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TESTIMONY OF
TIMOTHY C. MISLEY, TIMOTHY R. SMITH, AND CRAIG R. LARSON
Witnesses for Bonneville Power Administration

SUBJECT: Loads and Resources Study--Resources

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5 **SUBJECT: LOADS AND RESOURCES STUDY--RESOURCES**

6 **Section 1. Introduction and Purpose of Testimony**

7 *Q. Please state your names and qualifications.*

8 A. My name is Timothy C. Misley and my qualifications are contained in
9 WP-02-Q-BPA-51.

10 A. My name is Timothy R. Smith and my qualifications are contained in WP-02-Q-BPA-63.

11 A. My name is Craig R. Larson and my qualifications are contained in WP-02-Q-BPA-41.

12 *Q. What is the purpose of your testimony?*

13 A. The purpose of our testimony is to sponsor those sections of the Loads and Resources
14 Study (Study), WP-02-E-BPA-01, and the Loads and Resources Study Documentation
15 (Documentation), WP-02-E-BPA-01A, that address the hydroregulation study and the
16 generation forecasts obtained from that study, and to address resource availability and the
17 matching of resources to loads for BPA. This analysis provides input data for the risk
18 analysis program called RiskMod (*see* Risk Analysis Study, WP-02-E-BPA-03).

19 *Q. How is your testimony organized?*

20 A. This testimony will first describe the hydroregulation studies in section 2. Section 3
21 describes the spill requirements for the hydroregulation studies. Section 4 describes
22 generation efficiencies and acquisitions included in the Study. Section 5 shows contract
23 changes and the treatment of the Pacific Southwest surplus firm power sales. Section 6
24 describes the treatment of transmission losses and section 7 describes the secondary
25 energy produced in the Study.

1 **Section 2. Hydroregulation Study**

2 *Q. Please describe the primary drivers of reservoir operations in the hydroregulation*
3 *studies.*

4 A. The primary drivers of reservoir operations are Rule curves for the operating plans of
5 Canadian and U.S. reservoirs and various other operational constraints including those
6 imposed to protect fish. Canadian reservoirs are operated to their final Assured
7 Operating Plan (AOP) rule curves for the 2002 level of load and resource development.
8 U.S. project operations are guided by Critical Rule Curves (CRCs) developed in the
9 1997-98 Pacific Northwest Coordination Agreement (PNCA) Final Regulation. U.S.
10 reservoirs are also operated to various operational constraints related to the National
11 Marine Fisheries Service's (NMFS) Biological Opinion for Salmon, dated March 2,
12 1995, and the 1998 NMFS Supplemental Biological Opinion for Steelhead, dated
13 May 14, 1998 (BOs), as well as other operating requirements submitted under the PNCA
14 by the project operators.

15 *Q. Does this reflect the current method of reservoir operation in the PNCA planning*
16 *process?*

17 A. Yes. The only differences are that BPA used 2002 Canadian rule curves and the latest
18 information on operating requirements, principally the 1998 Supplemental Biological
19 Opinion, which were not incorporated into the PNCA's 1997-98 Final Regulation.

20 *Q. In the Loads and Resources Study, why is the hydroregulation study called a "50-year*
21 *study"?*

22 A. The hydro system operation under current operating requirements is simulated over the
23 50 historic water conditions from August 1928 through July 1978 in a continuous
24 operation. This simulation produces an estimate of what could reasonably be expected of
25 the hydropower system over a wide range of runoff conditions and determines the firm
26 energy production under critical water conditions. The full range of water conditions is

1 used as an input for estimating the revenues and risks associated with various
2 subscription and rate scenarios. *See Risk Analysis Study, WP-02-E-BPA-03.*

3 *Q. Please describe the steps in the hydroregulation study.*

4 A. First, an Actual Energy Regulation (AER) study is run to determine the operation of the
5 U.S. projects under each of the 50 historic water conditions while meeting the Firm
6 Energy Load Carrying Capability (FELCC) produced in the PNCA final regulation. In
7 this step, the Canadian operation is fixed to that specified in the AOP. The U.S. projects
8 draft to meet the Coordinated System FELCC while meeting their operating
9 requirements. All projects draft to their Energy Content Curve (ECC) if possible, to
10 produce secondary energy. The project operation from the AER study determines the
11 drafting rights of each of the projects for use in the Operational study.

12 Second, an Operational 50-year study is run with estimated regional firm loads
13 from BPA's 1997 Pacific Northwest Loads and Resources Study (Whitebook). The
14 operation of the non-Federal projects is limited to the proportional draft points (PDP's)
15 developed in the 50-year AER study.

16 *Q. How have the hydro studies changed from those in the 1996 rate case?*

17 A. The primary change is the implementation of the 1998 Supplemental Biological Opinion
18 for Steelhead (1998 BO) that changed the spring storage target to April 10 (previously
19 April 20). The 1998 BO also changed the commencement of flow augmentation to
20 April 3 (previously April 10) on the Lower Snake, added flow requirements beginning
21 April 10 for the Columbia at Priest Rapids, and increased spill and required flow at
22 selected projects. The rule curves in the hydroregulation study were updated to include
23 the 1998 PNCA rule curves for U.S. projects and 2002 rule curves for Canadian projects.

24 The final change is that BPA uses only one hydroregulation study for the
25 FY 2002-2006 rate period. In the 1996 rate case, BPA ran separate hydroregulation
26 studies for each year of the rate period. No substantive change is expected for the

1 Canadian rule curves during the rate period so only one study was needed. Also, the
2 PNCA rule curves are driven by the nonpower operating requirements in the Biological
3 Opinions.

4 *Q. How are fish alternatives addressed in the Loads and Resources Study?*

5 A. Fish alternatives are addressed in the Risk Analysis Study, WP-02-E-BPA-03.

6 **Section 3. Reservoir Spill**

7 *Q. What is reservoir spill?*

8 A. Reservoir spill is the movement of water past a project, rather than through the project's
9 turbines. Spill can occur in many forms including leakage under, around and through the
10 structure, flow through the transportation locks, flow through fish bypass facilities, and
11 flow over the structure's spillway.

12 *Q. How is reservoir spill included in the hydroregulation studies?*

13 A. Reservoir spill occurs in two ways: (1) forced spill occurs when regulated outflow from
14 projects exceed the physical hydraulic capacity of the installed turbines at a time of
15 unexpectedly large streamflows; and (2) fish or other spill occurs when amounts of water
16 are scheduled to be released for fish migration or other project purposes such as
17 navigation and fish ladders. Although fish or other spill is not always controllable, it is
18 consistent enough to plan on. Therefore, the Hydrosim model has several input files that
19 show the planned spill for the various projects for the different time periods in the
20 50-year record. These spill files outline planned project spill called for by the Biological
21 Opinions.

22 **Section 4. Generation Efficiencies and Acquisitions**

23 *Q. How are generation efficiencies treated in the Study?*

24 A. The Study reflects anticipated hydro generation efficiencies increasing to 77.4 aMW by
25 Operating Year (OY) 2006. These efficiencies are due to turbine and generator upgrades
26 at The Dalles, Chief Joseph, Grand Coulee, Green Springs, and Minidoka. The WNP-2

1 nuclear plant output increases by almost 40 aMW over the rate period as the result of
2 changing from a one year refueling cycle to a two-year cycle.

3 *Q. What Federal generation acquisitions are included in the Study?*

4 A. BPA's share of the output of the Clearwater hydro project, a future wind project, the
5 Wyoming Wind project, two geothermal projects, and the gas fired Wauna project are
6 included in the Study. These resources are included in the Summary of Federal System
7 Loads and Resources Table 2. See Study, WP-02-E-BPA-01, Appendix B.

8 *Q. What other acquired resources are included in the Study?*

9 A. Bonneville plans to make an additional 1,116 aMW (fiscal five-year average) of resource
10 augmentation purchases during the rate period. These purchases are flat monthly and are
11 reflected in the Summary of Federal System Loads and Resources Table 2. See Study,
12 WP-02-E-BPA-01, Appendix B.

13 *Q. Does BPA include industrial reserves in this Study?*

14 A. No. BPA does not include any industrial reserves in this Study because the current
15 industrial power sales contracts do not provide for industrial reserves, and this was
16 assumed to be the case with future industrial contracts.

17 **Section 5. Contract Changes**

18 *Q. Please describe how BPA accounts for capacity and capacity-for-energy exchange
19 contracts in the Study.*

20 A. In the 1996 rate case analysis, capacity and capacity-for-energy exchange contracts did
21 not include energy associated with the heavy load hour (HLH) delivery or light load hour
22 (LLH) return energy. The current analysis includes the HLH and LLH energy associated
23 with capacity and capacity-for-energy exchange contracts. This changed the treatment of
24 the following BPA contracts: BPA to PacifiCorp (PP&L) and BPA to Southern
25 California Edison (SCE). The SCE capacity sale is included through OY 2004. These
26

1 components help provide for the HLH/LLH splits used in the processing of contracts in
2 RiskMod.

3 *Q. Please describe how BPA's surplus firm power contracts with Pacific Southwest (PSW)*
4 *utilities were treated in the current Study.*

5 A. This analysis includes several contracts with the PSW utilities that contain power sales
6 and capacity-for-energy exchange agreements. This Study assumes that these contracts
7 with the cities of Burbank, Glendale, and Pasadena, and with SCE are surplus firm power
8 sales through the study horizon. The Study also includes a capacity contract with SCE
9 through OY 2004 that includes a 5-year callback provision. BPA has other contract
10 resource options with the PSW that were not included in this analysis. These include
11 SCE to BPA option energy through OY 2004; supplemental energy from the cities of
12 Burbank, Glendale, and Pasadena expiring April 15, 2008; and supplemental energy from
13 SCE expiring April 15, 2006. These options were not included in this analysis because
14 their cost would be greater than forecast market prices.

15 **Section 6. Transmission Losses**

16 *Q. Please describe BPA's treatment of transmission losses in the Study.*

17 A. Transmission losses are estimated as generation reductions of 2.82 percent to the energy
18 output of all Federal hydro, small and large thermal, renewable, and nonutility generation
19 resources. This reduction allows transmission losses to be calculated for all 50 water
20 years, which allows losses to be reflected in surplus energy availability. This makes the
21 Loads and Resources Study consistent with the Risk Analysis Study, WP-02-E-BPA-03.
22 This differs from the 1996 rate case, where transmission losses were included as
23 increases to only the Federal firm loads, thus they were not reflected in surplus energy
24 sales.

1 **Section 7. Federal Secondary Energy Availability (FSEA)**

2 *Q. How is the FSEA determination calculated in this rate case as compared to the 1996 rate*
3 *case?*

4 A. The 1996 rate case calculated the FSEA in the Loads and Resources Study for input into
5 the Non Firm Revenue and Pricing model (NFRAP) to establish rates. In the current rate
6 case, FSEA is estimated by RiskMod based on data from the Loads and Resources Study.
7 See Risk Analysis Study, [WP-02-E-BPA-03](#).

8 **Section 8. General**

9 *Q. Are there any study inconsistencies between the Loads and Resources Study and the*
10 *Wholesale Power Rate Development Study (WPRDS)?*

11 A. Yes, the system augmentation purchases five-year average was shown as 1116 aMW in
12 the Loads and Resources Study and as 1112 aMW in the WPRDS. This inconsistency
13 will be corrected in the final studies. This difference does not significantly affect the
14 rate case analysis.

15 *Q. Does this conclude your testimony?*

16 A. Yes.

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