BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. AVISTA CORPORATION, Respondent.	DOCKET UE-140188 and DOCKET UG-140189 (*Consolidated*)

EXHIBIT TO
TESTIMONY OF

Jason L. Ball

STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

Avista Response to Commission Staff Data Request 162

July 22, 2012

AVISTA CORP.
RESPONSE TO REQUEST FOR INFORMATION

JURISDICTION:	WASHINGTON	DATE PREPARED:	06/10/2014
CASE NO:	UE-140188 & UG-140189	WITNESS:	Mark Thies
REQUESTER:	WUTC Staff -	RESPONDER:	Grant D. Forsyth, Ph.D.
TYPE:	Data Request	DEPT:	State & Federal Regulation
REQUEST NO.:	Staff – 162	TELEPHONE:	(509) 495-2765
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REQUEST:

Please describe all major methodological changes and new explanatory (independent) variables incorporated into the Company's load forecasting methods used for the current rate case in comparison to the methods used to generate the Company's updated (July 2012) load forecasts used in its 2012 Washington rate case.

RESPONSE:

The electric and natural gas forecast method relies on linear regression analysis. The current forecasting methodology differs from that used in the July 2012 forecast for the following reasons:

1. The forecasting software is now SAS/ETS. ETS is SAS's time-series forecasting module. When appropriate, the current method includes an integrated autoregressive moving average (ARIMA) error correction term. This term adjusts for forecasting information that cannot be explicitly modeled with explanatory variables such as degree days. That is, variables that impact customer growth or use per customer (UPC) are not always directly measureable, but their influence can appear as an estimated error term that is non-random—that is, an error term that correlated over time with past error terms. Therefore, the estimated error term contains information that can improve the forecast if the error term itself is used as an explanatory variable.

2. To better capture the non-linearity between degree days and UPC, degree days used in the natural gas forecast are frequently squared in the regression model. Also, degree days do not always capture all seasonal fluctuations in UPC, so seasonal dummy variables are also included as explanatory variables. In addition, for both the electric and natural gas forecasts, normal weather is now assumed to be a 20-year moving average of degree days. The prior method used NOAA's 30-year average.

3. In the main residential schedules (Schedule 1 electric and Schedule 101 natural gas), real (inflation adjusted) average annual residential price per kilowatt hour or therm is an explicit explanatory variable for UPC.

4. In the main residential schedule (Schedule 1) in the electric forecast, average household size is an explicit explanatory variable for UPC.

5. For many of the industrial electric and natural gas schedules, the U.S. Industrial Production Index (IPI) is included as an explanatory variable for UPC. IPI is collected monthly by the U.S. Federal Reserve.

6. The customer forecasting models for Schedule 1 residential and Schedule 11 commercial are integrated to account for the historically high correlation between residential and commercial customer growth in these schedules. The Schedule 1 residential customer forecast is done using a base-forecast ARIMA model that is then (ex-post) adjusted up or down using forecasted population growth—population growth is proxy for future residential customer growth. The schedule 11 commercial customer forecast model is also an ARIMA based model, but uses residential customers as an explanatory variable. Therefore, the Schedule 1 residential customer forecasts can be used to forecast Schedule 11 commercial customers. This process maintains the historic correlation in the forecast. A similar approach is used for natural gas.

7. Although Global Insight's (GI) forecasts are still used in the forecasting process, their importance has diminished due to (1) more "in-house" forecasting and (2) moving to more "consensus" based forecasts that look at a range of forecast sources other than GI. These other sources include surveys of forecasters done by Bloomberg, Blue Chip, the Wall Street Journal, The Economist, The Federal Reserve Bank of Philadelphia, and the Federal Reserve's Federal Open Market Committee (FOMC). Using these sources, in conjunction with GI, generate the GDP and Employment forecasts that lead to the population forecasts connected to Schedules 1 and 101 residential customer forecasts. The same GDP forecasts are used to generate the IPI forecasts used for the industrial schedules.