade" or the "Company") as a Gas Supply Senior Resource Planning Analyst.

Q. Please describe your education background and previous background.

A. I am a graduate of Central Washington University with a B.S. degree in Actuarial Science. After graduating, I joined Cascade in February of 2014 as a Regulatory Analyst. I joined the Gas Supply Department in March of 2015 as a Resource Planning Analyst II and was promoted to a Gas Supply Senior Resource Planning Analyst in July of 2016.

Q. Have you previously written or presented testimony before the Washington Utilities and Transportation Commission ("Commission") or any other commission?

A. No.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to explain Cascade's weather normalization adjustment used in this case and applied to the 2016 test year. I also demonstrate how Cascade modified its weather normalization adjustment to reflect Cascade's commitments from the settlement agreement in Cascade's most recent rate case, docketed as UG-152286. I will also provide an update regarding the progress Cascade has made to date regarding the load study that Cascade initiated as part of the settlement agreement in Docket No. UG-152286.

II. WEATHER NORMALIZATION

Q. Have there been adjustments to the weather normalization since the last rate case?

A. Yes.

Q. Please describe the weather normalization methodology developed in the last rate case.

A. In Docket No. UG-152286, Cascade and Commission Staff ("Staff") worked together to develop a weather normalization methodology. The methodology is a linear regression model that analyzes five years of historical therm per customer per month usage for residential and commercial customers to monthly heating degree days ("HDDs") for Cascade's four weather locations: Bellingham, Bremerton, Walla Walla, and Yakima. The model produces an intercept which indicates the base load therms per customer. The model also provides a best-fit coefficient of use per customer for each month and weather location for both the residential and commercial customer class. The best-fit coefficient represents the heat sensitivity use per customer per HDD. The normal HDDs and actual customers from the test year are applied to the heat sensitive coefficient to produce normalized therms for the test year. The weather normalization adjustment was calculated as the difference between actual recorded therms and the calculated normalized therms.

Q. Did Staff make any recommendations to the weather normalization adjustment in the Company's last rate case?

A. Yes. In the last rate case, Staff recommended the Company implement the following changes to its weather normalization:

a. Use 10 years of usage and weather data;

b. Use National Oceanic and Atmospheric Administration ("NOAA") weather data for both actual temperature and "normal" temperature benchmark;

c. Refine regression models to exclude insignificant monthly heating degree day variables;

d. Include a trend variable in the regression models when appropriate, and correct common statistical problems such as serial correlations. Staff may provide technical assistance;

e. Identify outliers by comparing predicted usage with actual usage as well as double-checking data accuracy and re-specifying regression models if necessary; and

f. Use an alternative way of reporting monthly usage if unbilled therms are not trued up monthly: align heating degree days with billing cycles on a monthly basis, rather than using monthly usage data that includes gross estimates of unbilled therms.

As part of the settlement agreement, Cascade committed to implementing these recommendations in the preparation of its Commission Basis Report ("CBR").

Q. Did Cascade implement these changes in its 2017 CBR filing?

A. Yes. Cascade fully complied with these commitments in the preparation of its CBR filing, which was submitted to the Commission on April 27, 2017.

Q. Did Cascade implement these changes to the weather normalization adjustment in this rate case?

A. Yes and no. Cascade implemented these changes as a starting point for preparing its weather normalization adjustment in this rate case, however, as discussed further below, Cascade further refined the weather normalization adjustment in this rate case.

Q. Please describe how Cascade implemented Staff's recommended changes to the weather normalization adjustment in this rate case.

A. Cascade now uses 10 years of actual usage and weather data. Both actual and normal weather data is from NOAA. In this particular instance, normal weather is referring to the average daily temperature based on the most recent 30 years of weather history in each weather location which results in the average annual temperatures as well. The weather normalization adjustment used by Cascade occurs for both Residential and Commercial Schedules 503 and 504. Cascade has excluded insignificant monthly HDD variables. The Company implemented trend variables when significant and tested for serial correlation with Durbin-Watson. When serial correlation was found, Cascade used an autoregressive model. Cascade also removed any outliers when necessary. The Company believes it has resolved issue "f", unbilled therms, with Exhibit No. __ (BR-2), the demand forecast model.

Q. Did Cascade implement any other changes?

A. Yes. Cascade implemented a change to the methodology of calculating HDDs. Previously, Cascade calculated HDDs using a 65 °F reference temperature. For example, a 50 °F day would produce 15 HDDs (65-50). Now, the Company has implemented a 60 °F reference temperature when calculating HDDs. Cascade found that a 60 °F reference temperature has produced results that are statistically better than using a 65 °F reference temperature. Cascade has provided the results of this analysis in Exhibit No. __ (BR-3).

Q. Please explain the analysis Cascade performed to compare the use of a 60 °F reference temperature with a 65 °F reference temperature for the rest of the citygates.

A. Cascade performed the same 60 °F HDD reference analysis on the four largest citygates, one for each of the four weather locations in Washington for both the residential and commercial classes. Cascade used an autoregressive model analysis using use per customer ("upc") as the dependent variable and HDD as an explanatory variable. The analysis was performed using daily actual therm usage from July 2010 through November of 2016. The Company utilized the statistics Mean Absolute Percentage Error ("MAPE"), Mean Squared Error ("MSE"), Mean Absolute Error ("MAE"), and Akaike Information Criterion ("AIC") to determine which model was statistically better. In each case, the 60 °F reference temperature outperformed the 65 °F reference temperature.

Q. Please explain the source of the daily data performed in the analysis comparing a 60 °F reference temperature with a 65 °F reference temperature.

A. Cascade gathered daily usage data from the pipelines' electronic bulletin board ("EBB") for each of the Company's citygates. The EBB provides daily usage data at the citygate level but not at the customer class level. Utilizing Cascade's Fidelity National Information Services ("Aligne") system, the Company was able to remove the daily non-core usage data from the pipeline daily usage data, leaving the core daily usage data at the citygate level. To get the usage data to a customer class level, Cascade aligned the customer care and billing ("CC&B") data from its billing system to calendar dates as best as possible. Comparing pipeline usage data to CC&B data without shifting any data there was a 24.52 percent MAPE. Cascade found that shifting usage data to the previous month for billing cycles one through thirteen improved the MAPE to 5.29 percent. Using the newly defined CC&B data, the Company was able to create allocation percentages for

each customer class by month by city. The cities were allocated to the correct citygate, based on which citygate fed natural gas to that city.

Q. Please provide the initial results of Cascade's weather normalization adjustment.

A. Cascade has prepared its weather normalization adjustment consistent with Cascade's and Staff's recommended changes. As a result, the Company has calculated that residential therms would be 15,052,093 higher than the actual sales and commercial would be 8,330,039 higher than actual sales. These initial results are provided in the summary 60 sheet in Exhibit No. __ (BR-4).

Q. Is the Company satisfied with these initial results?

A. No. In theory, applying these adjustments to the actual usage will give therm sales Cascade would have sold with normal weather. Applying an adjustment of 15,052,093 to the 110,096,508 of actual therms results in an adjusted amount of 125,148,601 therms for the residential class. For the commercial class, applying an adjustment of 8,330,039 therms to 77,935,442 of actual therms results in an adjusted amount of 86,265,481 therms. These results appear to be abnormally high, and the Company does not expect a normal weather year to be this high in usage. In the past seven years of data, the year 2012 most closely replicated the normal weather year. In 2012, Cascade had a shifted billed usage of 113,664,863 therms. Given the 1.22 percent, 1.23 percent, 1.39 percent, and 1.47 percent growth in Rate Schedule 503 (Residential) in 2013, 2014, 2015, and 2016, respectively, Cascade would expect the normal weather year to be approximately 120,000,000 therms for the Test Year 2016. This analysis is shown in Exhibit No. __ (BR-5).

Q. What does the Company propose using for the weather normalization?

A. The Company proposes using Cascade's forecast model, with actual test year customers and normal year weather to calculate the normalized therms for the test year. Cascade's forecast model forecasts at the daily citygate level which allows for more granularity.

Q. Does the Company have a document that describes Cascade's forecast model in detail?

A. Yes. The forecast model design document is provided in Exhibit No. __ (BR-2).

Q. Did the company weather normalize rate schedules other than 503 (Residential) and 504 (Commercial)?

A. Yes. The company has weather normalized rate schedules 505 (Industrial) and 511 (Large Volume) as well.

Q. What are the results of the weather normalization using the forecast model?

A. The Company has calculated that rate schedule 503 would be 119,808,249 resulting in an adjustment of 9,711,741 therms higher than the actual sales and rate schedule 504 would be 81,292,836 resulting in an adjustment of 3,357,394 therms higher than actual sales. For rate schedule 505, the normalized therms would be 11,417,671 for an adjustment of 593,880 and rate schedule 511 normalized therms is 11,107,096 for a total adjustment of 791,498. These results are shown in Exhibit No. __ (BR-6).

III. LOAD STUDY

Q. Did Cascade agree to initiate a load study prior to filing this case?

A. Yes, as part of the settlement agreement in Docket No. UG-152286, Cascade agreed to "initiate a load study" for the purpose of determining "class core responsibilities of daily therms at the city gates."[1]

Q. Has Cascade had any meetings with Staff regarding the load study?

A. Yes. Cascade had a meeting with Christopher Hancock of Staff to discuss Cascade's plans for the load study on March 9th, 2017.

Q. Did Mr. Hancock explain Staff's expectations for the load study?

A. Mr. Hancock explained that the initial concept for the load study was to sample customers in each region using meters/loggers that provide daily measurements.

Q. Does Cascade currently have the equipment in place to use meter/loggers to provide daily measurements?

A. No. Due to Cascade's geographically dispersed and noncontiguous distribution service area, implementing meter/loggers would prove to be expensive and difficult to do.

Q. Did Cascade propose an alternative approach?

A. Yes. Cascade explained the methodology of its new forecast model and discussed its potential application for the new load study. The new forecast model will forecast at the daily citygate level by each customer class. This new methodology will allow Cascade to determine the class core responsibilities of daily therms at the citygates. The forecast model design document is provided in Exhibit No. __ (BR-2).

[1] *Wash. Utils. & Transp. Comm'n v. Cascade Natural Gas Corp.*, Docket UG-152286, Joint Settlement Agreement ¶46 (May 13, 2016).

Q. Will Cascade's alternative approach provide data adequate to analyze class core responsibilities at the citygate level?

A. The Company is optimistic that Cascade's approach will provide data adequate to analyze class core responsibilities of daily therms at the citygate level.

Q. Has the Company initiated this study?

A. Cascade has initiated the load study with the demand forecast model. The preliminary findings from the load study are not currently being used in this rate case because the customer forecast portion still needs to be tested and verified before the results can be finalized.

Q. When does Cascade expect the load study to be completed?

A. The Company has an expected completion date of August 31, 2017 for the load study, but it may be completed sooner or later depending on whether Cascade determines the need for any methodology changes to the model after testing and verifying the model results.

IV. CONCLUSION

Q. Does this conclude your testimony?

A. Yes.