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TESTIMONY OF

SIDNEY L. CONGER, ARNOLD L. WAGNER, EDWARD L. BLEIFUSS,

ROBERT J. PETTY, ROBERT W. ANDERSON, MARK H. EBBERTS, JON A. HIRSCH,

ELIZABETH A. EVANS, CARL T. BUSKUHL, AND JEFFREY W. CHOW

Witnesses for Bonneville Power Administration

SUBJECT: Risk Analysis Study and No-Slice Risk Analysis

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Section 1. Introduction and Purpose of Testimony

Q. Please state your names and qualifications.

A. My name is Sidney L. Conger, Jr. My qualifications are contained in WP-02-Q-BPA-14.

A. My name is Arnold L. Wagner. My qualifications are contained in WP-02-Q-BPA-67.

A. My name is Edward L. Bleifuss. My qualifications are contained in WP-02-Q-BPA-04.

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

A. My name is Robert W. Anderson. My qualifications are contained in WP-02-Q-BPA-01.

A. My name is Mark H. Ebberts. My qualifications are contained in WP-02-Q-BPA-18.

A. My name is Jon A. Hirsch. My qualifications are contained in WP-02-Q-BPA-28.

A. My name is Elizabeth A. Evans. My qualifications are contained in WP-02-Q-BPA-69.

A. My name is Carl T. Buskuhl. My qualifications are contained in WP-02-Q-BPA-09.

A. My name is Jeffrey W. Chow. My qualifications are contained in WP-02-Q-BPA-71.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to sponsor the Risk Analysis Study for the 2002 Supplemental Power Rate Proposal (Supplemental Proposal) and the No-Slice Risk Analysis performed in support of the Cost Shift Analysis for the Slice product. The Risk Analysis Study and the No-Slice Risk Analysis evaluate operating and non-operating risks that affect Bonneville Power Administration's (BPA) ability to make its annual U.S. Treasury payments on time and in full during the Fiscal Year (FY) 2002-2006 rate period. Operating risks include variations in economic, load, and generation resource conditions. These operating risks include the impact that spot market electricity prices, load levels, and resource output (including hydro generation under alternative hydro operations associated with the 13 fish and wildlife alternatives) have on net revenues. The impact of operating risks on BPA's net revenues is quantified by the Risk Model Analysis (RiskMod). *See* Risk Analysis Study and Study Documentation, WP-02-FS-BPA-03/03A. Non-operating risks include uncertainties in capital costs and expenses (but not operational impacts) associated with the 13 fish and wildlife alternatives, uncertainty in achieving cost reductions from the Cost Review recommendations, costs associated with Business Line separation, costs associated with conservation and renewables, and interest rates. The impact of non-operating risks on BPA's net revenues is quantified by the Non-Operating Risk Model (NORM). *See* Risk Analysis Study and Study Documentation, WP-02-FS-BPA-03/03A.

Q. How is your testimony organized?

A. This testimony contains seven sections including this introductory section. Section 2 provides an overview of the changes in the Risk Analysis Study since the 2002 Amended Power Rate Proposal (Amended Proposal). Section 3 describes the changes in RiskMod and NORM since the Amended Proposal. Section 4 describes the changes in loads and resources since the Amended Proposal. Section 5 describes the changes in the natural gas price forecast since the Amended Proposal. Section 6 describes the changes in the AURORA model since the Amended Proposal. Finally, Section 7 describes the changes that BPA anticipates making to the Risk Analysis Study and the No-Slice Risk Analysis for the Final Record of Decision (Final ROD).

Section 2. Changes in the Risk Analysis Study Since the Amended Proposal

Q. *What changes have been made to the Risk Analysis Study since the Amended Proposal?*

A. The Risk Analysis Study for the Supplemental Proposal incorporates several changes from the Risk Analysis Study performed for the Amended Proposal. The changes include the following: (1) modeling and data changes in RiskMod; (2) revised resources and analysis using two load levels; (3) revised methodology for simulating Heavy Load Hour (HLH) and Light Load Hour (LLH) monthly electricity price risk for FY 2002 and 2003 at three price levels. *See* Chapter 2, 2002 Supplemental Power Rate Proposal Study, WP-02-E-BPA-67.

Section 3. Changes in Risk Model Analysis and the Non-Operating Risk Model Since the Amended Proposal

Q. What modeling and data changes have been made to RiskMod since the Amended Proposal?

A. Modeling and data changes in RiskMod are as follows: (1) revisions so that the Rate Case parties bear the risk of the amount and price of System Augmentation purchases, including the cost of serving the load growth and load variability of the Full and Partial Requirement customers; (2) revisions to calculate the net revenue impact of two load levels and three market prices; (3) removal of the computation of the cost of the Inventory Solution from the Slice Revenue Requirement in RiskMod; (4) capping the 4(h)(10)(C) credits at the amount of the annual Treasury Payments for FY 2002-2006; (5) revision of the expected FCCF reserve at the start of FY 2002 and (6) revisions of the expected Non-Treaty Storage level at the start of FY 2002.

Q. Why were these changes made to RiskMod?

A. As discussed in the testimony of Burns, *et al*., WP-02-E-BPA-70, BPA and many rate case parties reached agreement on most of the rate case issues in the Partial Settlement Agreement. A key feature of the Partial Settlement Agreement is that BPA's power customers essentially bear the risk of the amount and price of System Augmentation purchases, including the costs of serving the load growth and load variability of the Full and Partial Requirements customers. This approach is a prudent means of dealing with the present market conditions. Therefore, RiskMod needed to be revised to account for this change.

Q. Why was RiskMod revised so that BPA could calculate the net revenue impact of a range of alternative loads?

A. As stated in Section 4 of the Testimony submitted by Burns, *et al*., WP-02-E-BPA-70, BPA has indicated that it will work with its customers to reduce the amount of System Augmentation purchases that BPA must make. Also, BPA anticipates that there could be load responses to the possible large adjustments to rates anticipated in the Supplemental Proposal through the Load-Based Cost Recovery Adjustment Clause (LB CRAC). These load responses might reduce the amount of System Augmentation purchases and subsequently lower the LB CRAC rate. However, since BPA does not know how much load reduction there will be, it is appropriate to evaluate a range of alternative loads. As a result, RiskMod was revised to incorporate these possible outcomes when estimating net revenues.

Q. Why did BPA remove the computation of the cost of the Inventory Solution from the Slice Revenue Requirement in RiskMod and incorporate this computation in the ToolKit Model?

A. BPA removed the computation of the cost of the Inventory Solution from the Slice Revenue Requirement in RiskMod and incorporated this computation in the ToolKit Model so that the calculations of the LB CRAC for all parties are performed in the ToolKit model.

Q. In the Amended Proposal, BPA did not have caps on 4(h)(10)(C) credits. Why did BPA cap 4(h)(10)(C) credits at the amount of the annual Treasury Payments for FY 2002-2006 in RiskMod for the Supplemental Proposal?

A. BPA capped 4(h)(10)(C) credits at the amount of the annual Treasury Payments for FY 2002-2006 in RiskMod for the Supplemental Proposal for two reasons. First, unlike in the Amended Proposal, market price and market price risk for FY 2002 and 2003 are much higher resulting in the possibility of 4(h)(10)(C) credits exceeding the annual Treasury Payments. Secondly, BPA capped the 4(h)(10)(C) credits at the amount of the annual Treasury Payments because BPA is unsure whether or not it is possible to collect funds beyond the amount of the Treasury Payment. It would be imprudent to assume more can be collected until an agreement has been reached with the U.S. Treasury that states BPA can collect more.

Q. Why did BPA revise its estimate of the expected Fish Cost Contingency Fund (FCCF) reserve at the start of FY 2002 to a point estimate of $167 million for the Supplemental Proposal?

A. BPA revised the expected FCCF reserve at the start of FY 2002 to a point estimate of $167 million for the Supplemental Proposal because BPA now has better estimates of streamflow conditions and potential streamflow variability for FY 2001 than when the Amended Proposal was published.

Q. Why did BPA revise the expected Non-Treaty Storage level at the start of FY 2002 from 2,858 megawatts (MW)/months to 1,000 MW/months for the Supplemental Proposal?

A. For the Supplemental Proposal, BPA has updated its forecast based on information on anticipated storage and withdrawals of Non-Treaty Storage in light of current storage levels, projected streamflows, and current hydro operations that reflect the impact of the dry weather conditions in FY 2001, which differ from typical Non-Treaty storage levels under normal weather conditions. Consideration of these factors resulted in the adjustment of the expected Non-Treaty Storage level at the start of FY 2000 from 2,858 MW/months to 1,000 MW/months.

Q. BPA performed risk analyses for two load scenarios (0 and 1,500 load reduction) and three electricity price levels ($315/megawatthour (MWh), $210/MWh, and $140/MWh in FY 2002). What was the basis for BPA selecting these particular values?

A. The values selected were for illustrative purposes, but they were deemed to represent reasonable potential ranges.

Q. Since the Amended Proposal, what changes have been made to the Risk Simulation Models (RiskSim), which are a component of RiskMod?

A. BPA developed the Forward Market Price Simulator to simulate electricity prices and price variability for FY 2002 and FY 2003. This risk model simulates market price uncertainty using monthly forward market electricity prices and electricity price volatilities derived from option premiums (implied price volatilities).

Q. Why did BPA use the Forward Market Price Simulator to simulate electricity prices and price variability for FY 2002 and 2003?

A. BPA used the Forward Market Price Simulator to simulate electricity prices and price variability for FY 2002 and 2003 because BPA believes the methodology is the most appropriate methodology for simulating electricity prices under current market conditions (*See* Section 6 of this Testimony). The Forward Market Price Simulator simulates monthly forward market electricity prices. The Forward Market Price Simulator uses forward market prices at which traders are currently willing to buy and sell energy for different points in time in the future and the price volatility reflected in option premiums (referred to as implied price volatility) at which market participants are currently willing to buy and sell options for different points/periods in time in the future.

Q. What is the implied volatility on forward electricity prices?

A. Implied volatility is a measure of the expected future volatility of forward electricity prices and is stated as the annualized day-to-day percentage change in price as a normal distribution.

Q. Why does BPA believe that the implied volatilities derived from currently traded options are a better reflection of future volatility than the volatility in historical market prices?

A. BPA believes the implied volatilities derived from currently traded option premiums are a better reflection of estimated future volatility than using historical changes in price because the market is willing to trade on their belief of future volatility. Historical volatility, however, says nothing about the future; it can only reflect price levels that have traded in the past.

Q. BPA describes in Section 2.2.7 of the 2002 Supplemental Power Rate Proposal Study (WP-02-E-BPA-67) a methodology for calibrating electricity prices estimated by AURORA to the electricity prices simulated by the Forward Market Price Simulator for FY 2002 and 2003. Why did BPA calibrate the prices estimated by AURORA to the results from the Forward Market Price Simulator, rather than just using the results from the Forward Market Price Simulator?

A. There are two reasons why BPA calibrated the prices estimated by AURORA to the results from the Forward Market Price Simulator, rather than just using the results from the Forward Market Price. The Forward Market Price Simulator simulates electricity price variability for each month independent of the prices simulated for all other months. This yields prices simulated for each month that do not account for the dependency in monthly prices through time. In contrast, AURORA, which estimates monthly prices using fundamental market data that incorporates monthly dependencies, estimates prices through time that reflect dependency in monthly prices through time. Also, the monthly prices simulated for each month by the Forward Market Price Simulator are not tied to any market fundamentals such as the amount of hydro generation and level of loads. Accordingly, it would be inappropriate to calculate revenues and expenses in RiskMod using randomly simulated prices. By using the calibrated AURORA prices to estimate revenues and expenses in RiskMod, the dependency between hydro generation, load, and prices are maintained.

Q. Have there been any changes in NORM since the Amended Proposa1?

A. No.

Section 4. Changes in Loads and Resources Since the Amended Proposal

Q. What changes have been made to Federal resources since the Amended Proposal?

A. BPA has revised the actual System Augmentation purchases that it has made since the Amended Proposal. Actual System Augmentation purchases used in RiskMod for the Amended Proposal amounted to 917 average megawatt (aMW)/year at a cost of $242.9 million/year ($30.20/MWh) and were based on all purchases as of October 23, 2000. *See* Tables 2-3 and 2-4 in the 2002 Amended Power Rate Proposal Study Documentation, WP-02-E-BPA-60. Actual System Augmentation purchases used in RiskMod for the Supplemental Proposal amount to 1,048 aMW/year at a cost of $280.5 million/year ($30.55/MWh) and were based on all purchases as of January 1, 2001. *See* Tables 2-1 and 2-2 in the 2002 Supplemental Power Rate Proposal Study, WP-02-E-BPA-67.

Q. Has BPA modified its public utility customer sales forecast from that presented in the Amended Proposal?

A. No, BPA has not modified its public utility customer sales forecast for this Supplemental Proposal. The sales forecast in the Amended Proposal was based on signed contracts. No changes in the status of those signed contracts have occurred as yet, and individual utility forecasts have not been modified.

Q. Why did BPA analyze the impact of alternative load scenarios on BPA rates?

A. As stated in Section 3 of the Testimony submitted by Burns, *et al.*, WP-02-E-BPA-70, the LB CRAC employs a formula approach, rather than a fixed percentage specified in the Final ROD, and is subject to adjustment and true-up every six months, depending on the amount and price of System Augmentation purchases. The level of augmentation required, a major component of the cost of the LB CRAC, is a direct reflection of the level of sales projected. BPA is working with its customers to reduce the level of BPA System Augmentation needs. It is also possible that there will be a load response to the size of the LB CRAC being anticipated in the Supplemental Proposal. Therefore, an analysis of a range of loads is appropriate.

Q. Do you anticipate changing the sales forecast for the Final ROD?

A. Yes, it is likely that BPA will change the sales forecast for the Final ROD.

Section 5. Changes in the Natural Gas Price Forecast Since the Amended Proposal

Q. Are there any changes to the natural gas price forecast from the Amended Proposal?

A. No. The natural gas price forecast can be separated into two parts, a short-term forecast applied from FY 2000 to 2002, and a mid-term forecast for the years after 2002. The short-term forecast was tied to the New York Mercantile Exchange (NYMEX) futures contract for Henry Hub. The mid-term forecast was based solely on BPA analysis. BPA believes that the mid-term forecast is still valid. For the short-term, the NYMEX price has changed from the Amended Proposal. However, BPA is proposing a new method for calculating the short-term electricity market prices in which the natural gas price forecast is not a factor. Therefore, the short-term forecast is not relevant and was not updated.

Section 6. Changes in AURORA Since the Amended Proposal

Q. Has BPA made any changes to AURORA for the Supplemental Proposal?

A. No. For the Supplemental Proposal, BPA used another methodology described in Section 3 of this Testimony for estimating electricity prices and price variability for FY 2002 and 2003. BPA believes that the prices and price variability estimated by AURORA for FY 2004-2006 remain sound estimates. However, BPA may update the AURORA model to estimate prices and price variability for FY 2004–2006 in the Final ROD.

Q. Why did BPA decide not to use the price output from the AURORA for the first two fiscal years of the rate period?

A. BPA has witnessed market prices much higher in the near term than the AURORA model is forecasting. The AURORA model is an economic fundamentals based model. BPA believes that during normal market conditions, when loads and resources are in balance, the AURORA model is a reasonable model for forecasting prices. However, the current market conditions and prices reflect an extreme state of load and resource imbalance. In these extreme situations, a purely economic fundamentals based model may not adequately account for the market dynamics that can produce the very high prices currently being observed. During these situations, market quotes used in combination with statistical methods are a more appropriate way to simulate market prices.

Section 7. Anticipated Changes for the Final Amended Proposal

Q. Has BPA identified any changes that it anticipates making to the Risk Analysis Study for the Final ROD?

A. Yes, as indicated in Section 4 of this Testimony, BPA anticipates making revisions to its sales forecast. It is also very likely that BPA will be updating its electricity price forecast and estimates of market price variability.

Q. *Are the changes that BPA has identified in this Testimony all the possible changes that BPA might make in the Risk Analysis Study for the Final ROD?*

A. No. BPA may make additional changes in the Risk Analysis Study for the Final ROD.

Q. *Does this conclude your testimony?*

A. Yes.