Exh. GDF-1T

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET UE-240006

DOCKET UG-240007

DIRECT TESTIMONY OF

GRANT D. FORSYTH

REPRESENTING AVISTA CORPORATION

## I. INTRODUCTION

**Q. Please state your name, present position with Avista Corporation, and business address.**

A. My name is Dr. Grant D. Forsyth. I am employed by Avista Corporation as its Chief Economist. My business address is 1411 E. Mission Avenue, Spokane, Washington.

**Q. Dr. Forsyth, please provide information pertaining to your educational background and professional experience.**

A. I am a graduate of Central Washington University with a Bachelor of Arts Degree in Economics, the University of Oregon with an MBA in Finance, and Washington State University with a Ph.D. in Economics. Before joining Avista in April 2012, I was a tenured faculty member in the Department of Economics at Eastern Washington University. In my 13-year career at EWU, beginning in 1999, I specialized in money and banking, macroeconomics, international finance, and regional economic analysis. The majority of my academic research used applied econometrics. Prior to EWU, I worked in the Czech Republic as an academic economist (1996-1997) and private sector economist (1997-1999) in the Czech financial industry. My financial industry position was the Director of Research for a diversified Czech financial holding company. In this position I oversaw a staff doing both equity and macroeconomic research.

**Q. What are your current job duties at Avista?**

A. My primary job duties at Avista include generating the customer and load forecasts for electric and natural gas operations,[1] and generating the peak load forecast for

[1] My forecasts are used by the Company's Financial Planning and Analysis department in the development of the financial forecast. It is also frequently used as modeling inputs by the Company's Energy Supply department, led by Company witness Mr. Kinney.

electric operations. I also participate in various external policy groups, such as the Washington Governor's Council of Economic Advisors and Washington's Citizen Commission for Performance Measurement of Tax Preferences.

**Q. What is the purpose of your testimony in this proceeding?**

A. I will discuss the proposed methodology changes to the Company's weather normalization process.

**Q. Are you sponsoring any exhibits to be introduced in this proceeding?**

A. No, I am not.

## II. WEATHER NORMALIZATION METHODOLOGY CHANGES

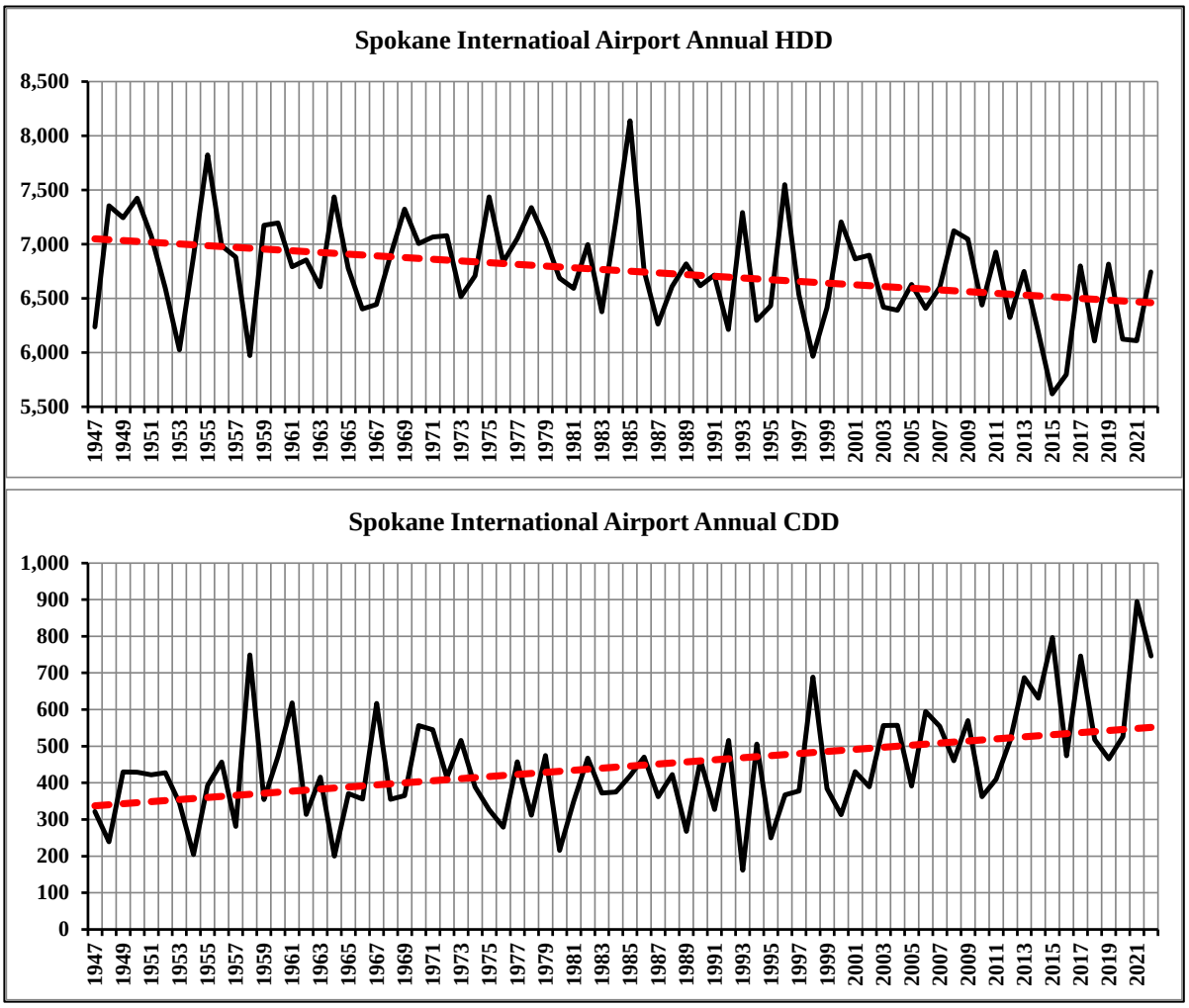
**Q. Has the Company recently changed its weather normalization methodology?**

A. Yes. The Company decided to update and improve the weather normalization process to better account for climate change and non-temperature seasonal variation and improve estimation transparency. The Company analyzed its weather normalization process and is proposing, in this case, to (1) adjust the definition of "normal" weather from a 30-year rolling average to a 20-year rolling average; (2) to adjust its non-degree day seasonal regression factors from seasonal factors to monthly factors; and (3) allow for non-linear behavior in the relationship between HDD and non-weather, non-seasonal use-per-customer (UPC) trends.

**Q. Regarding the first change, can you describe why the Company is proposing to move from a 30-year rolling average to a 20-year rolling average?**

A. Yes, the Company is moving to a 20-year rolling average for two reasons. First, the Company believes that the 20-year rolling average better captures the ongoing trends in heating degree days (HDD) and cooling degree days (CDD) shown in Illustration No. 1.

**Illustration No. 1: Heating and Cooling Degree Days since 1947**




The first graph in Illustration No. 1 shows that starting in late 1980s, HDD started to decline. In contrast, in the early 2000s, CDD started to increase as shown in the second graph. This is represented by the dashed lines in Illustration No. 1 above. For the pre-trend period, 1947 to 1989, average annual HDD were 6,907 compared to 6,469 for the 2003-2022 twenty-year period — on average — a decline of over 430 HDD a year, or 6.3%.

For the pre-trend period, 1947 to 1999, average annual CDD were about 399 compared to 573 for the 2003-2022 twenty-year period—on average, an increase of 173 CDD a year, or 43.4%. Based on these trends, the Company believes using a 30-year average will allocate too many HDD and too few CDD.

The second reason for using a 20-year rolling average is to sync up the weather adjustment definition of normal weather with other parts of the Company, including the definition of normal weather used for the load forecasts for the Company's Integrated Resource Plans (IRP) and revenue models.

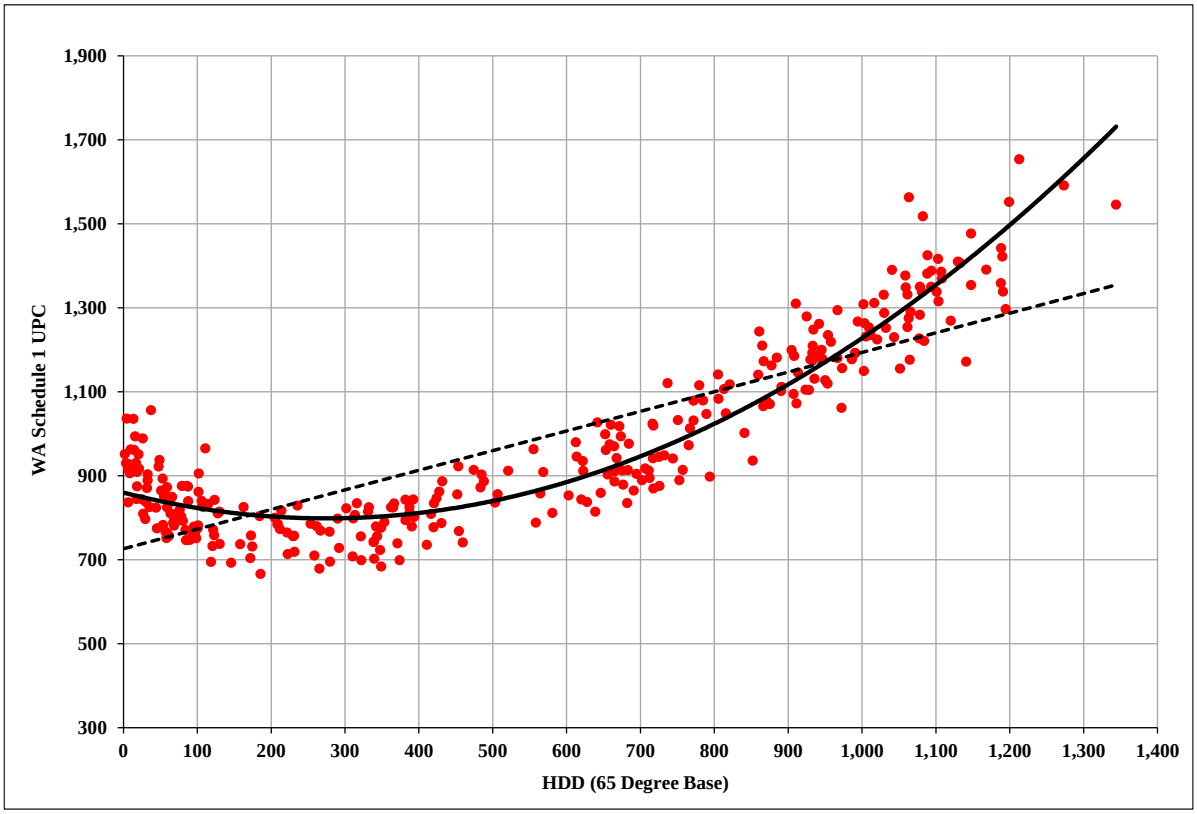
**Q. Regarding the second Weather Normalization proposed change, would you describe why the Company is proposing to move from non-degree day seasonal regression factors to monthly factors?**

A. Yes. The use of seasonal factors (as were applied in the previous methodology) can obscure non-degree day influences that are unique to each month, especially in transitional months like June and October. Using monthly factors improved the models' fit and helped to eliminate the need for error corrected regressions (also known as autocorrelated error regressions) that the Company used in the previous weather normalization method. In addition, accounting for individual months rather than groups of month reduces the likelihood of non-weather seasonal effects being captured by the HDD and CDD variables in a way that biases the impact of HDD and CDD on usage.

**Q. Please describe why the Company is proposing to use, in some regressions, non-linear variables for HDD and the time trends (i.e., the third proposed Weather Normalization modification).**

A. The use of non-linear variables such as HDD are consistent with the long-run historical behavior of use-per-customer relative to HDD. For example, Illustration No. 2 below provides a scatter plot that shows the relationship between HDD and electric use-per-customer (UPC) between 1997 and 2023 (the dots shown in the graph). The dashed black line in Illustration No. 2 is a linear regression of HDD versus UPC. The solid black line is regression line with HDD and HDD-squared versus UPC. Comparing the linear and non-linear regression lines clearly shows that non-linear variate does a much better job of capturing the "bend" in the relationship between HDD and UPC.

**Illustration No. 2: HDD vs. UPC from 1997-2023**




In addition to a non-linear HDD variable, some regressions also control for long-term trends in UPC (e.g., due to conservation or other non-weather, non-seasonal factors) using non-liner

time trends. For example, instead of regressing only "time" against UPC, it might be "time and time-squared." This is important because not all time-trends in UPC move along a linear path. As a result, improperly modeling the time trend correctly can lead to regression problems, including biasing the impact of HDD and CDD on usage.

**Q. In addition to the changes discussed above, are there any other changes the Company made to the weather normalization process?**

A. Yes. The new method adjusts for monthly net unbilled load before the weather normalization is done; this means the historical monthly billed load is calendarized **before** the weather normalization regressions are estimated. The Company's previous method calendarized monthly load by adding net unbilled **after** the weather normalization of the billed load. The new method recognizes that net unbilled load can be influenced by weather and non-weather factors; this means adjusting billed load for net unbilled load before weather normalization is preferable.

**Q. Has the Company quantified the difference between a 30-year rolling average and a 20-year rolling average?**

A. Yes. This comparison is done in two ways. The first way was to compare the new method, which uses a 20-year rolling average, with the previous method, which used a 30-year rolling average. The second way was to compare the new method (proposed changes #2 and #3 discussed above) with a 20-year rolling average, to the new method using a 30-year rolling average.

**Q. Has the Company quantified the kilowatt hour (kWh) and therm (THM) difference on an annual basis of making proposed weather normalization methodology changes described above?**

A. Yes. Based on a comparison of actual calendarized usage for 2022, Table No. 1 shows the kWh and THM differences between the new weather normalization methodology changes.

**Table No. 1: Weather Normalization Comparison for 12 Months Ending June 2023**

| Weather Normalization Method | Total Electric, kWh | Total Natural Gas, THM |
|---|---|---|
| New Method, WA 20-yr Rolling Average | **5,763,799,501** | **290,465,111** |
| New Method, WA 30-yr Rolling Average | **5,755,086,992** | **292,479,130** |
| Previous Method, WA 30-yr Rolling Average | **5,707,559,688** | **295,244,160** |
| | | |
| **% Difference Comparison** | **Total, % Diff** | **Total, % Diff** |
| 20-yr New Method to 30-yr Previous Method | **1.0%** | **-1.6%** |
| 30-yr New Method to 30-yr Previous Method | **0.8%** | **-0.9%** |
| 20-yr New Method to 30-yr New Method | **0.2%** | **-0.7%** |
| | | |
| **Load Difference Comparison** | **Total, kWh Diff** | **Total, THM Diff** |
| 20-yr New Method to 30-yr Previous Method | **56,239,813** | **(4,779,049)** |
| 30-yr New Method to 30-yr Previous Method | **47,527,303** | **(2,765,030)** |
| 20-yr New Method to 30-yr New Method | **8,712,509** | **(2,014,019)** |

In the Company's view, the annual differences of 1.0% for electric (about 56 million kilowatt hours) and 1.6% for natural gas (about 4.8 million therms) are not unexpectedly large from a statistical point of view given that different weather normalization models will always generate different results. In addition to the new method assuming less HDD and more CDD (using a 20-year rolling average), observed differences between the new and the previous methods also reflect the use of monthly factors in place of seasonal factors; the assumption (in some schedules) of non-linearity between HDD, time, and use-per-customer; and the addition of net unbilled usage before weather normalization occurs. The Company believes

each of these changes improves and streamlines the weather normalization process and eliminates the need for specialized econometric software. [2]

Specific to natural gas, the relatively larger impact of 20-year weather versus 30-year weather (-0.7% compared to 0.2% for electric using the new method) reflects the sensitivity of natural gas load to HDD. In comparison, smaller impact to electric with the change 20-year weather reflects a certain amount of winter load (with lower HDD compared to 30-year weather) being shifted to summer (with higher CDD compared to 30-year weather).

**Q. Has the Company's new approach been applied in other jurisdictions?**

A. Yes. The methodology changes were proposed and approved as part of a settlement agreement in the Company's recently concluded Idaho electric and natural gas general rate cases (Case Nos. AVU-E-23-01/AVU-G-23-01).

**Q. Is the weather normalization adjustment incorporated into the proposed revenue requirement adjustments in this case?**

A. Yes. The weather normalization adjustment is a component of the revenue normalization adjustment which is sponsored by Company witness Mr. Garbarino for electric operations, and Company witness Mr. Anderson for natural gas operations. Please refer to their testimonies for a full description of the revenue normalization adjustment and its components.

**Q. Does this conclude your pre-filed direct testimony?**

A. Yes.

[2] The proposed modeling approach eliminates the need for autocorrelated error regressions. This means all regressions are now done in Excel without the aid of E-views or other specialized econometrics software. The Excel based regressions have been built with diagnostic checks to validate model fit.