INDEX

TESTIMONY OF

STEPHEN OLIVER, WILLIAM LAMB, KIMBERLY LEATHLEY, AND ROBERT PETTY

Witnesses for Bonneville Power Administration

SUBJECT: Five-Year Flat-Block Price Forecast

TESTIMONY OF

STEPHEN OLIVER, WILLIAM LAMB, KIMBERLY LEATHLEY, AND ROBERT PETTY

Witnesses for Bonneville Power Administration

SUBJECT: FIVE-YEAR FLAT-BLOCK PRICE FORECAST

Section 1: Introduction and Purpose of Testimony

Q. Please state your names and qualifications.

A. My name is Stephen Oliver and my qualifications are contained in WP-02-Q-BPA-54.

A. My name is William Lamb and my qualifications are contained in WP-02-Q-BPA-40.

A. My name is Kimberly Leathley and my qualifications are contained in WP-02-Q-BPA-42.

A. My name is Robert Petty and my qualifications are contained in WP-02-Q-BPA-58.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to describe the development of BPA's five-year flat-block price forecast to be used: (1) in the calculation of the cash component of the proposed settlement of the Residential Exchange Program with regional investor-owned utilities (IOUs) as described in BPA's Power Subscription Strategy; and (2) as the estimated purchase price for augmenting the Federal Base System (FBS) with five-year flat-block purchases.

Q. How is your testimony organized?

A. This testimony is organized in three sections. Section 1 outlines the purpose of our testimony. Section 2 describes the development of the five-year flat-block price forecast. Section 3 describes the inapplicability of other price forecasts for developing a five-year flat-block price forecast.

Section 2: Five-Year Flat-Block Price Forecast

Q. Why is BPA developing price forecasts in its 2002 rate case?

A. For the purposes of this rate case, BPA has developed price forecasts to be used in: (1) designing rates; (2) determining surplus revenue; (3) calculating the cash component of the proposed settlement of the Residential Exchange Program with regional IOUs; and (4) estimating the cost of augmenting the FBS with five-year flat-block purchases.

Q. Please describe the price forecasts BPA used for these purposes.

A. For designing rates, BPA relies on the Marginal Cost Analysis Study (MCA), which uses the AURORA model. The MCA is described in detail in the testimony of Anderson, *et al.*, WP-02-E-BPA-16. The testimony of Keep, *et al.*, WP-02-E-BPA-17, describes how the MCA is used in rate design. For determining surplus revenue, BPA uses a forecast of prices based on the MCA but with adjustments. This forecast is described in greater detail in the testimony of Conger, *et al.*, WP-02-E-BPA-15. The five-year flat-block price forecast that BPA has developed for calculating the cash component of the proposed settlement of the Residential Exchange Program and for estimating the cost of augmenting the FBS with five-year flat-block purchases is discussed below.

Q. Please describe in more detail why BPA is developing a five-year flat-block price forecast.

A. BPA has developed a five-year flat-block price forecast for two purposes. The first purpose is for use in calculating the cash component of the proposed settlement of the Residential Exchange Program with regional IOUs as described in BPA's Power Subscription Strategy. The Power Subscription Strategy, at pages 8-9, states:

> *BPA's strategy is that IOUs may agree to a settlement of the Residential Exchange Program in which they would be able to purchase a specified amount of power under subscription for their residential and small farm consumers at a rate approximately equivalent to the PF Preference rate.*
>
> . . .

> *In subscription, BPA proposes a settlement in which residential and small farm loads of the IOUs will be assured access to the equivalent of 1,800 aMW of federal power for the 2002–2006 period. Of this amount, at least 1,000 aMW will be met with actual BPA power deliveries. The remainder may be provided through either a financial arrangement or additional power deliveries, depending on which approach is most cost-effective for BPA.*
>
> *. . . Any cash payment will reflect the difference between the market price of power forecast in the rate case and the rate used to make such subscription sales. The actual power deliveries for these loads will be in equal hourly amounts over the period. . . .*

The other forecasts developed for this rate case are not appropriate for estimating advance purchases of five-year flat-block energy (*see* Section 3 below). Therefore, a separate forecast was developed for this purpose.

The second purpose for this forecast is to estimate the purchase price for power for five-year flat-blocks of energy to meet BPA's firm obligations. BPA's firm obligations and firm resources are described in the Loads and Resources Study, WP-02-E-BPA-01. Some of BPA's firm obligations are met by making purchases during the rate period on an as-needed basis depending on generation levels, hydro conditions and weather conditions. In addition, BPA anticipates making substantial purchases prior to the rate period for terms longer than one year to augment the FBS. A forecast of the five-year price of the flat-block power acquired in the 1999-2000 market timeframe is a more accurate reflection of the costs and structure of these augmentation purchases than the other price estimates.

Q. How did BPA develop its price forecast for five-year block purchases?

A. BPA used a combination of qualitative and quantitative assessments as well as professional judgment to arrive at a price estimate of five-year block purchases. BPA used actual market experience to derive a price estimate of five-year block purchases and confirmed this estimate by using a derivation of BPA's MCA, market quotes for forward transactions in the five-year period, and a reasonable extrapolation of current market prices.

Q. How did BPA use actual market experience to derive a price estimate of five-year block purchases?

A. BPA used real market examples of flat-block forward purchases in its analysis. BPA recently made 250 average megawatts (aMW) of block (flat energy) purchases in amounts greater than 25 aMW. At the time these purchases were made, twelve-month five-year strips averaged approximately $26 per MWh. However, due to the normally expected large surplus from the Federal Columbia River Power System during the spring, BPA chose not to purchase for the months of April, May, and June. These purchases were for the nine months (July through March) of each of the five years in the rate period. The average price for these purchases was $29.70 per megawatthour (MWh). BPA expects to supply spring months with BPA's share of secondary energy if it purchases nine-month blocks, or it will purchase the full twelve-month block. It is BPA's expectation that the purchase of additional forward blocks will place upward pressure on the price of this power. BPA expects the price will approach, but not reach, the $32.24 per MWh MCA marginal cost for reasons that will be described in section 3 below. Therefore, BPA assumes that as 250 megawatt increments are purchased, the price will rise from approximately $26 per MWh (recent experience) to just over $30 per MWh. The average price is approximately $28.10 per MWh. The average price of this range reflects the average purchase price for all purchases. At any given time, the prices will be above or below this average, but the average itself stands as a good proxy for the price of the total purchases. The higher range of just over $30 per MWh represents a high-side estimate for specific new generation based on a compilation of verbal and proprietary commercial information BPA has received on its trading floor from Independent Power Producers, marketers, and other generation developers.

Q. How did BPA use the MCA to confirm the price estimate for five-year purchases?

A. BPA used the MCA as a starting point to derive a range of possible five-year flat-block prices. The MCA estimates are described in detail in the MCA Study, WP-02-E-BPA-04,

and the testimony of Anderson, *et al.*, WP-02-E-BPA-16. The MCA marginal costs are equal to the hourly variable cost of the marginal resource (the cost associated with the last unit dispatched in least cost order to meet the next hourly energy demand) for energy available at the Mid-Columbia trading hub. The flat-block price forecast is estimating five-year purchases of 2,362 aMW (1,562 aMW of BPA purchases and 800 aMW of IOU purchases). Rather than estimating the marginal cost of the last one-kilowatt, BPA assessed the average price of the last 4,724 aMW of the load associated with the resources on the margin in the Western Systems Coordinating Council (WSCC) using the AURORA model in the MCA. BPA used the MCA price of the last 4,724 aMW because it was twice the level of load BPA is attempting to price. Pricing this breadth of marginal resources, rather than the last one-kilowatt in AURORA, captures a more realistic representation of the prices BPA is likely to encounter when purchasing firm blocks of power for this period because the wholesale market cannot precisely predict a marginal one–kilowatt price, particularly two years in advance of the sales period. Considering that 4,724 aMW of load in the Northwest represents a small fraction of the total energy available, approximately 108,000 aMW from the supply capability in the WSCC, even with this method, BPA acknowledges that sellers of surplus power will attempt to approximate marginal value in the five-year period and sell their highest cost resources first. The conclusion drawn from this analysis is that the prices at which sellers will offer energy supply for five-year flat-block forward purchases will be between the marginal cost price resulting from the decremented load and the marginal cost price that represents the last one kilowatt of load.

In order to evaluate this broader-band marginal analysis, BPA reduced the total load in the Northwest in the MCA by 4,724 aMW, which represents BPA making purchases for load that is being served by new and existing resources. The resulting marginal cost price of a 4,724 aMW decrement to load is $23.81 per MWh. The marginal cost price from the MCA estimated $32.24 per MWh for the last kilowatt. The average price in this range is

$28.03 per MWh. In summary, using this analytical approach, BPA concluded that parties conducting bilateral negotiations for the FY 2002–2006 period, for quantities of about 2,362 aMW, should expect prices to be between $23.81 per MWh and $32.24 per MWh with an average of $28.03 per MWh.

Q. *How did BPA use market quotes for forward transactions in the five-year period to confirm the price estimate for five-year purchases?*

A. BPA assessed the future price of power by receiving market quotes for forward transactions in the five-year rate period from financial institutions. Over the last several months BPA has been discussing financial swap options with major financial institutions. Recent quotes BPA has received have been for $28.00 per MWh for 250 aMW of flat-block firm energy for the October 1, 2001, through September 30, 2006, period.

Q. *How did BPA use an extrapolation of current market prices to confirm the price estimate for five-year purchases?*

A. BPA assessed historical market price escalation and forecast price escalation embodied in the MCA, and then calculated a range of future prices when these escalations are applied to the current market price. This technique captures a historical look at market cycles and fundamental market changes inherent in the electricity industry and a future perspective using the escalation of marginal cost pricing. BPA used historical nominal prices for the most likely alternative generation additions from 1980 through 1997. The annual escalation of energy prices from these generation sources during this period was –2.7 percent as the marginal resource transitioned from coal generation to natural gas resources. In contrast, the more recent market price escalation is reflected in the nominal annual escalation from the MCA for the October 1, 1999, to September 30, 2006, period; that is, 6.2 percent per year. Assuming that it is possible for either the historical trend of the 17 years prior to 1997 to occur, or for recent escalation trends to continue over the long run, BPA applied each of these average annual escalation rates to the current market price of flat forward blocks sold

from October 1999 to September 2000. The current market price from BPA's trading floor is approximately $25.50 per MWh and applying these growth rates yields an average price range of $22.90 per MWh to $32.58 per MWh over the October 1, 2001, to September 30, 2006, period. Given the wide range of prices possible using historical escalation and forecasted marginal cost escalation, it is reasonable to assert that the price of energy purchases in five-year forward blocks will fall within that range.

Q. Please summarize the results of your analysis.

A. In summary, based on recent market experience and confirmed by a variety of information using a derivation of the MCA, financial swap quotes, and a reasonable extrapolation of current prices using historical and forecasted assessments of price escalation, BPA has determined that a price of $28.10 per MWh reasonably reflects the average long-term purchase price for five-year flat-block energy.

Section 3. Inapplicability of Other Price Forecasts

Q. Earlier you noted that BPA relies on the MCA for designing rates and BPA uses an adjusted price forecast based on the MCA for determining surplus revenues. Are these forecasts appropriate for determining the price of five-year block purchases?

A. No. The MCA estimates are described in detail in the MCA Study, WP-02-E-BPA-04, and the testimony of Anderson, *et al.,* WP-02-E-BPA-16. The MCA marginal costs are equal to the hourly variable cost of the marginal resource (the cost associated with the last unit dispatched in least cost order to meet the next hourly energy demand) for energy available at the Mid-Columbia trading hub. There are several reasons why a forecast of the hourly marginal cost and a forecast of prices from a combination of daily, within month, monthly, and annual products, are not appropriate measures of five-year flat-block purchases.

Q. Please describe why forecasts of hourly marginal costs are not appropriate measures of five-year flat-block purchases.

A. The structure of a five-year forward block purchase is not similar to an hourly product that is subject to real-time pricing based on the last one-kilowatt of demand. As previously described, the MCA marginal costs are equal to the hourly variable cost of the marginal resource for energy available at the Mid-Columbia trading hub, essentially the variable cost of the last one-kilowatt generated. Five-year forward block purchases do not reflect the last one-kilowatt generated. Rather, they reflect market participants' willingness to sell generation above their variable cost. The MCA marginal cost estimates are used as an indication of what we expect to actually experience in the real time market-clearing price for hourly bulk energy transactions during the rate period. In contrast, these five-year blocks will be acquired in advance of the five-year period through bilateral agreements. Further, the product that BPA is expecting to acquire is five-year, flat annual energy blocks over all hours of the year irrespective of overall demand levels and in amounts greater than one kilowatt. Therefore, using the MCA marginal cost estimates as a forecast for five-year block purchases is not appropriate.

Q. Are there any additional reasons why these forecasts are not appropriate measures of five-year flat-block purchases?

A. Yes. Market participants do not have uniform or perfect information with respect to future supply and demand levels or market and economic conditions, particularly for periods starting 24 to 60 months in the future. AURORA models the functioning of a competitive economic market system that has a theoretical solution of information and timing. The market can generate solutions different from a theoretical model since market participants are individually making decisions to build generating resources in the Northwest to meet perceived demand. Market participants may be willing to sell below the expected marginal cost and above their variable cost for many reasons, including: to ensure cost recovery of a

capital investment, to hedge against a high future risk exposure, and simply because they have a different view of the future market. Market participants use bilateral transactions to diversify their portfolio of sales and cover purchases made to lock in an acceptable margin.

Q. Please continue.

A. Another reason why these forecasts are not appropriate measures of five-year flat-block purchases is that the risk profiles of buyers and sellers fundamentally diverge. Sellers of assets are more likely to lock in prices above their variable costs to protect from the risk of a low market than to wait for potential high markets. On the other hand, because buyers generally have a higher risk profile, they can either purchase when prices are perceived to be "reasonable" or wait to buy. Potential high markets for buyers pose less risk since buyers have more substitution options than sellers. Buyers can substitute electricity with gas and, of course, buyers can readily go out of business. The result of the divergence of risk profiles enables transactions to occur at less than the expected hourly market clearing price. Some market participants are likely to sell forward to hedge the risk of a lower market. This market speculation contributes to energy available at a range of prices.

Q. Does this conclude your testimony?

A. Yes.