

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET NO. UE-15 _____

DIRECT TESTIMONY OF

CLINT G. KALICH

REPRESENTING AVISTA CORPORATION

I. INTRODUCTION

1
2 **Q. Please state your name, the name of your employer, and your business**
3 **address.**

4 A. My name is Clint Kalich. I am employed by Avista Corporation at 1411 East
5 Mission Avenue, Spokane, Washington.

6 **Q. In what capacity are you employed?**

7 A. I am the Manager of Resource Planning & Power Supply Analyses in the
8 Energy Resources Department of Avista Utilities.

9 **Q. Please state your educational background and professional experience.**

10 A. I graduated from Central Washington University in 1991 with a Bachelor of
11 Science Degree in Business Economics. Shortly after graduation, I accepted an analyst
12 position with Economic and Engineering Services, Inc. (now EES Consulting, Inc.), a
13 Northwest management-consulting firm located in Bellevue, Washington. While employed
14 by EES, I worked primarily for municipalities, public utility districts, and cooperatives in
15 the area of electric utility management. My specific areas of focus were economic analyses
16 of new resource development, rate case proceedings involving the Bonneville Power
17 Administration, integrated (least-cost) resource planning, and demand-side management
18 program development.

19 In late 1995, I left Economic and Engineering Services, Inc. to join Tacoma Power in
20 Tacoma, Washington. I provided key analytical and policy support in the areas of resource
21 development, procurement, and optimization, hydroelectric operations and re-licensing,
22 unbundled power supply rate-making, contract negotiations, and system operations. I

1 helped develop, and ultimately managed, Tacoma Power's industrial market access program
2 serving one-quarter of the company's retail load.

3 In mid-2000 I joined Avista Utilities and accepted my current position assisting the
4 Company in resource analysis, dispatch modeling, resource procurement, integrated
5 resource planning, and rate case proceedings. Much of my career has involved resource
6 dispatch modeling of the nature described in this testimony.

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

8 A. My testimony will describe the Company's use of the AURORA_{XMP} dispatch
9 model, or "Dispatch Model." I will explain the key assumptions driving the Dispatch
10 Model's market forecast of electricity prices. The discussion includes the variables of
11 natural gas, Western Interconnect loads and resources, and hydroelectric conditions. I will
12 describe how the model dispatches its resources and contracts to maximize customer benefit
13 and tracks their values for use in pro forma calculations. Finally, I will present the modeling
14 results provided to Company witness Mr. Johnson for his power supply pro forma
15 adjustment calculations.

16 **Q. Are you sponsoring any exhibits in this proceeding?**

17 A. Yes. I am sponsoring one exhibit marked Confidential Exhibit No. ____
18 (CGK-2C). It provides summary output from the Dispatch Model and data that are used by
19 Company witness Mr. Johnson as input for his work. All information contained in the
20 exhibit was prepared under my direction.

II. THE DISPATCH MODEL

1
2 **Q. What model is the Company using to dispatch its portfolio of resources**
3 **and obligations?**

4 A. The Company uses EPIS, Inc.’s AURORA_{XMP} market forecasting model
5 (“Dispatch Model”) and its associated database for determining power supply costs.¹ The
6 Dispatch Model optimizes Company-owned resource and contract dispatch during each hour
7 of the January 1, 2016 through December 31, 2016 pro forma year.

8 **Q. Please briefly describe the Dispatch Model.**

9 A. The Dispatch Model was developed by EPIS, Inc. of Sandpoint, Idaho. It is a
10 fundamentals-based tool containing demand and resource data for the entire Western
11 Interconnect. It employs multi-area, transmission-constrained dispatch logic to simulate real
12 market conditions. Its true economic dispatch captures the dynamics and economics of
13 electricity markets—both short-term (hourly, daily, monthly) and long-term. On an hourly
14 basis the Dispatch Model develops an available resource stack, sorting resources from
15 lowest to highest cost. It then compares this resource stack with load obligations in the same
16 hour to arrive at the least-cost market-clearing price for the hour. Once resources are
17 dispatched and market prices are determined, the Dispatch Model singles out Avista
18 resources and loads and values them against the marketplace.

19 **Q. What experience does the Company have using AURORA_{XMP}?**

20 A. The Company purchased a license to use the Dispatch Model in April 2002.
21 AURORA_{XMP} has been used for numerous studies, including each of its integrated resource
22 plans and rate filings after 2001. The tool is also used for various resource evaluations,

¹ The Company uses AURORA_{XMP} version 11.5.1043 with a Windows 7 operating system.

1 market forecasting, and requests-for-proposal evaluations. It is used in the Company's
2 annual Commission Basis Reports.

3 **Q. Who else uses AURORA_{XMP}?**

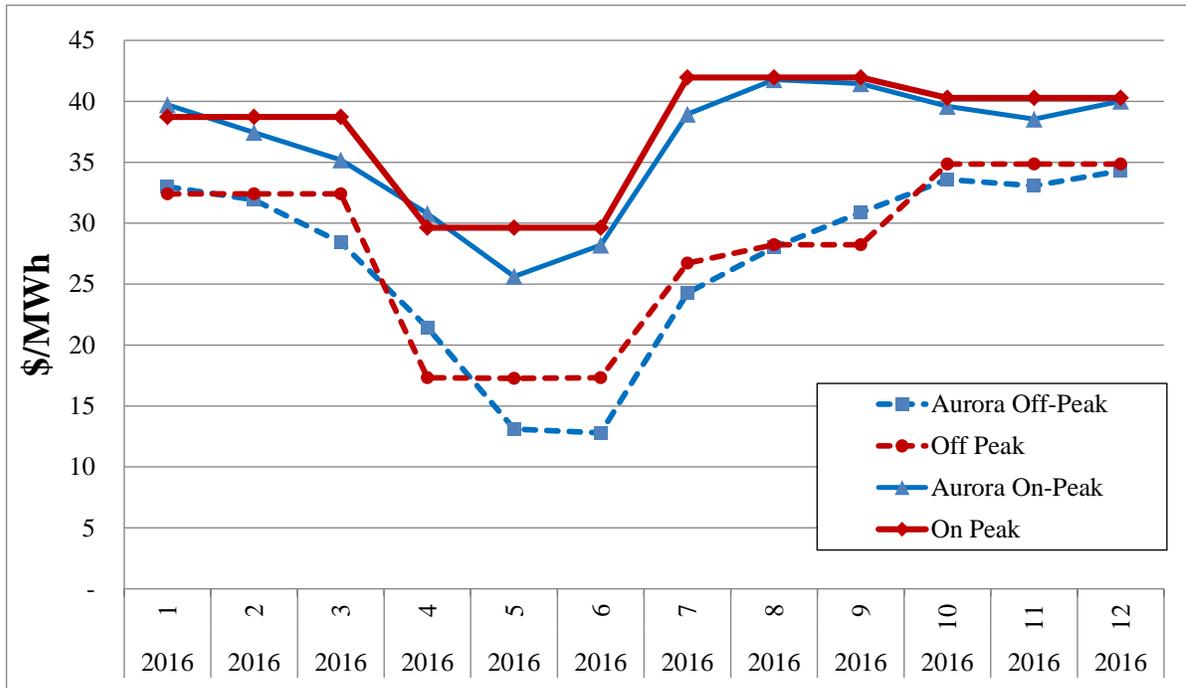
4 A. AURORA_{XMP} is used all across North America, Europe, and the Middle East.
5 In the Northwest specifically, AURORA_{XMP} is used by the Bonneville Power
6 Administration, the Northwest Power and Conservation Council, Puget Sound Energy, Idaho
7 Power, Portland General Electric, PacifiCorp, Seattle City Light, Grant County PUD, and
8 Snohomish County PUD.

9 **Q. What benefits does the Dispatch Model offer for this type of analysis?**

10 A. The Dispatch Model generates hourly electricity prices across the Western
11 Interconnect, accounting for its specific mix of resources and loads. The Dispatch Model
12 reflects the impact of regions outside the Northwest on Northwest market prices, limited by
13 known transfer (transmission) capabilities. Ultimately, the Dispatch Model allows the
14 Company to generate price forecasts in-house instead of relying on exogenous forecasts.

15 The Company owns a number of resources, including hydroelectric plants and
16 natural gas-fired peaking units serving customer loads during more valuable on-peak hours.
17 By optimizing resource operation on an hourly basis, the Dispatch Model is able to
18 appropriately value the capabilities of these assets. Forward prices for the proforma 2016
19 period are 34% higher in the on-peak hours than off-peak hours at the time this case was
20 prepared. The Dispatch Model forecasts on-peak prices for the pro forma period to average
21 35% higher than off-peak prices, a figure very close to forwards. A graphical representation
22 of the differences in on- and off-peak prices over the proforma period is shown below in
23 Chart No. 1.

Illustration No. 1 – Monthly AURORA modeled versus forward Mid-C Prices



Forward Mid-Columbia prices shown as the latest three month average (Aug 4, 2014 through Nov 4, 2014) of Intercontinental Exchange (ICE) quarterly prices at the time the study was prepared. Over time, the quarterly forward periods are broken into monthly prices, but quarterly ICE prices do not break out into monthly prices until much closer to delivery.

Dispatch Model and forward prices can and sometimes will differ, as forward prices are based on market expectations whereas the data used in the Dispatch Model are normalized for hydro, loads, and resource outages. Where the market expects a low hydro year forthcoming, forward market prices could be significantly higher than Dispatch Model prices. Referring back to Chart No. 1, the average price for the 2016 forward period is \$32.36 per MWh; the Dispatch model result is \$32.43 per MWh. These results explain that the market is not forecasting a bias in future conditions (e.g., a low hydro year). The

1 Dispatch Model therefore provides a very close approximation to what the actual market is
2 predicting, and provides a good data set for the pro forma.

3 **Q. On a broader scale, what calculations are being performed by the**
4 **Dispatch Model?**

5 A. The Dispatch Model's goal is to minimize overall system operating costs
6 across the Western Interconnect, including Avista's portfolio of loads and resources. The
7 Dispatch Model generates a wholesale electricity market price forecast by evaluating all
8 Western Interconnect resources simultaneously in a least-cost equation to meet regional
9 loads. As the Dispatch Model progresses from hour to hour, it "operates" those least-cost
10 resources necessary to meet load. With respect to the Company's portfolio, the Dispatch
11 Model tracks the hourly output and fuel costs associated with Avista's portfolio generation.
12 It also calculates hourly energy quantities and values for the Company's contractual rights
13 and obligations. In every hour, the Company's loads and obligations are compared to
14 available resources to determine a net position. This net position is balanced using the
15 simulated wholesale electricity market. The cost of energy purchased from or sold into the
16 market is determined based on the electric market-clearing price for the specified hour and
17 the amount of energy necessary to balance loads and resources.

18 **Q. How does the Dispatch Model determine electricity market prices, and**
19 **how are the prices used to calculate market purchases and sales?**

20 A. The Dispatch Model calculates electricity prices for the entire Western
21 Interconnect, separated into various geographical areas such as the Northwest and Northern
22 and Southern California. The load in each area is compared to available resources,
23 including resources available from other areas that are linked by transmission connections,

1 to determine the electricity price in each hour. Ultimately, the market price for an hour is set
2 based on the last resource in the stack to be dispatched. This resource is referred to as the
3 “marginal resource.” Given the prominence of natural gas-fired resources on the margin,
4 this fuel is a key variable in the determination of wholesale electricity prices.

5 **Q. How does the Dispatch Model operate regional hydroelectric projects?**

6 A. The model begins by “peak shaving” loads using hydro resources with
7 storage. When peak shaving, the Dispatch Model determines the hours with the highest
8 loads and allocates to them as much hydroelectric energy within the constraints of the hydro
9 system. Remaining loads are then met with other available resources.

10 **Q. Has the Company made any modifications to the EPIS database for this**
11 **case?**

12 A. Yes. As we have in the past, Avista’s resource portfolio is modified from
13 EPIS’s default database to reflect actual project operating characteristics. Also, natural gas
14 prices are modified to match the latest three month average of forward prices over the pro-
15 forma period, regional resources and loads are modified where better information is made
16 available, and Northwest hydro data are replaced with Bonneville Power Administration
17 data. The EPIS database is modified to include various assumptions used in the Company’s
18 2015 Integrated Resource Planning process and other new resource information where
19 available.

20 **Q. Has the Company made any changes to the way it models hydro in this**
21 **case?**

22 A. No. Avista is using the same 80 year hydro record used in UE-140188, our
23 2014 general rate case filing.

Table No. 1 – Pro Forma Natural Gas Prices

Basis	Price (\$2016/dth)
AECO	3.48
Malin	3.98
Spokane	4.11
Rockies	3.83
Stanfield	3.90
Sumas	3.96
Henry Hub	4.03
S. Calif.	4.21

Q. What is the Company's assumption for rate period loads?

A. Consistent with prior general rate case proceedings, historical loads are weather-adjusted. For this filing weather normalized 2013-14 loads is 1,052.1 average megawatts compared to actual loads of 1,066.4. Table No. 3 below details data included in this proceeding. Further information on the weather normalization is within witness Ms. Knox's testimony.

Table No. 2 – Pro Forma Loads

Month	Average Load	Month	Average Load
Oct 2013	968.4	Apr 2014	978.5
Nov 2013	1,106.0	May 2014	948.9
Dec 2013	1,246.1	Jun 2014	967.4
Jan 2014	1,052.1	Jul 2014	1,006.9
Feb 2014	1,204.5	Aug 2014	1,015.2
Mar 2014	1,186.3	Sep 2014	934.1

Q. Please discuss your outage assumptions for the Colstrip units.

A. As with our assumptions for other plants, and consistent with prior cases, Avista uses the most recent available 5-year average forced outages to estimate long-run performance at the Colstrip plant. The 11.48% forced outage rate is based on the average

1 outages between 2010 and 2014. Maintenance outages use the 6-year average planned
2 outages. Six years is used as the plant maintenance schedule is every three years.

3 **Q. Are there any other significant modeling changes from the last rate**
4 **filing?**

5 A. No.

6
7 **IV. RESULTS**

8 **Q. Please summarize the results from the Dispatch Model.**

9 A. The Dispatch Model tracks the Company's portfolio during each hour of the
10 pro forma study. Fuel costs and generation for each resource are summarized by month.
11 Total market sales and purchases, and their revenues and costs, are also determined and
12 summarized by month. These values are contained in Confidential Exhibit No. ____ (CGK-
13 2C) and were provided to Mr. Johnson for use in his calculations. Mr. Johnson adds
14 resource and contract revenues and expenses not accounted for in the Dispatch Model (e.g.,
15 fixed costs) to determine net power supply expense.

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

17 A. Yes, it does.