2003 Safety-Net Cost Recovery Adjustment Clause Initial Proposal

Direct Testimony

SN-03-E-BPA-07 RISK ANALYSIS

March 2003

BONNEVILLE
POWER ADMINISTRATION

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TESTIMONY OF

SIDNEY L. CONGER, JR., ARNOLD L. WAGNER, AND BYRNE E. LOVELL

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SIDNEY L. CONGER, JR., ARNOLD L. WAGNER, AND BYRNE E. LOVELL

SUBJECT: RISK ANALYSIS

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 SN-03-Q-BPA-03.

A.   My name is Arnold L. Wagner. My qualifications are contained in SN-03-Q-BPA-27.

A.   My name is Byrne E. Lovell. My qualifications are contained in SN-03-Q-BPA-12.

Q.   What is the purpose of your testimony?

A.   The purpose of this testimony is to sponsor the Risk Analysis that evaluates Power

Business Line (PBL) operating risks and Transmission Business Line (TBL) risks that

affect BPA's ability to provide sufficient assurance, *i.e*., a high probability that BPA will

have made all its payments to the U.S. Treasury by the end of the rate period. *See* Keep*,*

et al., SN-03-E-BPA-04. PBL operating risks include variations in economic, load, and

generation resource conditions. TBL operating risks include uncertainties in TBL

revenues and expenses.

Q.   How is your testimony organized?

A.   This testimony contains 4 sections including this introductory section. Section 2

describes changes in the Risk Analysis since BPA's 2002 Final Supplemental Power Rate

Proposal of June 2001 (Supplemental Proposal). Section 3 describes the changes in PBL

risk modeling since the Supplemental Proposal. Section 4 describes the TBL risk

included in this rate filing.

1	**Section 2.**	**Risk Analysis Changes Since BPA's Supplemental Proposal**
2	*Q.*	*What does BPA's Risk Analysis examine and why is it performed?*
3	A.	BPA's Risk Analysis examines BPA's operating risk such as variations in economic
4		conditions, load, and generation resource capability and looks at their impact on BPA's
5		revenues and expenses. These operating risks are modeled in RiskMod, a computer
6		simulation model that calculates firm and surplus energy revenues, balancing power
7		purchase expenses, Fish Cost Contingency Fund (FCCF) credits, and 4(h)(10)(C) credits
8		under various load, resource, and market price conditions. BPA uses the output from
9		RiskMod to provide a distribution of net revenue deviations that are used as an input into
10		the ToolKit Model. *See* SN-03 Study, SN-03-E-BPA-01, Chapter 7. The ToolKit Model
11		uses the net revenue data, along with other inputs, to provide sufficient assurance that
12		BPA's rate design is capable of recovering enough revenue for BPA to attain a high
13		probability of having made all its payments to the U.S. Treasury by the end of the rate
14		period. Additionally, BPA uses the output from RiskMod to provide estimates of surplus
15		energy revenues, balancing power purchase expenses, FCCF credits, and 4(h)(10)(C)
16		credits for use in the Revenue Forecast. *See* SN-03 Study, SN-03-E-BPA-01, Chapter 5.
17	*Q.*	*How has the methodology used to perform the Risk Analysis changed since the*
18		*Supplemental Proposal?*
19	A.	The Risk Analysis methodology has changed in several ways since the Supplemental
20		Proposal. These changes are the following: (1) removal of the 13 Fish and Wildlife
21		Alternatives; (2) revision in the number of simulated net revenues; (3) removal of non-
22		operating risks previously estimated by the Non-Operating Risk Model (NORM); (4) use
23		of AURORA for estimating FY 2003 wholesale electricity prices; (5) revision in the risk
24		methodology used in the Natural Gas Price Risk Model; (6) revision in the risk
25		methodology to reflect FY 2003 hydro generation risk; (7) revision in Non-Treaty
26		Storage operations; (8) inclusion of Load-Based (LB) and Financial-Based (FB) CRAC

1	rates and Slice in RiskMod; (9) removal of the 50 Water Year (50 WY) run of RiskMod;
2	and (10) inclusion of TBL operating risks.
3	**Section 3. Changes in PBL Risk Modeling**
4	*Q.* *Why did BPA remove the 13 Fish and Wildlife Alternatives from the Risk Analysis?*
5	A. As explained in the Overview and Management Direction testimony, BPA has removed
6	the 13 Fish and Wildlife Alternatives from the Risk Analysis because the uncertainty that
7	necessitated using these various alternatives no longer exists. *See* Keep*, et al.,*
8	SN-03-E-BPA-04. When BPA submitted its Supplemental Proposal to FERC in
9	June 2001, a range of uncertainty existed regarding the extent of BPA's fish and wildlife
10	obligations. *See* Revenue Requirement Study Documentation, Volume 1,
11	WP-02-FS-BPA-02, Chapter 13. Because of this uncertainty, BPA chose to model 13
12	alternatives to capture the costs associated with the various alternatives. Since that time,
13	the issuances of the Biological Opinions (BiOp) for salmon, sturgeon, and bull trout in
14	the Federal Columbia River Power System (FCRPS) and the issuance of the
15	November 2002 Five-Year Implementation Plan have narrowed that uncertainty enough
16	to obviate the need to model the various alternatives. *See* Keep*, et al.,* SN-03-E-BPA-04.
17	*Q.* *Why did BPA revise the number of simulations run to perform the Risk Analysis?*
18	A. In BPA's WP-02 rate proceedings, the results from the Risk Analysis were comprised of
19	27,000 simulated annual net revenues, of which 19,500 simulated annual net revenues
20	(13 Fish and Wildlife Alternatives * 300 net revenues * 5 years) were input into the
21	ToolKit Model. *See* Risk Analysis Study, WP-02-FS-BPA-03. The removal of the
22	13 Fish and Wildlife Alternatives, along with having only 4 years remaining in the rate
23	period, would result in 1,200 simulated annual net revenues (300 annual net revenues *
24	4 years) in the Risk Analysis. In our professional opinion, such a small number of
25	observations is considered to be statistically inadequate. BPA therefore increased the
26	

1		number of risk simulations that it ran for the Risk Analysis to 12,000 simulated net
2		revenues (3,000 annual net revenues * 4 years) to provide a more robust data set of risk.
3	*Q.*	*Why did BPA exclude non-operating risks previously estimated by the NORM?*
4	A.	BPA used the NORM in the WP-02 rate proceedings to include variability around
5		non-operating costs. The decision to not model the non-operating risks is based upon
6		BPA's commitment, along with assurances by Energy Northwest (ENW), the Corps of
7		Engineers (Corps), and the Bureau of Reclamation (Reclamation), to rigorously manage
8		their expense levels to the limits established in this initial proposal and BPA's decision to
9		not reflect any additional savings in the SN-03 proposal unless there is a high degree of
10		certainty that they will be achieved. *See* Keep*, et al.,* SN-03-E-BPA-04.
11	*Q.*	*Why is BPA using AURORA to estimate FY 2003-2006 electricity prices and price risk?*
12	A.	In BPA's Supplemental Proposal, it used the Forward Market Price Simulator to estimate
13		FY 2002 and FY 2003 electricity prices and price risk, and AURORA to estimate the
14		FY 2004-2006 electricity prices and price risk. The current outlook for FY 2003 market
15		conditions and prices no longer reflects the extreme state of load and resource imbalance
16		that existed at the time BPA filed its rate proposal in 2001. Given these changed
17		conditions, BPA believes the prices and price variability estimated by AURORA for
18		FY 2003-2006, as adjusted in Oliver*, et al.,* SN-03-E-BPA-08, are sound estimates.
19	*Q.*	*Were any changes made to the methodology used in the Natural Gas Price Risk Model?*
20	A.	Yes. BPA modified the methodology used in the Natural Gas Price Risk Model to allow
21		natural gas price risk to be quantified in terms of lognormal probability distributions,
22		rather than normal probability distributions.
23	*Q.*	*Why did BPA model natural gas price risk in terms of lognormal probability distributions*
24		*rather than normal probability distributions?*
25	A.	BPA modeled natural gas price risk in terms of lognormal probability distributions rather
26		than normal probability distributions because lognormal probability distributions better

1		reflect the commodity price phenomenon that prices can only drop so much (to some
2		minimum floor price above or at zero), while upward price movements are less
3		constrained.
4	*Q.*	*Was the risk methodology modified in the Risk Analysis to reflect the risk exposure of*
5		*FY 2003 hydro operations data?*
6	A.	Yes. BPA modeled FY 2003 Federal and PNW hydro generation risk using a discrete
7		probability distribution. This distribution reflects the probability of the January-July
8		streamflow amounts in million acre feet (MAF) for each of the 50 Water Years occurring
9		in FY 2003. Under this approach, several of the water years have probability weights of
10		zero because they are very unlikely to occur this fiscal year. The discrete probability
11		distribution was developed from probability values associated with the 2003 January-July
12		runoff volume forecast (February Early Bird) of 74.8 MAF by the Northwest River
13		Forecast Center. *See* SN-03 Study, SN-03-E-BPA-01, Chapter 2. The likelihoods of
14		various hydro generation amounts in FY 2003 were determined by sampling 3000 times
15		from the 50 WY (1929 to 1978) at their respective probability weights from the discrete
16		probability distribution and selecting the corresponding monthly Federal and PNW hydro
17		generation data. Federal Heavy Load Hour (HLH) hydro generation for each simulation
18		was derived by multiplying the Federal hydro generation by the associated HLH hydro
19		generation ratios from the Hourly Operating and Scheduling Simulator (HOSS).
20	*Q.*	*Why did BPA choose a discrete probability distribution to model hydro generation risk*
21		*for FY 2003?*
22	A.	A discrete probability distribution was selected for modeling hydro generation risk for
23		FY 2003 because it easily and accurately accommodates the probability weights
24		associated with the 2003 January-July runoff volume forecast (February Early Bird) of
25		74.8 MAF by the Northwest River Forecast Center. *See* SN-03 Study, SN-03-E-BPA-01,
26		Chapter 2.

1	*Q.*	*What other financial impacts result from the way BPA modeled FY 2003 hydro*
2		*generation risk in the Risk Analysis?*
3	A.	Modeling hydro generation risk in this fashion impacts the amount and variability of the
4		FCCF and 4(h)(10)(C) credits forecasted for FY 2003. The variability and amount of
5		these credits are affected by the probability weights associated with each of the 50 WY.
6	*Q.*	*How were Non-Treaty Storage operations modeled in the Risk Analysis for*
7		*FY 2003-2006?*
8	A.	For FY 2003, the operation of Non-Treaty Storage was included in the FY 2003 Federal
9		Hydro Generation data. To avoid double counting Non-Treaty Storage operations, the
10		Non-Treaty Storage algorithm in RiskMod was turned off for FY 2003. BPA used the
11		Non-Treaty Storage algorithm in RiskMod to model Non-Treaty Storage operations for
12		FY 2004-2006. The starting FY 2004 Non-Treaty Storage balance in RiskMod was set to
13		638 MW-Months (MW-Mo) to reflect the forecasted expected Non-Treaty Storage level
14		at the end of FY 2003. A maximum Non-Treaty Storage level limit of 2,800 MW-Mo
15		was used for FY 2004-2006.
16	*Q.*	*Why did BPA use a maximum Non-Treaty Storage level limit of 2,800 MW-Mo in*
17		*RiskMod for FY 2004-2006?*
18	A.	BPA used the 2,800 MW-Mo limit because it better reflects the expected Non-Treaty
19		Storage operations in FY 2004-2006 than the Non-Treaty Storage level limit used in
20		earlier WP-02 rate proceedings.
21	*Q.*	*What other revisions have been made to RiskMod?*
22	A.	BPA modified RiskMod to estimate the Slice revenue using the Slice Revenue Forecast
23		from the May 2000 Final Proposal, and the current Slice percentage. Additionally, BPA
24		modified RiskMod to accept the forecasted Load-Based (LB) and Financial-Based
25		(FB) CRAC percentages as inputs. RiskMod applies this factor to revenues subject to the
26		LB and FB CRACs. Both the Slice revenue and the revenues subject to the LB and FB

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1	CRACs are calibrated to align with the revenues in the Revenue Forecast. *See* SN-03
2	Study, SN-03-E-BPA-01, Chapter 5.
3	*Q.* *Why did BPA determine that it was not necessary to perform a 50 WY Run of RiskMod in*
4	*this rate proceeding?*
5	A. Because BPA is not recomputing its base rates in the Rate Analysis Model (RAM) for the
6	SN-03 initial proposal, the 50 WY Run of RiskMod is not needed. The 50 WY Run of
7	RiskMod was performed for the May 2000 Final Proposal to provide the RAM with
8	annual average surplus energy revenues, power purchase expenses, 4(h)(10)(C) credits,
9	and FCCF credits. This information was used in RAM to calculate a set of preliminary
10	rates that were then input into RiskMod to perform the Risk Simulation Run of RiskMod.
11	The results from the Risk Simulation Run of RiskMod were used in the ToolKit Model to
12	calculate the amount of Planned Net Revenues for Risk (PNRR) that needed to be
13	recovered in rates in the RAM. *See* Risk Analysis Study Documentation,
14	WP-02-FS-BPA-03A, Section 1.19. This proposal does not reset base rates, but rather is
15	a variable adjustment to those rates.

Section 4:   Inclusion of TBL Operating Risk

17	*Q.* *What risks are reflected in the TBL operating risks?*
18	A. TBL operating risks reflected in the Risk Analysis include uncertainties in several
19	categories of TBL revenues, TBL expenses, Corporate expenses, interest rates, and sales
20	of facilities. The testimony of the Rate Design Panel provides more detail on the TBL
21	risks and the reasons why BPA is using this data in this proceeding. *See* McCoy, *et al*.,
22	SN-03-E-BPA-10.
23	*Q.* *Does this conclude your testimony?*
24	A. Yes.