EXHIBIT NO. ___(EMM-23)
DOCKET NO. _____
2005 POWER COST ONLY RATE CASE
WITNESS: ERIC M. MARKELL

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PUGET SOUND ENERGY, INC., Respondent.	Docket No. UE-_____

TWENTY-SECOND EXHIBIT TO THE PREFILED DIRECT TESTIMONY OF ERIC M. MARKELL (NONCONFIDENTIAL) ON BEHALF OF PUGET SOUND ENERGY, INC.

JUNE 7, 2005

1.0 UPDATED DEVELOPMENTAL ANALYSIS

In this section, we analyze the Snoqualmie Falls Project's use of the Snoqualmie River for hydropower purposes regarding the effect various environmental measures would have on the Project's costs and power benefits. To estimate the net benefits of an alternative, we compare Project costs to the value of the power output. For any alternative, a positive net annual power benefit indicates that the value of the power exceeds the Project's costs.

1.1 Power and Economic Benefits of the Project

We base our economic studies on a 30-year period of analysis[1] and current (2004) price levels[2]. Consistent with the Commission's approach to economic analysis, the value of the power is determined by estimating the cost of obtaining the same amount of energy and capacity using other resources. Table 1 (presented at the end of this section) summarizes the assumptions we use in our analysis. Puget is a regulated utility, and the analysis reflects the authorized return on capital as accepted by the Washington Utilities and Transportation Commission (WUTC).

Under current conditions (No-action Alternative) and in the absence of any new environmental measures, we estimate annual Project costs as shown in table 2 under both without-inflation and with-inflation scenarios. The no-inflation scenario serves the Commission's economic analysis requirements consistent with the Mead Decision of 1995.[3]

We base the energy values for on-peak and off-peak generation on Puget's modeling to support its least cost plan (Puget, 2003a, 2003b). We base the capacity value on the cost of replacing lost dependable capacity with a simple-cycle combustion turbine and include only capital costs and fixed operations and maintenance costs in determining this value.

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[1] The term of any new license issued will be determined by the Commission in the license order.

[2] For purposes of economic analysis, we assume that implementation of any new license terms would begin in 2004, the year of current annual license expiration, and we use 2004 as the base year of the analysis.

[3] Mead Corporation, Publishing Paper Division, 72 FERC ¶ 61,027 (July 13, 1995).

Under current conditions (No-action Alternative), the Project provides average annual generation of 272,771 MWh and a dependable capacity of 31.84 MW as shown in table 3 (without inflation) and table 4 (with inflation). The annual power benefits under current conditions are $13,623,600 (without inflation) and $14,440,700 (with inflation).

1.2 Cost of Developmental and Environmental Measures

In this section, we estimate the annual costs of the various developmental and environmental measures contained in the Minor Upgrade Revised Action. First, we address the effect of the developmental measures on power benefits in terms of energy and capacity replacement costs. Then, we estimate the cost of other protection, mitigation, and enhancement (PME) measures.

1.2.1 Cost Impacts of Operational Changes

Currently, Puget generally operates the Snoqualmie Falls Project in coordination with its other power supply resources to meet the power needs of its customers. On a weekly basis, the demand for electricity is generally higher Monday through Saturday than on Sunday, and, on a daily basis, the demand for power peaks during the morning (6 a.m. to 10 a.m.) and early evening (5 p.m. to 9 p.m.). Since the project is a run-of-the-river project, inflow up to the project capacity is released through the powerhouses, except for water routed over the falls. During periods of high inflow, however, the Project may generate continuously for several days or weeks.

Currently, the minimum flow for aesthetic purposes is 100-cfs over the falls during daylight hours and 25-cfs over the falls at night. Daylight is defined as the period 1 hour before sunrise until 1 hour after sunset. There is currently no ramping requirement. The Section 401 Water Quality Certification (WQC) provides new minimum flow requirements and ramping requirements described below. Transfers of water between the powerhouses and falls are subject to these state ramping criteria.

Operational changes from both the developmental resource improvements and WQC, when implemented, would affect energy generation and dependable capacity. We base our estimates of energy effects on data provided by the CHEOPS model (DES, undated), a hydropower operations computer optimization model. We determine dependable capacity effects by estimating Project capacity during a critical hydrologic period. The Pacific Northwest Region adopted September 1936 through April 1937 as the critical period (ACOE, 1999). The most recent period with crucially dry conditions for which modeling exists is September 1976 through April 1977, and we use this period for determining dependable capacity.

The Minor Upgrade Revised Action operation would include upgraded turbine-generators at both plants 1 and 2. Puget would install upgraded units such that the current 44.5 MW capacity of the project would increase to 47.2 MW. The capacity is limited since the maximum flow from the project through the turbines would remain limited by Puget's water right for 2,500 cfs. The minimum flow out of the project through the turbines would remain at 30 cfs. We display the effect of these

developmental resource measures on power benefits in table 3 (without inflation) and table 4 (with inflation). Table 5 summarizes the annual cost of developmental resource measures.[4]

Under Minor Upgrade Revised Action operations, the Project provides average annual generation of 301,011 MWh and a dependable capacity of 34.73 MW. These values during the first 5 years (2004–2008) are estimated based on the current project configuration in compliance with the WQC. There is a slight reduction of annual average energy generation to 270,014 MWh during this period. By 2009, all new upgrades would be complete, resulting in an average annual energy generation of 307,208 MWh. These two figures yield an average of 301,011 MWh over the 30 year economic evaluation period. The ultimate effect of the Minor Upgrade Revised Action operations, in conjunction with the project upgrades, would be an increase in on-peak energy and an increase in dependable capacity relative to the No-action Alternative.

The on-peak energy generation under the Minor Upgrade Revised Action is increased due to the greater efficiency of the new turbine generators. The dependable capacity also increases under the Minor Upgrade Revised Action because of the improved efficiency of the new units. Note that under the WQC, there are increased minimum instream flows (over the falls). Daytime flows would range from 100 cfs for September through May 15 up to 450 cfs during June under the Minor Upgrade Revised Action. Nighttime flows would range from 25 cfs to 450 cfs depending on the time of year and weekend versus weekday. Additionally, a minimum flow of 300 cfs or natural river flow would be maintained between the plunge pool and Powerhouse #2. Furthermore, the Minor Upgrade Revised Action ramp rate measure would require ramping rates from 0 to 2 inches per hour depending on the season and time of day. Details of required flows and ramp rates are contained in the Section 401 WQC (WDOE, 2003).

In combination, the increased on-peak generation and the improved dependable capacity of the Minor Upgrade Revised Action result in about an 8 percent (with inflation) to 9 percent (without inflation) improvement in annual power benefits compared with No-action.

1.2.2 Cost of Other Environmental Measures

The Minor Upgrade Revised Action includes numerous environmental PME measures that do not affect Project operations and power benefits, but would affect Project costs. Table 6 summarizes the annual costs of the aquatics and water resources measures included in the Minor Upgrade Revised Action. Table 7 summarizes the terrestrial measures. Table 8 summarizes the recreation and aesthetics measures. Table 9 summarizes the cultural and historical measures. Table 10 provides a summary of measures by resource area and an overall cost of environmental and developmental measures.

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[4] The annual cost is that levelized annual amount that is equivalent to the present value of the stream of planning, design, implementation, construction, operation, and maintenance costs over the 30-year period of analysis.

1.3 Comparison of Alternatives

In this section, we summarize Project output, power benefits, and costs under the No-action Alternative (current conditions) and the Minor Upgrade Revised Action. The net effect of implementing the Minor Upgrade Revised Action is a $2,631,900 reduction in the net annual levelized value of the Project (about 26 percent of the net benefit) without inflation (table 11), or a $3,787,600 reduction (about 38 percent of the net benefit) with inflation included (table 12).

1.4 Greenhouse Gases

By producing hydroelectricity, the Snoqualmie Falls Project displaces the need for other power plants, primarily fossil-fueled facilities, to operate, thereby avoiding some power plant emissions and creating an environmental benefit. If the electrical energy generated by the Project were replaced with efficient generation using fossil fuels, greenhouse gas emissions could potentially increase by 120,000 tons to 206,000 tons of CO_2 emissions per year (0.403 tons per MWh for an efficient combined-cycle combustion turbine or 0.684 tons per MWh for a simple-cycle combustion turbine).

1.5 Literature Cited

DES (Duke Engineering and Services). Undated. CHEOPS Hydroelectric Operations Model, Bothell, WA. Undated.

Puget (Puget Sound Energy). 2003a. April 2003 least cost plan. Puget Sound Energy, Bellevue, WA. April 30, 2003

Puget (Puget Sound Energy). 2003b. Least cost plan update. Puget Sound Energy, Bellevue, WA. August 31, 2003.

ACOE (U.S. Army Corps of Engineers). 1999. Status report: Work to date on the development of the VARQ flood control operation at Libby dam and Hungry Horse dam. U.S. Army Corps of Engineers, Northwestern Division, North Pacific Region, Portland, OR. January 1999.

WDOE (Washington Department of Ecology). 2003. Snoqualmie Falls Hydroelectric Project, FERC No. 2493, Section 401 Water Quality Certificate. Washington Department of Ecology. September 30, 2003.

Table 1. Economic analysis parameters. (Source: Puget)

Energy Value ($/MWh) ($2004)	Peak	Off-peak
Month		
January	54.38	43.79
February	50.83	45.76
March	50.11	41.06
April	43.21	32.89
May	33.99	24.31
June	25.93	27.73
July	42.17	40.04
August	52.12	44.36
September	55.39	47.38
October	47.00	42.88
November	47.43	43.22
December	49.37	42.92

	without inflation	with inflation
Capacity Value ($/MW-year) 1/	63,500	80,900

Base Year	2004	
Period of analysis (years)	30	
Federal Income Tax Rate	35.00%	
Levy Rate	66.00%	
Assessment Rate	1.48%	
Insurance	0.07%	
Energy value inflation	0.00%	varies
O&M Inflation	0.00%	2.50%
Capital Inflation	0.00%	2.50%

		without inflation		with inflation	
Debt Structure		Interest		Interest	
	Mix	Raw	Adjusted	Raw	Adjusted
Long Term Debt	52.07%	4.91%	2.55%	7.53%	3.92%
Short Term Debt	5.50%	1.95%	0.11%	4.50%	0.25%
Preferred	2.43%	5.15%	0.13%	7.78%	0.19%
Common	40.00%	8.29%	3.32%	11.00%	4.40%
Weighted cost capital 2/			6.10%		8.76%

1/ Source: Baker Hydroelectric Project Application for New License, Exhibit D, Table D-6
2/ The weighted average cost of capital serves as the discount rate.

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 2. Current annual costs. (Source: Puget)

	Capital cost	Without Inflation Annual cost	Total levelized cost	Present Value Capital cost	With Inflation Levelized annual cost	Total levelized cost
Net investment 1/	5,461,100	-	378,100	5,461,100	-	478,200
Future major capital cost 2/	7,740,300		535,900	7,740,300		677,800
Existing plant O&M 3/		1,135,800	1,135,800		1,436,700	1,436,700
FERC Fees 4/		103,000	103,000		130,300	130,300
Relicensing Costs 5/	13,600,000		941,600	13,600,000		1,191,000
Total	26,801,400	1,238,800	3,094,400	26,801,400	1,567,000	3,914,000
Total adjusted 6/			3,628,200			4,597,600

1/ Net investment is the depreciated project investment allocated to power purposes.
2/ Future major capital costs include major plant rehabilitation to maintain present day capability scehduled between 2004 and 2033 and are expressed as the present value.
3/ Existing plant O&M includes O&M related to current PM&Es associated with the current license. Any new PM&E costs are incremental and shown in tables 6-5 and 6-6.
4/ FERC fees are based on statements of annual charges received from FERC for federal lands and administrative charges based on authorized capacity.
5/ Relicensing costs include the amount spent to date and an estimate of the additional amount to be spent between now and license issuance.
6/ Adjustments include the effects of depreciation, income tax, property tax, AFUDC and insurance.

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 3. Project output and annual benefits summary (no inflation).

	No Action (current conditions)	Draft Action 3/	Draft Action minus No Action
On-peak generation (MWh)	180,547	199,164	18,617
Levelized annual value ($2004)	8,080,400	8,764,400	684,000
Off-peak generation (MWh)	92,225	101,847	9,623
Levelized annual value ($2004)	3,520,500	3,850,500	330,000
Total generation (MWh)	272,771	301,011	28,240
Levelized annual value ($2004) 1/	11,600,900	12,614,900	1,014,000
Dependable capacity (MW) 2/	31.84	34.73	2.89
Dependable capacity levelized annual value ($2004)	2,022,700	2,174,900	152,200
Grand total levelized annual value ($2004)	13,623,600	14,789,800	1,166,200
Unit value of benefits ($/MWh)	49.95	49.13	(0.81)

1/ Our value of generation is based on modeling conducted to support the least cost plan. We have used values from the Aurora IV forecast held constant at 2004 levels.

2/ Dependable capacity for draft action is 31.80 MW for 2004-2008 and 35.32 MW thereafter for an average of 34.73 MW.

3/ Draft Action assumed to include 5 years at Current Conditions modified for WQC flows and 25 years at Draft Action, based on 2009 online date for upgrades.

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 4. Project output and annual benefits summary (with inflation) 1/.

	No Action (current conditions)	Draft Action 2/	Draft Action minus No Action
On-peak generation (MWh)	180,547	199,164	18,617
Levelized annual value ($2004)	8,361,300	9,002,700	641,400
Off-peak generation (MWh)	92,225	101,847	9,623
Levelized annual value ($2004)	3,520,800	3,804,400	283,600
Total generation (MWh)	272,771	301,011	28,240
Levelized annual value ($2004) 1/	11,882,100	12,807,100	925,000
Dependable capacity (MW)	31.84	34.73	2.89
Dependable capacity levelized annual value ($2004)	2,558,600	2,751,100	192,500
Grand total levelized annual value ($2004)	14,440,700	15,558,200	1,117,500
Unit value of benefits ($/MWh)	52.94	51.69	(1.25)

1/ Our value of generation is based on modeling conducted to support the least cost plan. We have used values from the Aurora IV forecast held constant at 2004 levels.
2/ Dependable capacity for draft action is 31.80 MW for 2004-2008 and 35.32 MW thereafter for an average of 34.73 MW.
3/ Draft Action assumed to include 5 years at Current Conditions modified for WQC flows and 25 years at Draft Action, based on 2009 online date for upgrades.

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 5. Summary of developmental measures.

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Diversion Dam	$163,600	$11,300	$4,315,000	$298,700	$4,478,600	$310,000
Refurbish PH #2	$338,500	$23,400	$17,947,300	$1,242,500	$18,285,800	$1,265,900
Refurbish PH #1	$0	$0	$15,502,100	$1,073,200	$15,502,100	$1,073,200
Building Refurbishment	$0	$0	$1,593,500	$110,300	$1,593,500	$110,300
Total Resource Cost Developmental Resources	$502,100	$34,700	$39,357,900	$2,724,700	$39,860,000	$2,759,400

	With Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Diversion Dam	$163,600	$14,300	$4,315,000	$377,900	$4,478,600	$392,200
Refurbish PH #2	$338,500	$29,600	$17,947,300	$1,571,700	$18,285,800	$1,601,300
Refurbish PH #1	$0	$0	$15,502,100	$1,357,600	$15,502,100	$1,357,600
Building Refurbishment	$0	$0	$1,593,500	$139,500	$1,593,500	$139,500
Total Resource Cost Developmental Resources	$502,100	$43,900	$39,357,900	$3,446,700	$39,860,000	$3,490,600

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 6. Summary of aquatics and water resources measures.

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Flood Management Plan (WQC)	$0	$0	$10,000	$700	$10,000	$700
Waste Disposal and Transportation Plan	$0	$0	$10,000	$700	$10,000	$700
Protective Devices for water control	$23,300	$1,600	$292,100	$20,200	$315,400	$21,800
Erosion and Sediment Control Plan	$0	$0	$50,000	$3,500	$50,000	$3,500
Monitor TDG at Powerhouse tailraces	$53,100	$3,700	$12,000	$800	$65,100	$4,500
30 cfs minimum flow for Plant 1; smooth tailrace floor to prevent stranding	$0	$0	$81,000	$5,600	$81,000	$5,600
Monitor tailrace stage at Plants 1 & 2	$272,000	$18,800	$25,000	$1,700	$297,000	$20,500
Mitigation and Monitoring Plan	$14,400	$1,000	$25,000	$1,700	$39,400	$2,700
Automate Headgates for emergency shutdown	$31,800	$2,200	$160,000	$11,100	$191,800	$13,300
Aesthetic Flows and ramping	$103,700	$7,200	$0	$0	$103,700	$7,200
Temperature monitoring for compliance with state water quality standards	$43,300	$3,000	$20,000	$1,400	$63,300	$4,400
Water Quality and Flow annual reporting	$57,800	$4,000	$10,000	$700	$67,800	$4,700
Develop WQ Protection Plan for the Project	$73,400	$5,100	$25,000	$1,700	$98,400	$6,800
Total Resource Cost	$672,800	$46,600	$720,100	$49,800	$1,392,900	$96,400

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 6. Summary of aquatics and water resources measures (cont.)

	With Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Flood Management Plan (WQC)	$0	$0	$10,000	$900	$10,000	$900
Waste Disposal and Transportation Plan	$0	$0	$10,000	$900	$10,000	$900
Protective Devices for water control	$23,300	$2,000	$292,100	$25,600	$315,400	$27,600
Erosion and Sediment Control Plan	$0	$0	$50,000	$4,400	$50,000	$4,400
Monitor TDG at Powerhouse tailraces	$53,100	$4,700	$12,000	$1,100	$65,100	$5,800
30 cfs minimum flow for Plant 1; smooth tailrace floor to prevent stranding	$0	$0	$81,000	$7,100	$81,000	$7,100
Monitor tailrace stage at Plants 1 & 2	$272,000	$23,800	$25,000	$2,200	$297,000	$26,000
Mitigation and Monitoring Plan	$14,400	$1,300	$25,000	$2,200	$39,400	$3,500
Automate Headgates for emergency shutdown	$31,800	$2,800	$160,000	$14,000	$191,800	$16,800
Aesthetic Flows and ramping	$103,700	$9,100	$0	$0	$103,700	$9,100
Temperature monitoring for compliance with state water quality standards	$43,300	$3,800	$20,000	$1,800	$63,300	$5,600
Water Quality and Flow annual reporting	$57,800	$5,100	$10,000	$900	$67,800	$6,000
Develop WQ Protection Plan for the Project	$73,400	$6,400	$25,000	$2,200	$98,400	$8,600
Total Resource Cost	$672,800	$59,000	$720,100	$63,300	$1,392,900	$122,300

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 7. Summary of terrestrial measures.

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Boat Barrier modification	$0	$0	$10,000	$700	$10,000	$700
Develop and implement a revegetation plan for erosion control and restoring disturbed sites.	$0	$0	$104,900	$7,300	$104,900	$7,300
Plant 2 wetland restoration and enhancement project	$10,800	$700	$96,900	$6,700	$107,700	$7,400
Pre-construction Osprey surveys below Plant 2	$0	$0	$3,700	$300	$3,700	$300
Bald Eagle Line Strike Protection	$4,200	$300	$9,900	$700	$14,100	$1,000
Terrestrial Resource Management Plan	$9,800	$700	$3,600	$200	$13,400	$900
Annual fish and wildlife compliance reports	$37,500	$2,600	$5,800	$400	$43,300	$3,000
Total Resource Cost	$62,300	$4,300	$234,800	$16,300	$297,100	$20,600

	With Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Boat Barrier modification	$0	$0	$10,000	$900	$10,000	$900
Develop and implement a revegetation plan for erosion control and restoring disturbed sites.	$0	$0	$104,900	$9,200	$104,900	$9,200
Plant 2 wetland restoration and enhancement project	$10,800	$900	$96,900	$8,500	$107,700	$9,400
Pre-construction Osprey surveys below Plant 2	$0	$0	$3,700	$300	$3,700	$300
Bald Eagle Line Strike Protection	$4,200	$400	$9,900	$900	$14,100	$1,300
Terrestrial Resource Management Plan	$9,800	$900	$3,600	$300	$13,400	$1,200
Annual fish and wildlife compliance reports	$37,500	$3,300	$5,800	$500	$43,300	$3,800
Total Resource Cost	$62,300	$5,500	$234,800	$20,600	$297,100	$26,100

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 8. Summary of recreation and aesthetic measures.

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Prepare Interpretive Plan	$0	$0	$25,000	$1,700	$25,000	$1,700
Provide new facilities for Park area	$144,400	$10,000	$25,000	$1,700	$169,400	$11,700
Prepare and install dispersed interpretive signs and information for Park area (based on Interpretive Plan)	$0	$0	$23,600	$1,600	$23,600	$1,600
Rebuild education center	$0	$0	$15,800	$1,100	$15,800	$1,100
Trail Relocation	$0	$0	$23,700	$1,600	$23,700	$1,600
Provide restrooms at Plant 2	$0	$0	$7,900	$500	$7,900	$500
Provide river access downstream of Plant 2	$0	$0	$15,800	$1,100	$15,800	$1,100
Dispersed interpretive signs and info for Plant 1 and Plant 2 areas	$0	$0	$19,700	$1,400	$19,700	$1,400
Upgrade fencing for Plant 1 and Plant 2 areas	$0	$0	$19,700	$1,400	$19,700	$1,400
Restore external appearance of historic buildings in Plants 1 & 2 areas	$0	$0	$19,700	$1,400	$19,700	$1,400
Total Resource Cost	$144,400	$10,000	$195,900	$13,500	$340,300	$23,500

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 8. Summary of recreation and aesthetic measures (cont.)

	With Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Prepare Interpretive Plan	$0	$0	$25,000	$2,200	$25,000	$2,200
Provide new facilities for Park area	$144,400	$12,600	$25,000	$2,200	$169,400	$14,800
Prepare and install dispersed interpretive signs and information for Park area (based on Interpretive Plan)	$0	$0	$23,600	$2,100	$23,600	$2,100
Rebuild education center	$0	$0	$15,800	$1,400	$15,800	$1,400
Trail Relocation	$0	$0	$23,700	$2,100	$23,700	$2,100
Provide restrooms at Plant 2	$0	$0	$7,900	$700	$7,900	$700
Provide river access downstream of Plant 2	$0	$0	$15,800	$1,400	$15,800	$1,400
Dispersed interpretive signs and info for Plant 1 and Plant 2 areas	$0	$0	$19,700	$1,700	$19,700	$1,700
Upgrade fencing for Plant 1 and Plant 2 areas	$0	$0	$19,700	$1,700	$19,700	$1,700
Restore external appearance of historic buildings in Plants 1 & 2 areas	$0	$0	$19,700	$1,700	$19,700	$1,700
Total Resource Cost	$144,400	$12,600	$195,900	$17,200	$340,300	$29,800

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 9. Summary of cultural and historical measures.

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Prepare Maintenance Guidelines for historic resources	$0	$0	$50,000	$3,500	$50,000	$3,500
Prepare Cultural Resources Mitigation Proposal	$1,227,800	$85,000	$50,000	$3,500	$1,277,800	$88,500
Prepare Curation Policy	$0	$0	$20,000	$1,400	$20,000	$1,400
Cultural Resources/Native American Interpretation Program	$0	$0	$20,000	$1,400	$20,000	$1,400
Cultural Resource Training Program for Employees	$0	$0	$10,000	$700	$10,000	$700
Photo-doc. for buildings and structures within historic district	$0	$0	$50,000	$3,500	$50,000	$3,500
Prepare historic resources interpretation program, including displays	$72,200	$5,000	$25,000	$1,700	$97,200	$6,700
Prepare implementation plan for disposition of historic buildings	$0	$0	$25,000	$1,700	$25,000	$1,700
Total Resource Cost	$1,300,000	$90,000	$250,000	$17,400	$1,550,000	$107,400

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 9. Summary of cultural and historical measures (cont.)

	With Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Prepare Maintenance Guidelines for historic resources	$0	$0	$50,000	$4,400	$50,000	$4.400
Prepare Cultural Resources Mitigation Proposal	$1,227,800	$107,500	$50,000	$4,400	$1,277,800	$111,900
Prepare Curation Policy	$0	$0	$20,000	$1,800	$20,000	$1,800
Cultural Resources/Native American Interpretation Program	$0	$0	$20,000	$1,800	$20,000	$1,800
Cultural Resource Training Program for Employees	$0	$0	$10,000	$900	$10,000	$900
Photo-doc. for buildings and structures within historic district	$0	$0	$50,000	$4,400	$50.000	$4.400
Prepare historic resources interpretation program, including displays	$72,200	$6,300	$25,000	$2,200	$97.200	$8.500
Prepare implementation plan for disposition of historic buildings	$0	$0	$25,000	$2,200	$25,000	$2,200
Total Resource Cost	$1,300,000	$113,800	$250,000	$22,100	$1,550,000	$135,900

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 10. Summary of developmental measures and environmental measures by resource area.

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Developmental	$502,100	$34,700	$39,357,900	$2,724,700	$39,860,000	$2,759,400
Aquatics and Water Resources	$672,800	$46,600	$720,100	$49,800	$1,392,900	$96,400
Terrestrial	$62,300	$4,300	$234,800	$16,300	$297,100	$20,600
Recreation and aesthetics	$144,400	$10,000	$195,900	$13,500	$340,300	$23,500
Cultural and historical	$1,300,000	$90,000	$250,000	$17,400	$1,550,000	$107,400
Grand Total Resource Cost	$2,681,600	$185,600	$40,758,700	$2,821,700	$43,440,300	$3,007,300
Grand Total Resource Cost Adjusted 1/					$54,860,000	$3,798,100

1/ Adjustments include the effects of depreciation, income tax, property tax, AFUDC and insurance.

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 10. Summary of developmental measures and environmental measures by resource area (cont.)

	No Inflation					
	Present Value O&M	Levelized O&M	Present Value Capital	Levelized Capital	Present Value Total	Levelized Total
Developmental	$502,100	$43,900	$39,357,900	$3,446,700	$39,860,000	$3,490,600
Aquatics and Water Resources	$672,800	$59,000	$720,100	$63,300	$1,392,900	$122,300
Terrestrial	$62,300	$5,500	$234,800	$20,600	$297,100	$26,100
Recreation and aesthetics	$144,400	$12,600	$195,900	$17,200	$340,300	$29,800
Cultural and historical	$1,300,000	$113,800	$250,000	$22,100	$1,550,000	$135,900
Grand Total Resource Cost	$2,681,600	$234,800	$40,758,700	$3,569,900	$43,440,300	$3,804,700
Grand Total Resource Cost Adjusted 1/					$56,012,000	$4,905,100

1/ Adjustments include the effects of depreciation, income tax, property tax, AFUDC and insurance.

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 11. Project costs and annual net benefits summary (no inflation).

	No Action (current conditions)	Draft Action	Draft Action minus No Action	Percentage Change No Action to Draft Action
Total Generation (MWh)	272,771	301,011	28,240	
Grand Total Value ($2004)	13,623,600	14,789,800	1,166,200	8.56%
Unit Value of Benefits ($/MWh)	49.95	49.13	(0.81)	
Levelized Project Costs ($2004)	3,628,200	7,426,300	3,798,100	104.68%
Unit Costs ($/MWh)	13.30	24.67	11.37	
Net Project Benefits ($2004)	9,995,400	7,363,500	(2,631,900)	-26.33%
Unit Value of Net Project Benefits ($/MWh)	36.64	24.46	(12.18)	

TABLE 8, Project Economics for Minor Upgrade Revised 2003, continued

Table 12. Project costs and annual net benefits summary (with inflation).

	No Action (current conditions)	Draft Action	Draft Action minus No Action	Percentage Change No Action to Draft Action
Total Generation (MWh)	272,771	301,011	28,240	
Grand Total Value ($2004)	14,440,700	15,558,200	1,117,500	7.74%
Unit Value of Benefits ($/MWh)	52.94	51.69	(1.25)	
Levelized Project Costs ($2004)	4,597,600	9,502,700	4,905,100	106.69%
Unit Costs ($/MWh)	16.86	31.57	14.71	
Net Project Benefits ($2004)	9,843,100	6,055,500	(3,787,600)	-38.48%
Unit Value of Net Project Benefits ($/MWh)	36.09	20.12	(15.97)	