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TESTIMONY of

JOHN D. WELLSCHLAGER, DANNY L. CHEN,

MELIKE B. KAYIM, AND RONALD E. MESSINGER

Witnesses for Bonneville Power Administration

SUBJECT: GENERATION INPUTS FOR OTHER SERVICES

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Section 1: Introduction and Purpose of Testimony

Q. Please state your names and qualifications.

A. My name is John D. Wellschlager, and my qualifications are contained in BP-14-Q-BPA-64. I am a witness for Synchronous Condensing.

A. My name is Danny L. Chen, and my qualifications are contained in BP-14-Q-BPA-10. I am a witness for Generation Dropping and Generation Input to Supply Energy for Imbalance Services.

A. My name is Melike B. Kayim, and my qualifications are contained in BP-14-Q-BPA-32. I am a witness for Synchronous Condensing, Generation Dropping, and Generation Input to Supply Energy for Imbalance Services.

A. My name is Ronald E. Messinger, and my qualifications are contained in BP-14-Q-BPA-46. I am a witness for Synchronous Condensing.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to sponsor sections 5 and 6 of the Generation Inputs Study, BP-14-E-BPA-05 (Study), and its Documentation, BP-14-E-BPA-05A (Documentation). We: (1) describe Synchronous Condensing and the allocation of costs to Transmission Services (TS) for operating Federal Columbia River Power System (FCRPS) hydro units as synchronous condensers; (2) explain the costing methodologies used to allocate generation costs to Generation Dropping; and (3) explain the energy and

generation imbalance services and the proposed cost allocation for the associated generation input.

Section 2: Synchronous Condensing

Q. What is a synchronous condenser?

A. A synchronous condenser is essentially a motor with an exciter system that enables it to dynamically absorb or supply reactive power as necessary to maintain voltage as needed by the transmission system. Study section 5.1. Some FCRPS generating units are capable of operating in synchronous condenser or "condense" mode and are requested to do so at times by TS for voltage control. *Id.* As with any motor, FCRPS generators operating in synchronous condense mode consume real power supplied by the FCRPS. *Id.*

Q. What is the distinction between generators operated for power production and generators operated as synchronous condensers?

A. Generators operated in condense mode perform the same voltage control function as when producing real power. Normally, generating units are operated to produce real power and at the same time provide voltage control. However, at certain times real power production must be curtailed (*e.g.*, for fish-related spill). At such times, having units idle at particular locations may degrade reliability, so the transmission system operator will request that certain units be operated in condense mode. Generators operated in condense mode perform the same voltage control function as generators that are producing real power, but the units are not capable of producing any real power while being operated in condense mode. This is because the generator turbine is "de-watered" by shutting off the water supply (and using air compressors, if necessary, to push water below the blades of the turbine), so that the unit may spin freely.

Q. Why is the operation of certain FCRPS generators in condense mode an important service?

A. At certain locations and under certain conditions, having generating units offline adversely affects transmission reliability. For example, TS monitors and manages reactive margins to support transfers on the Southern Intertie. To the extent a sufficient number of units are not online and generating near the Intertie, TS will request that units be placed in condense mode to ensure adequate voltage support and reactive reserves.

Q. What costs do you propose to assign to TS for synchronous condensing?

A. We propose the following costs be assigned to TS for synchronous condensing:

(1) Energy costs consumed by FCRPS generators while operating in condense mode for voltage control; and

(2) Investment in plant modifications at the John Day and The Dalles projects necessary to provide synchronous condensing. Study section 5.2.

Q. Why do you use the market price forecast to calculate the cost allocation for synchronous condensing?

A. Because the energy consumed to run these units is energy not available to market, it is appropriate to use the market price of this energy rather than the PF rate. This valuation more accurately reflects the alternative use of this energy. The market price forecast for the risk analysis is used to be consistent with other market valued power forecasts in this rate case. Power Risk and Market Price Study, BP-14-E-BPA-04, section 2.4.

Q. What is the total cost assigned to TS for synchronous condensing?

A. The proposed cost of generation inputs to provide synchronous condensing is $1,578,953 per year ($1,291,953 per year for energy consumed by synchronous condensing, and an average of $287,000 per year for synchronous condenser plant modifications at John Day and The Dalles). Study section 5.4; Documentation Tables 5.1 and 5.3.

Q. To which Transmission segments are the costs for Synchronous Condensing assigned?

A. Costs associated with John Day and The Dalles projects are assigned to the Southern Intertie Segment. Documentation Table 5.3. Costs for all other projects are assigned to the Network Segment.

Section 3: Generation Dropping

Section 3.1: Generation Dropping Frequency Forecast

Q. What is Generation Dropping?

A. Generation Dropping is a remedial action scheme (RAS) action implemented to maximize transfer capacity on constrained transmission paths and to protect the system against cascading outages or other major system disturbances. Study section 6.2. These paths can be either internal to the BPA system (*e.g.*, the Raver-Paul line) or major interties to other systems, such as the California-Oregon Intertie (COI). For purposes of allocating generation input costs, we focus on the cost of Generation Dropping associated with the COI.

Q. Why does the cost analysis focus on Generation Dropping associated with the COI?

A. There is a contractual allowance in the Pacific Northwest AC Intertie Ownership Agreements that non-Federal participants associated with the AC intertie transmission that do not self-supply the generation dropping for their capacity ownership share of the intertie will be charged for BPA supplying the generation dropping. Currently, five out of six participants are not self-supplying.

Q. Which hydro projects are equipped to provide Generation Dropping for the COI?

A. The RAS associated with Generation Dropping for the COI path is armed to drop the large generating units at Grand Coulee and smaller generation units at Grand Coulee, Chief Joseph, McNary, John Day, and Lower Monumental.

Q. Why does the cost analysis focus on the large generation units at Grand Coulee?

A. The cost of using large units at Grand Coulee for Generation Dropping significantly exceeds the costs associated with wear and tear on smaller units at Grand Coulee and at the other projects that are sometimes used for Generation Dropping. Thus, we excluded the negligible impact of smaller units at Grand Coulee and at other projects in our cost analysis.

Q. How do you forecast the amount of average Generation Dropping per year?

A. Because events that cause generation to be dropped happen on an irregular basis, we determined that analyzing as long a period of time as possible would yield a more representative average historical pattern of generation dropping. Therefore, we considered all the data available since the first identified generation drop, which occurred in 1996. From 1996 through 2012 (a 17-year period), 18 drops have occurred, resulting in one drop per year on average. Study section 6.3.

Section 3.2: Generation Dropping Costs

Q. Did you make any changes to the methodology used to calculate costs for Generation Dropping from that used for the FY 2012–2013 rate period? If so, what were the changes?

A. We are using the same method of analysis for the BP-14 rate case that we used for the BP-12 case.

Q. What costs do you propose to assign to TS for Generation Dropping?

A. We propose the following costs be assigned to TS for generation dropping:

(1) Incremental equipment deterioration, replacement, or overhaul costs;

(2) Incremental routine operation and maintenance costs; and

(3) Incremental lost revenue in the event of replacement or overhaul.

Q. What are the amounts of these costs that you propose to allocate to Generation Dropping?

A. The costs are allocated to reimburse the three cost categories listed above. We calculated "Incremental Equipment Deterioration, Replacement, or Overhaul" costs to be $138,763 annually. We calculated "Incremental Routine Operation and Maintenance" costs to be $4,441 annually. We calculated "Incremental Lost Revenue in the Event of Replacement or Overhaul" costs to be $191,503 annually. Documentation Table 6.1, line 6.

Q. What is the total revenue forecast for Generation Dropping?

A. The cost of Generation Dropping allocated to TS, which becomes revenue to PS, is forecast at $334,707 annually for FY 2014–2015. *Id.*

Section 4: Generation Input to Supply Energy for Imbalance Services

Q. What is energy imbalance?

A. Energy Imbalance is an Ancillary Service that BPA provides to transmission customers with load in the BPA balancing authority area. Energy Imbalance is provided when there is a difference between scheduled and actual energy delivered to a load in the balancing authority area during a schedule hour. Study section 10.7.1.

Q. What is generation imbalance?

A. Generation Imbalance is a Control Area Service that BPA provides to generation resources with generation in the BPA balancing authority area. Generation Imbalance is provided when there is a difference between scheduled and actual energy delivered from a generation resource during a schedule hour. *Id.* section 10.7.2.

Q. What is the generation input to supply energy for imbalance needs?

A. As the Balancing Authority, TS supplies or absorbs energy to maintain load-resource balance within the BPA balancing authority area. When actual deliveries vary from scheduled deliveries, TS must use generation resources to supply imbalance needs to

make up the difference. This energy is supplied by Power Services except where a customer self-supplies its generation imbalance obligation.

Q. How is the generation input for energy and generation imbalance discussed here different from the imbalance component of Variable Energy Resource Balancing Service (VERBS) and Dispatchable Energy Resource Balancing Service (DERBS) reserve capacity described in other testimonies, e.g., BP-14-E-BPA-21 and BP-14-E-BPA-28?

A. The generation energy input for Energy and Generation Imbalance is an amount of energy required to meet the hourly imbalance calculated after the fact. Study sections 10.7.1 and 10.7.2. The imbalance capacity components of VERBS and DERBS are amounts of capacity, part of the total balancing reserve capacity that BPA sets aside and uses to balance the generation and load within the scheduling hour. *See id.* sections 2.1.2, 10.5, 10.6. The capacity provides the capability to provide the required amount of energy to meet the imbalance between scheduled and actual energy.

Q. How do you propose to price energy supplied from the Federal system for imbalance needs?

A. When energy is supplied from the Federal system to meet imbalance needs, such energy would be priced based on an hourly energy index in the Pacific Northwest, as determined by PS, and in accordance with the BPA Open Access Transmission Tariff and rate schedules. PS will determine an energy index based on volume of trade, liquidity, and price transparency that best reflects market value. If an adequate hourly energy index is not available, PS will apply the criteria set forth above to select an appropriate energy index.

Q. Why do you propose to use an hourly index to price energy supplied from the Federal system for imbalance services?

A. Because the energy forgone by these units is not available to market, it is appropriate to use the market price of this energy. This valuation reflects the opportunity cost of

energy. The market price forecast is used to be consistent with other market-valued power forecasts in this Initial Proposal. *See, e.g., id.* section 9.7.

Q. What effect does the use of non-Federal balancing reserves have on your proposal to use an hourly index to price energy for imbalance needs?

A. The use of non-Federal balancing reserves does not affect the cost of supplying energy from the FCRPS. The hourly index price is the cost of energy provided by PS to TS for imbalance needs. The Study describes our proposal to base the Energy Imbalance Service and Generator Imbalance Service rates on an hourly average cost of all energy deployed, Federal and non-Federal, to provide imbalance services. *Id.* section 10.7; *see also* Fisher *et al.*, BP-14-E-BPA-21, section 7.

Q. What is the revenue forecast for generation inputs to meet imbalance needs?

A. The net energy transfer can result in either a revenue or cost. The transfer results in revenue when TS provides energy to the customer to meet the imbalance and results in a cost when TS absorbs energy from the customer to meet the imbalance. The forecast for the FY 2014–2015 rate period is $0 revenue for energy to meet the imbalance needs, for both Energy and Generation Imbalance services. This is consistent with the TS forecast need for this service. Study section 10.7.

Q. Why are you forecasting $0 in revenue for generation inputs to provide imbalance services?

A. Revenues from imbalance services are dependent on variations in market price and each customer's scheduling accuracy. We are not forecasting any revenue from imbalance services because of the uncertainty associated with those variables. In addition, we expect the amount of imbalance on the system to decrease over the rate period. We are proposing to continue its Customer-Supplied Generation Imbalance pilot program and to expand the available committed scheduling options. *See* Fisher *et al.*, BP-14-E-BPA-21. All of these programs are expected to decrease the amount of imbalance. Fisher *et al.*,

BP-14-E-BPA-21, sections 5.1, 5.4. Therefore, we are not projecting any revenue associated with generation inputs for imbalance services.

Q. Does this conclude your testimony?

A. Yes.