**EXHIBIT NO. ___(EMM-21)**
**DOCKET NO. _____**
**2005 POWER COST ONLY RATE CASE**
**WITNESS: ERIC M. MARKELL**

**BEFORE THE**
**WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

| | |
|---|---|
| **WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,**<br><br>**Complainant,**<br><br>**v.**<br><br>**PUGET SOUND ENERGY, INC.,**<br><br>**Respondent.** | **Docket No. UE-_____** |

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

**JUNE 7, 2005**

**PUGET POWER**

February 17, 1995

Ms. Lois D. Cashell
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street N.E.
Washington, D.C. 20426

**RE: Puget Sound Power & Light Company's Comments on Draft Environmental Impact Statement Snoqualmie Falls Hydroelectric Project FERC/DEIS-0080D; FERC Project No. 2493**

Dear Ms. Cashell:

Enclosed in the above-referenced proceeding are an original and eight copies of comments prepared by Puget Sound Power & Light Company ("Puget Power") on the Draft Environmental Impact Statement (DEIS) for the Snoqualmie Falls Hydroelectric Project.

On November 25, 1991, Puget Power filed an Application for License with the Federal Energy Regulatory Commission (FERC) which proposed expansion of the Snoqualmie Falls Project and provided supporting information which was relevant to the proposal at that time. Since the time of that filing, several factors have changed and new information has become available which has caused Puget Power to reevaluate the expansion of the Snoqualmie Falls Project, as proposed.

Based upon new information, as summarized in our comments, Puget Power believes that the FERC Staff-preferred Alternative as outlined in the DEIS is no longer feasible. Puget Power believes that the public interest would be best served by further analysis of the "Minor Upgrade Alternative" of the DEIS and the development of findings and recommendations in support of that action as a basis for a License.

If you have any questions or need further information regarding this filing, please contact Virginia Howell, Relicense Project Manager at (206) 462-3058.

Very truly yours,

Gary B. Swofford
Senior Vice President
Customer and Operations Services

cc: Service List

# ATTACHMENT 1

## ECONOMICS OF EXPANDED PROJECT

### Original Cost Analysis

In the License Application, the present value capital cost of the Expanded Project was predicated upon certain project modifications. These modifications were intended to replace or refurbish existing equipment, install new generating facilities to increase capacity, and provide increased operational efficiency. Also proposed were improvements to non-power generating amenities on the site, including measures associated with fish and wildlife resources, flood reduction, and visitor and recreation facilities. The present value capital cost for the expanded project was also predicated upon what were then current economic assumptions. Inflation was predicted to be a uniform 5% annually; Puget Power's weighted average cost of capital was predicted to be 10.41%; operation and maintenance expenditures were estimated to be 2.5 Mils/KWH; continuing capital improvements were expected to cost $324,000 annually; and a levelizing factor to annualize project costs over a 40-year economic lifetime was calculated to be 13.99%. With the proposed improvements and economic assumptions, the present value capital cost was estimated by Puget Power to be $144,724,000. The Expanded Project would provide an average annual energy production of 381,338 MWH for a overall project cost of 40.3 Mils/KWH.

Revised Cost Analysis

Puget Power regularly reviews and reevaluates work scope and costs associated with a wide range of actual and proposed construction projects. This reevaluation is intended to verify the continuing efficacy and customer benefit of such projects in an evolving utility marketplace. A reevaluation of the proposed generating expansion at Snoqualmie Falls has now been completed, updating the economic factors to reflect current conditions and to quantify the detrimental effect on generation of higher instream flows than those originally proposed.

In the project reevaluation, inflation was not considered to be a flat rate of 5%, but rather was assumed to follow WEFA projections of 3.0% to 3.3% over the next 40 years. Puget Power's weighted average cost of capital was predicted to be 9.05%, operating and maintenance expenditures were unchanged at 2.5 Mils/KWH (but escalated at the lower inflation rate over the life of the project), continuing capital improvements were unchanged at $324,000 annually (but escalated at the lower inflation rate over the life of the project), and a levelizing factor to annualize project costs over its projected 40-year economic lifetime was calculated to be 12.21%. The revised economic assumptions reduce the present value capital cost to $130,749,596. With an average annual energy production of 381,338 MWH, the overall Expanded Project cost dropped to 32 Mils/KWH.

Instream Flows

The overall project costs stated above do not consider instream flow proposals other than that advanced by Puget Power in the License Application. Other flow proposals, which result in a greater volume of water bypassing the generation

equipment, will necessarily reduce the energy produced from an Expanded Project. For example, flow option "C" results in an 8 percent loss in electrical generation for the Expanded Project. Compared to Puget Power's flow proposal, annual electric energy production would drop to 353,300 MWH. The resultant decrease in generation increases the reevaluated overall melded project cost to 34.5 Mils/KWH.

Given the Company's lower avoided cost of power based on factors and influences stated elsewhere in this submittal, the Expanded Project is not judged economical for the Company to pursue. The current calculation of avoided cost is set forth in the table on the following page: Table I-1: Short Term Firm Rates (Mills/Kwh).

Table I-1: Short Term Firm Rates (Mills/Kwh)

| Year | Escalation (%) | Winter (mills/kwh) | Summer (mills/kwh) |
|---|---|---|---|
| 1994 | | 27.65 | 17.61 |
| 1995 | | 27.15 | 21.01 |
| 1996 | | 25.37 | 19.79 |
| 1997 | | 25.58 | 19.84 |
| 1998 | 2.50% | 26.22 | 20.40 |
| 1999 | 2.50% | 26.87 | 20.91 |
| 2000 | 2.50% | 27.55 | 21.43 |
| 2001 | 2.50% | 28.24 | 21.97 |
| 2002 | 2.50% | 28.94 | 22.52 |
| 2003 | 2.50% | 29.66 | 23.08 |
| 2004 | 2.50% | 30.41 | 23.66 |
| 2005 | 2.50% | 31.17 | 24.25 |
| 2006 | 2.50% | 31.95 | 24.86 |
| 2007 | 2.50% | 32.74 | 25.48 |
| 2008 | 2.50% | 33.56 | 26.11 |
| 2009 | 2.50% | 34.40 | 26.77 |
| 2010 | 2.50% | 35.26 | 27.44 |
| 2011 | 2.50% | 36.14 | 28.12 |
| 2012 | 2.50% | 37.05 | 28.82 |
| 2013 | 2.50% | 37.97 | 29.55 |
| 2014 | 2.50% | 38.92 | 30.28 |
| 2015 | 2.50% | 39.90 | 31.04 |
| 2016 | 2.50% | 40.89 | 31.82 |
| 2017 | 2.50% | 41.92 | 32.61 |
| 2018 | 2.50% | 42.96 | 33.43 |
| 2019 | 2.50% | 44.04 | 34.26 |
| 2020 | 2.50% | 45.14 | 35.12 |
| 2021 | 2.50% | 46.27 | 36.00 |
| 2022 | 2.50% | 47.42 | 36.90 |
| 2023 | 2.50% | 48.61 | 37.82 |
| 2024 | 2.50% | 49.82 | 38.77 |
| 2025 | 2.50% | 51.07 | 39.74 |
| 2026 | 2.50% | 52.35 | 40.73 |
| 2027 | 2.50% | 53.66 | 41.75 |
| 2028 | 2.50% | 55.00 | 42.79 |
| 2029 | 2.50% | 56.37 | 43.86 |
| 2030 | 2.50% | 57.78 | 44.96 |

**Snoqualmie Falls Relicensing**

**Document 3**

**Support Filed at FERC for Refurbishment Plan**

PUGET POWER

June 28, 1995

Ms. Lois D. Cashell
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

**Re: Snoqualmie Falls Project, FERC No. 2493**

Dear Ms. Cashell:

By letter dated February 17, 1995, Puget Sound Power & Light Company ("Puget Power") submitted comments on the Draft Environmental Impact Statement for the Snoqualmie Falls Hydroelectric Project ("DEIS").[1] In the Comment Letter, Puget Power advised FERC:

> Based upon new information, as summarized in our comments, Puget Power believes that the FERC Staff-preferred Alternative as outlined in the DEIS is no longer feasible. Puget Power believes that the public interest would be best served by further analysis of the "Minor Upgrade Alternative" of the DEIS and the development of findings and recommendations in support of that action as a basis for a License.

Puget Power further stated:

> Therefore, Puget Power respectfully requests that FERC expand upon the analysis of the Minor Upgrade Alternative contained in the Draft Environmental Impact Statement (DEIS). An expanded analysis of this alternative will describe a Project that best serves the public interest. Such further analysis will support revised findings and recommendations, to be reflected in a License, for a Project that is best adapted to a comprehensive plan for development of the waterway for beneficial public uses.

---

[1] Letter from Gary B. Swofford to Lois D. Cashell (with attachments), dated February 17, 1995 (hereinafter "Comment Letter").

To this end, Puget Power stated:

> Puget Power's proposal to refurbish a 2,500 cfs project at Snoqualmie Falls is preliminary, may resemble the "Minor Upgrade Alternative" in some ways, and may differ from it in other ways. Puget Power is preparing a detailed project plan..... Puget Power anticipates that such a detailed plan would be available for FERC's review by October 1, 1995.

In the Comment Letter, we were careful to distinguish the "Minor Upgrade Alternative" from the "Refurbished Project." The distinction was to account for anticipated differences between what are otherwise substantially similar Project descriptions: one in the DEIS and one to be subsequently provided in greater detail by Puget Power. We were also careful in our comments to refer to the Staff-preferred alternative described at pages 6-46 through 6-51 of the DEIS as the "Expanded Project." These terms, with the same meanings, are also used in this submittal.

We now provide FERC with further information on the Refurbished Project. In an effort to provide the FERC with as much detail on the Refurbished Project as possible, some information already provided in the License Application and the DEIS has been repeated for purposes of context and clarity. The Refurbished Project is sufficiently similar to the Minor Upgrade Alternative for purposes of further analysis, the few notable differences being:

- Rather than the full range of flow alternatives considered in the DEIS, the Refurbished Project proposes instream flows that have been identified as potential conditions of a Water Quality Certification by the Washington State Department of Ecology ("Ecology") (See the Water Use and Quality section contained in this filing.).

- In consideration of public safety and fishery resources, the Refurbished Project carries forward a proposed flow continuation system.

- To improve removal of suspended sediments for Plant 2, the Refurbished Project includes minor expansion of the Plant 2 forebay.

- In consideration of historic preservation values, Unit 4 in Plant 1 will be left in place rather than removed from the cavity.

- The existing foot bridge (not addressed in the Minor Upgade Alternative) will be retained and refurbished.

Enclosed for filing are an original and eight copies of a package providing additional information on the Refurbished Project as set forth in the following attachments:

**Engineering/Cost Information**
- Project Description
- Project Operation and Control
- Project Development Schedule
- Estimated Cost of Refurbished Project

**Special Information**

**Environmental Information**
- Water Use and Quality
- Fish and Aquatic Resources
- Terrestrial Resources
- Cultural Resources
- Socioeconomic Impacts
- Geology and Soils
- Recreational Resources
- Aesthetic Resources
- Land Use

Under a separate filing by letter dated June 27, 1995, Puget Power has submitted five copies each of the following related technical reports to the FERC:

- Preliminary Design Criteria for the Refurbished Project
- Erosion and Sediment Control Information for the Refurbished Project
- Detailed Cost Information for the Refurbished Project

Puget Power will be happy to provide copies of these reports to those on the service list upon request.

If you have any questions regarding this filing, please contact Virginia Howell, Relicense Project Manager at (206) 462-3058.

Very truly yours,

Gary B. Swofford
Senior Vice President
Customer Operations

cc: Service List

# ESTIMATED COSTS AND FINANCING FOR THE REFURBISHED PROJECT

## Estimated Costs Of The Proposed Refurbishment

### Land And Water Rights

There will be no significant expenditure for acquisition of land or water rights.

### Direct Construction Costs

The construction cost (sub-total direct cost, 1995 dollars) for the Refurbished Project, including refurbishment, modifications and new facilities, is estimated to be $ 22,438,606. The direct construction cost includes 8.2% for applicable Washington State Sales Tax. This cost estimate is based on 1995 price levels and is summarized by FERC account in the following table:

**Table 2. Direct Construction Cost Summary**

| FERC Acct. # | Description | Rates (%) | Amount ($) |
|---|---|---|---|
| | *HYDRAULIC PRODUCTION PLANT* | | |
| 331 | Structures & Improvements | | $1,179,950 |
| 332 | Reservoirs, Dams, & Waterways | | $7,343,055 |
| 332.2 | Reservoirs, Dams, & Waterways - Recreation | | $62,400 |
| 333 | Waterwheels, Turbines, & Generators | | $6,617,250 |
| 334 | Accessory Electrical Equipment | | $658,000 |
| 335 | Miscellaneous Power Plant Equipment | | $1,171,750 |
| 336 | Roads & Bridges | | $50,000 |
| | *TRANSMISSION PLANT* | | |
| 353 | Station Equipment | | $450,000 |
| | *GENERAL PLANT* | | |
| 397 | Communications Equipment | | $125,000 |
| | Sub-Total Direct Costs (1995$) | | $17,657,405 |
| | Construction Contingency | 20.0% | $1,728,271 |
| | Equipment Contingency | 15.0% | $1,352,407 |
| | Sales Tax | 8.2% | $1,700,523 |
| | Sub-Total Direct Costs (1995$) | | $22,438,606 |
| | Engineering | 10.0% | $2,243,861 |
| | Administration | 5.0% | $1,121,930 |
| | Puget Overheads | 10.0% | $2,580,440 |
| | AFUDC | 9.01% | $2,557,474 |
| | Total Estimated Direct Construction Cost (1995$) | | $30,942,311 |

Total Capital Cost: The total estimated direct construction cost for the construction is estimated to be $ 30,942,311 in 1995 dollars. The total capital cost includes the direct costs including Washington State Sales Tax, and indirect costs including engineering, administration, Puget Power overheads, and AFUDC. The total estimated direct construction cost escalated to 2003 dollars is $ 39,500,954.

Assuming a present day Operation and Maintenance cost of 3.2 mils/kWh, the present value of Operations and Maintenance over the projected 40-year operating life of the project is estimated to be $ 19,146,437 in 2003 dollars.

Assuming a present day continuing Capital Improvements cost of $ 220,000 per year, the present value of continuing Capital Improvements over the 40-year operating life of the project is estimated to be $ 5,522,916 in 2003 dollars.

The remaining book value of the existing project takes into account depreciation and routine capital improvements since the filing of the original License Application. The remaining book value for the project in 2003 dollars is $ 4,883,847.

The sum of the present value project cost estimate, present value Operations & Maintenance cost estimate, present value continuing improvements cost estimate, and existing book value equals the total present value project cost of $ 86,505,868 in 2003 dollars. This equates to a levelized power cost estimate for the entire project of approximately 26 mils/kWh in 2003 dollars. Puget Power's nominal levelized avoided cost is estimated to be 32 mils/kWh in 2003 dollars, based on a 20-year cost horizon for an equivalent amount of generation.

Contingencies: The contingencies for this project range from 15% to 20% of the direct construction cost. For the purposes of this submittal, the relative contingencies have been broken down into equipment contingencies at 15% and construction contingencies at 20%. These contingencies are included in the direct cost estimate as part of the total in the above direct cost table.

Indirect Construction Costs

Indirect construction costs included in the project cost estimate include 10% for engineering, 5% for administration, 10% for Puget Power overheads, and 9% for AFUDC.

**Project Takeover Value**

Fair Value

The value of the Snoqualmie Falls Generating Station to Puget Power is best evaluated in terms of the long-term costs to replace the electrical generation from the project and the book value of the facilities. Because much of the original cost of the existing project has long ago been depreciated, and because the project has low operation and maintenance costs, the cost to Puget Power is much lower than Puget Power's

alternatives for replacing the project.

The estimated present value of the cost of project power versus replacement power costs is shown below.

| | |
|---|---|
| Replacement Power Cost | $ 111,740,441 |
| Present Value Project Cost | $ 86,505,868 |

The replacement power cost estimate is based on the Puget Power's latest avoided cost estimate. Unlike the project cost estimates which are evaluated over a 40-year operating license, the avoided cost for project power was evaluated over a 20-year period and converted to present value in 2003 dollars. The 20-year avoided cost horizon is used to reflect the effect of wholesale power market competition. The replacement cost estimate is based on the average annual electrical energy production of 306,000 MWH from the proposed refurbished plant and the annual avoided cost projection based on a 20-year time horizon. The difference between the Replacement Power Cost and the Present Value Project Cost represents more than $25,000,000 in cost savings to ratepayers over the 40 year license term.

## Net Investment

Puget Power's net investment in the existing project as of December 31, 1994 is as set forth in the following table:

**Table 3. Net Investment in Snoqualmie Falls Existing Project**

| Balances as of 12-31-94 | Book Cost | Accumulated Provision for Depreciation | Book Value |
|---|---|---|---|
| Plant 1 | | | |
| Hydraulic Production | | | |
| Land | 32,750.45 | 0.00 | 32,750.45 |
| Other | 4,017,756.06 | (1,282,885.65) | 2,734,870.41 |
| Transmission | 508,463.12 | (263,650.07) | 244,813.05 |
| | 4,558,969.63 | (1,546,535.72) | 3,012,433.91 |
| Plant 2 | | | |
| Hydraulic Production | | | |
| Land | 0.00 | 0.00 | 0.00 |
| Other | 4,349,497.09 | (1,489,699.44) | 2,859,797.65 |
| Transmission | 495,266.21 | (193,151.00) | 302,115.21 |
| | 4,844,763.30 | (1,682,850.44) | 3,161,912.86 |
| Total | 9,403,732.93 | (3,229,386.16) | 6,174,346.77 |

Annual Costs

Construction is expected to occur between 1998 and 2002, with the cost of improvements entering ratebase in 2003.

The capital investment is expected to be financed according to Puget Power capital structure and cost rates as shown in the following table:

**Table 4. Puget Power Capital Structure and Cost Rates**

| Capital Type | Capital Structure | Marginal Cost | Weighted Forecast Cost Rate |
|---|---|---|---|
| Short-Term Debt | 2.4% | 6.80% | 0.16% |
| Long-Term Debt | 41.2% | 8.08% | 3.33% |
| Preferred Equity | 8.4% | 8.24% | 0.69% |
| Common Equity | 48.0% | 11.20% | 5.38% |
| Estimated Cost of Capital | 100.0% | | 9.56% |

A levelized fixed charge rate of 13.35% is used to calculate the annual cost of the proposed refurbishment capital investment.

The average annual cost of power is calculated by determining the levelized annual cost of the capital investment and then dividing by the project generation. The levelized annual cost for the Refurbished Project is 26 mils/kWh in 2003 dollars. This cost includes depreciation, State and Federal taxes, Operating and Maintenance expenses, existing project book value, and the capital costs of the improvements. It also takes into account the reduced generation resulting from the proposed instream flows as described in "Water Use and Quality."

**Snoqualmie Falls Relicensing**

**Document 3**

**Support Filed at FERC for Refurbishment Plan**

PUGET POWER

June 28, 1995

Ms. Lois D. Cashell
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

**Re: Snoqualmie Falls Project, FERC No. 2493**
**Supporting Technical Information**

Dear Ms. Cashell:

Enclosed for filing are five copies of a technical information package regarding the Snoqualmie Falls Project Relicense. This information is filed in conjunction with a June 29, 1995 filing by Mr. Gary B. Swofford of Puget Sound Power & Light Company that provided information for FERC's further environmental analysis of the Minor Upgrade Alternative.

The enclosed technical reports are entitled as follows:

Preliminary Design Criteria for the Refurbished Project

Erosion & Sediment Control for the Refurbished Project

Detailed Cost Information for the Refurbished Project

If you have questions or would like further information, please call me at (206) 462-3058.

Sincerely,

Virginia A. Howell

Virginia A. Howell, Project Manager
Snoqualmie Falls Project Relicense

Environmental Department, P.O. Box 97034 OBC 11N, 411 108th Avenue NE, Bellevue, WA 98009-9734

# Detailed Cost Information for the Refurbished Project

# Snoqualmie Falls Project Relicense FERC Project No. 2493

June 28, 1995

Puget Sound Power & Light Company

## *Snoqualmie Falls Refurbished Project*
## *Direct Construction Cost Summary*

| FERC Acct. # | Description | Rate (%) | Amount ($) | |
|---|---|---|---|---|
| | ***HYDRAULIC PRODUCTION PLANT*** | | | |
| 331 | Structures & Improvements | | $1,179,950 | |
| 332 | Reservoirs, Dams, & Waterways | | $7,343,055 | |
| 332.2 | Reservoirs, Dams, & Waterways - Recreation | | $62,400 | |
| 333 | Waterwheels, Turbines, & Generators | | $6,617,250 | |
| 334 | Accessory Electrical Equipment | | $658,000 | |
| 335 | Miscellaneous Power Plant Equipment | | $1,171,750 | |
| 336 | Roads & Bridges | | $50,000 | |
| | ***TRANSMISSION PLANT*** | | | |
| 353 | Station Equipment | | $450,000 | |
| | ***GENERAL PLANT*** | | | |
| 397 | Communications Equipment | | $125,000 | |
| | Sub-Total Direct Costs (1995$) | | $17,657,405 | |
| | Construction Contingency | 20.0% | $1,728,271 | |
| | Equipment Contingency | 15.0% | $1,352,407 | |
| | Sales Tax | 8.2% | $1,700,523 | |
| | Sub-Total Direct Costs (1995$) | | $22,438,606 | |
| | Engineering | 10.0% | $2,243,861 | |
| | Administration | 5.0% | $1,121,930 | |
| | Puget Overheads | 10.0% | $2,580,440 | |
| | AFUDC | 9.01% | $2,557,474 | |
| | Total Estimated Direct Construction Cost (1995$) | | $30,942,311 | 13.50 $/MWH |
| | Inflation from 1995$ to 2003$ | 27.66% | $8,558,643 | |
| | Total Estimated Direct Construction Cost (2003$) | | $39,500,954 | |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 331
STRUCTURES & IMPROVEMENTS

H:\HYD\SNOFALL\D[illegible]
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Seismic Retrofit | 1 | LS | 125000 | $125,000 | |
| Misc Concrete Repair | 1 | LS | 15000 | $15,000 | |
| Public Restroom Facilities | 1 | LS | 60000 | $60,000 | |
| Improvements to Existing Shelter | 1 | LS | 15000 | $15,000 | |
| | | | | | CIVIL |
| | | | | | $215,000 |
| ELECTRICAL WORK | | | | | |
| Primary Station Service Transformer | 1 | LS | 35000 | $35,000 | |
| Reserve Station Service Transformer | 1 | LS | 25000 | $25,000 | MECHANICAL |
| | | | | | $60,000 |
| | | | | | |
| SUBTOTAL PLANT 2 IMPROVEMENTS | | | | | $275,000 |
| | | | | | |
| HISTORIC STRUCTURE IMPROVEMENTS | | | | | |
| CIVIL WORK | | | | | |
| Stabilize Building - Transformer House | 1 | LS | 465000 | $465,000 | |
| Seismic Upgrade - Transformer House | | | | included | |
| Stabilize Building - Machine Shop | 1 | LS | 374000 | $374,000 | |
| Seismic Upgrade - Machine Shop | | | | included | |
| | | | | | CIVIL |
| | | | | | $839,000 |
| MECHANICAL WORK | | | | | |
| Miscellaneous Improvements | 1 | LS | 15000 | $15,000 | |
| | | | | | MECHANICAL |
| | | | | | $15,000 |
| ELECTRICAL WORK | | | | | |
| Miscellaneous Improvements | 1.00 | LS | 30000 | $30,000 | ELECTRICAL |
| | | | | | $30,000 |
| SUBTOTALHISTORIC STRUCTURES | | | | | $884,000 |
| | | | | | |
| TRAIL IMPROVEMENTS | | | | | |
| CIVIL WORK | | | | | |
| Regrade Existing Trail to Plant 2 | 2,500 | LF | 3 | $7,500 | |
| Clearing and Grubbing | 0 | AC | 8000 | $800 | |
| Ditch Excavation | 10 | CY | 15 | $150 | |
| Miscellaneous Improvements | 1 | LS | 2500 | $2,500 | CIVIL |
| | | | | | $10,950 |
| MECHANICAL WORK | | | | | |
| Interpretive Signs/Exhibits | 1 | LS | 5000 | $5,000 | |
| Handrails | 1 | LS | 5000 | $5,000 | MECHANICAL |
| | | | | | $10,000 |
| | | | | | |
| SUBTOTAL TRAIL IMPROVEMENTS | | | | | $20,950 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $1,179,950 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
DAM REHABILITATION

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Mobilization | 1 | LS | 200000 | $200,000 | |
| Stage 1 Cofferdam | 1 | LS | 25000 | $25,000 | |
| Stage 2 Cofferdam | 1 | LS | 55000 | $55,000 | |
| Stage 3 Cofferdam | 1 | LS | 55000 | $55,000 | |
| Access Improvements | 1 | LS | 25000 | $25,000 | |
| Bore 36-inch sluiceway in dam | 1 | LS | 36000 | $36,000 | |
| Sluiceway Concrete | 45 | YD | 400 | $18,000 | |
| Main Dam | | | | | |
| Replacement Timbers | 55 | MBF | 1600 | $88,000 | |
| Mass Concrete | 220 | CY | 200 | $44,000 | |
| Structural Concrete | 170 | CY | 400 | $68,000 | |
| Anchors | 1400 | LF | 30 | $42,000 | |
| Rebar | 42000 | LB | 0.75 | $31,500 | |
| Side Channel Spillway | | | | | |
| Common Excavation | 4100 | CY | 10 | $41,000 | |
| Rock Excavation | 1340 | CY | 50 | $67,000 | |
| Mass Concrete | 180 | CY | 200 | $36,000 | |
| Structural Concrete | 60 | CY | 400 | $24,000 | |
| Anchors | 1500 | LF | 30 | $45,000 | |
| Rebar | 18000 | LB | 0.75 | $13,500 | |
| Lean Concrete Fill | 10 | CY | 100 | $1,000 | |
| Gabion Wall | 180 | LF | 150 | $27,000 | |
| Backfill | 900 | CY | 5 | $4,500 | |
| Control House | | | | | |
| Mass Concrete | 25 | CY | 200 | $5,000 | |
| Structural Concrete | 90 | CY | 400 | $36,000 | |
| Rebar | 16000 | LB | 0.75 | $12,000 | CIVIL |
| | | | | | $999,500 |
| | | | | | |
| MECHANICAL WORK | | | | | |
| Piping & Conduit | 1 | LS | 20000 | $20,000 | |
| Miscellaneous Metals | 1 | LS | 20000 | $20,000 | |
| Sluiceway stoplogs | 1 | LS | 1500 | $1,500 | |
| 42-inch sluice gate | 1 | LS | 18000 | $18,000 | |
| Rubber Dam | | | | | |
| Main Dam | 1 | LS | 275000 | $275,000 | |
| Right Bank Dam | 1 | LS | 145000 | $145,000 | |
| Side Spillway Dam | 1 | LS | 165000 | $165,000 | |
| Controls | 1 | LS | 50000 | $50,000 | |
| Installation | 1 | LS | 35000 | $35,000 | |
| Control House | | | | | |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
DAM REHABILITATION

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| | | | | | |
|---|---|---|---|---|---|
| Miscellaneous Metals | 1 | LS | 10000 | $10,000 | |
| Mechanical | 1 | LS | 7000 | $7,000 | MECHANICAL |
| | | | | | $746,500 |
| | | | | | |
| ELECTRICAL | | | | | |
| Electrical | 1 | LS | 55000 | $55,000 | |
| Site Electrical | 1 | LS | 21000 | $21,000 | ELECTRICAL |
| | | | | | $76,000 |
| DEMOLITION | | | | | |
| Main Dam | | | | | |
| Timber Crest Removal | 1 | LS | 8000 | $8,000 | |
| Concrete Demolition | 210 | CY | 90 | $18,900 | |
| Side Channel Spillway | | | | | |
| Timber Wall Removal | 1 | LS | 3000 | $3,000 | |
| Concrete Demolition | 75 | CY | 60 | $4,500 | DEMOLITION |
| | | | | | $34,400 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $1,856,400 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 1 TAILRACE

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Mobilization | 1 | LS | 5000 | $5,000 | |
| Care of Water | 1 | LS | 2000 | $2,000 | |
| Rock Excavation | 80 | CY | 300 | $24,000 | |
| Backfill | 1 | LS | 10000 | $10,000 | |
| Concrete Downstream Flow Control | 1 | LS | 10000 | $10,000 | CIVIL |
| | | | | | $51,000 |
| MECHANICAL WORK | | | | | |
| Piping | 50 | LF | 160 | $8,000 | |
| Plug Valve | 0 | LS | 5000 | $0 | MECHANICAL |
| | | | | | $8,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $59,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 1 INTAKE

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Backfill | 790 | CY | 10 | $7,900 | |
| Cofferdam | 1 | LS | 33000 | $33,000 | |
| Coarse debris barrier | | | | | |
| Removal and Disposal | 50 | LF | 60 | $3,000 | |
| Concrete | 1 | LS | 45000 | $45,000 | |
| Rehab existing concrete | 1 | LS | 34000 | $34,000 | |
| Headwall, Deck and Supports | 250 | CY | 400 | $100,000 | |
| Pier | 80 | CY | 400 | $32,000 | |
| Sediment Exclusion Wall | 42 | CY | 400 | $16,800 | |
| | 65 | CY | 300 | $19,500 | |
| MECHANICAL WORK | | | | | $291,200 |
| Rake/Crane (incl. power and controls) | | | | | |
| Stoplogs | 1 | LS | 82000 | $82,000 | |
| Miscellaneous Metals | 1 | LS | 32000 | $32,000 | |
| Refurbish Existing Trashracks | 1 | LS | 8000 | $8,000 | |
| New 8' x 10' Headgates | 1 | LS | 15000 | $15,000 | |
| (Price & Installation) | 2 | LS | 110000 | $220,000 | |
| | | | | | MECHANICAL |
| ELECTRICAL WORK | | | | | $357,000 |
| | 1 | LS | 75000 | $75,000 | ELECTRICAL |
| DEMOLITION | | | | | $75,000 |
| | | | | | DEMOLITION |
| Remove Trashrack, Intake Gate & Full Debris Rack | 1 | LS | 5000 | $5,000 | $5,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $728,200 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 1 PENSTOCKS

H:\HYD\SNOFALL\DE...\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Concrete Headwall Replacement | 110 | CY | 425 | $46,750 | |
| Submerged sediment wall | 50 | CY | 425 | $21,250 | CIVIL |
| | | | | | $68,000 |
| MECHANICAL WORK | | | | | |
| 8' Diameter Penstock | 190,000 | LB | 1.5 | $285,000 | |
| 6' Diameter Penstock | 150,000 | LB | 1.5 | $225,000 | |
| 72 - Inch Butterfly Valve | 1 | EA | 70000 | $70,000 | |
| 54 - Inch Butterfly Valve | 1 | EA | 65000 | $65,000 | |
| Penstock Supports | 12 | EA | 5000 | $60,000 | |
| Penstock Installation | 630 | FT | 400 | $252,000 | MECHANICAL |
| | | | | | $957,000 |
| DEMOLITION | | | | | |
| Penstock Removal/Disposal (incl. salvage value) | 1 | LS | 15000 | $15,000 | |
| Concrete Headwall Removal | 1 | LS | 10000 | $10,000 | DEMOLITION |
| | | | | | $25,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $1,050,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 2 INTAKE

H:\HYD\SNOFALL\DEIS\RESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Sections 3 and 4 Rock Excavation | 8,000 | CY | 50 | $400,000 | |
| Rock Disposal | 7,500 | CY | 12 | $90,000 | |
| Concrete | | | | | |
| Headwall | 55 | CY | 400 | $22,000 | |
| Sediment exclusion wall | 90 | LS | 300 | $27,000 | |
| Miscellaneous Repairs | 1 | LS | 36000 | $36,000 | CIVIL |
| | | | | | $575,000 |
| MECHANICAL WORK | | | | | |
| New Intake Gates and Operators | 1 | LS | 140000 | $140,000 | |
| Refurbish Existing Operators and Mechanisms | 1 | LS | 50000 | $50,000 | |
| Stoplog Refurbishment | 1 | LS | 25000 | $25,000 | |
| Miscellaneous Metals | 1 | LS | 35000 | $35,000 | |
| Replace Debris Rack | 12,000 | LB | 3 | $36,000 | |
| Disposal existing rack, trough, gates | 1 | LS | 25000 | $25,000 | |
| Trashraking System | 1 | LS | 95000 | $95,000 | |
| Refurbish Existing Trashrack | 1 | LS | 10000 | $10,000 | MECHANICAL |
| | | | | | $276,000 |
| ELECTRICAL WORK | | | | | |
| Miscellaneous Electrical | 1 | LS | 75000 | $75,000 | |
| Deicing System | 1 | LS | 15000 | $15,000 | |
| | | | | | ELECTRICAL |
| | | | | | $75,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $926,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 2 UNIT 1 PENSTOCK

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| New Concrete for Thrust Blocks and Saddles | 450 | CY | 350 | $157,500 | |
| Thrust Block and Saddle Anchors | 1 | LS | 75000 | $75,000 | |
| Piping Restraint | 1 | LS | 15000 | $15,000 | |
| Temporary Penstock Support | 1 | LS | 25000 | $25,000 | |
| Mobilization | 1 | LS | 25000 | $25,000 | CIVIL |
| | | | | | $297,500 |
| MECHANICAL WORK | | | | | |
| Penstock Expansion Joints | 3 | EA | 1100 | $3,300 | |
| Penstock Lining | 13,200 | SF | 6.15 | $81,180 | |
| Penstock Coating | 13,500 | SF | 4 | $54,000 | |
| | | | | | MECHANICAL |
| | | | | | $138,480 |
| DEMOLITION | | | | | |
| Thrust Blocks and Saddles | 1 | LS | 7500 | $7,500 | DEMOLITION |
| | | | | | $7,500 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $443,480 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 2 UNIT 2 PENSTOCK

H:\HYD\SNOFALL\DELISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| New Concrete for Thrust Blocks | 415 | CY | 250 | $103,750 | CIVIL |
| | | | | | $103,750 |
| MECHANICAL WORK | | | | | |
| Penstock Coating | 19,200 | SF | 4 | $76,800 | |
| Ring Girders | 4 | EA | 6000 | $24,000 | |
| Penstock Expansion Joints | 2 | EA | 3400 | $6,800 | |
| 120-inch Butterfly Valve | 1 | EA | 100000 | $100,000 | |
| 10' x 8' Fabricated Bifurcation | 50,000 | LB | 4 | $200,000 | MECHANICAL |
| | | | | | $407,600 |
| DEMOLITION | | | | | |
| Pipe and Disposal | 1 | LS | 2500 | $2,500 | |
| Thrust Blocks | 1 | LS | 2500 | $2,500 | DEMOLITION |
| | | | | | $5,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $516,350 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 2 BYPASS

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Common Excavation | 28,200 | CY | 10 | $282,000 | |
| Backfill | 26,320 | CY | 5 | $131,600 | |
| Concrete - Bypass Chamber | 750 | CY | 400 | $300,000 | |
| Concrete - Butterfly Valve Vault | 20 | CY | 300 | $6,000 | |
| Rock Stabilization | 1 | LS | 10000 | $10,000 | |
| Stoplogs and Guides | 1 | LS | 60000 | $60,000 | |
| Cofferdam and Dewatering | 1 | LS | 50000 | $50,000 | CIVIL |
| | | | | | $839,600 |
| MECHANICAL WORK | | | | | |
| Steel Liner | 1 | LS | 100000 | $100,000 | |
| Penstock | 30,000 | LB | 1.5 | $45,000 | |
| Fixed Cone Valve, 54" Diameter | 1 | LS | 175000 | $175,000 | |
| Hydraulic Power Unit | 1 | LS | 45000 | $45,000 | |
| 8' Diameter Butterfly Valve | 1 | LS | 75000 | $75,000 | |
| Miscellaneous Metals | 1 | LS | 5000 | $5,000 | MECHANICAL |
| | | | | | $445,000 |
| ELECTRICAL WORK | | | | | |
| Controls | 1 | LS | 20000 | $20,000 | ELECTRICAL |
| | | | | | $20,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $1,304,600 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332
RESERVOIRS, DAMS & WATERWAYS
PLANT 2 FOREBAY AND GATEHOUSE

H:\HYD\SNOFALL\D...\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Forebay | | | | | |
| Excavation (Rock) | 650 | YD | 50 | $32,500 | |
| Concrete | 10 | CY | 400 | $4,000 | |
| 18-inch sediment ejector hole | 90 | LF | 1000 | $90,000 | |
| Gate House | | | | | |
| Seismic Retrofit | 1 | LS | 100000 | $100,000 | |
| Concrete (Plain) | 25 | CY | 250 | $6,250 | |
| Concrete (Reinforced) | 15 | CY | 425 | $6,375 | |
| Architectural Features | 1 | LS | 50000 | $50,000 | |
| Fencing | 700 | LF | 12 | $8,400 | CIVIL |
| | | | | | $297,525 |
| MECHANICAL WORK | | | | | |
| Forebay | | | | | |
| Access Doors | 4 | EA | 2500 | $10,000 | |
| Steel Guide for Future Stoplogs | 1 | LS | 5000 | $5,000 | |
| Miscellaneous metal | 1 | LS | 8000 | $8,000 | |
| Gatehouse | | | | | |
| 24-inch sluice gate w/operator | 1 | LS | 6500 | $6,500 | |
| Replace Headgates | 1 | LS | 50000 | $50,000 | |
| Bar Screen | 1 | LS | 40000 | $40,000 | MECHANICAL |
| | | | | | $119,500 |
| ELECTRICAL | | | | | |
| New Controls and Actuators | 3 | EA | 25000 | $75,000 | |
| Gatehouse (Power, Lights, Etc.) | 1 | LS | 50000 | $50,000 | ELECTRICAL |
| | | | | | $50,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $467,025 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 332.2
RESERVOIRS, DAMS & WATERWAYS-RECREATION
SAFETY FENCING

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| MECHANICAL WORK | | | | | |
| Black Vinyl Fencing | 4,500 | LF | 12 | $54,000 | |
| Wood Framed Fencing | 600 | LF | 14 | $8,400 | MECHANICAL |
| | | | | | $62,400 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $62,400 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 333
TURBINE, GENERATOR & CONTROLS
PLANT 2 UNIT 1-UPGRADE

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| MECHANICAL WORK | | | | | |
| Unit 1 Turbine Runner,Gates, Etc. | 1 | LS | 675000 | $675,000 | |
| Generator Rewind | 1 | LS | 750000 | $750,000 | |
| Installation | 1 | LS | 125000 | $125,000 | MECHANICAL |
| | | | | | $1,425,000 |
| ELECTRICAL WORK | | | | | |
| Control (Breaker) | 1 | LS | 25000 | $25,000 | ELECTRICAL |
| Flow Monitoring Equipment | 1 | LS | 35000 | $35,000 | $60,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $1,485,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 333
TURBINE, GENERATOR & CONTROLS
PLANT 2 UNIT 2-UPGRADE

6/22/95
H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| MECHANICAL WORK | | | | | |
| Unit 2 Turbine Runner, Seals, Etc. | 1 | LS | 225000 | $225,000 | |
| Governor Replacement | 1 | LS | 45000 | $45,000 | MECHANICAL |
| | | | | | $270,000 |
| ELECTRICAL WORK | | | | | |
| Control Upgrades (Both Units) | 1 | LS | 150000 | $150,000 | ELECTRICAL |
| | | | | | $150,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $420,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 333
WATER WHEELS, TURBINES & GENERATORS
P1 U1 TURBINE & GENER.

6/22/95
H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| MECHANICAL WORK | | | | | |
| Turbine, Generator, Governor, Exciter | 1 | LS | 1,800,000 | $1,800,000 | |
| Cooling System | | | | included | |
| Lube System | | | | included | |
| Meters, Gages, Etc. | | | | included | |
| Scroll Case Fill-Drain System | | | | included | |
| Pressure-Regulator System | | | | included | |
| Installation | 1 | LS | 150000 | $150,000 | MECHANICAL |
| | | | | | $1,950,000 |
| ELECTRICAL WORK | | | | | |
| Controls, Instrumentation | 1 | LS | 225,000 | $225,000 | ELECTRICAL |
| Flow Monitoring Equipment | 1 | LS | 55,000 | $55,000 | |
| | | | | | $280,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $2,230,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 333
WATER WHEELS, TURBINES & GENERATORS
P1 U2 TURBINE & GENER.

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| MECHANICAL WORK | | | | | |
| Turbine, Generator, Governor, Exciter | 1 | LS | 1500000 | $1,500,000 | |
| Cooling System | | | | included | |
| Lube System | | | | included | |
| Meters, Gages, Etc. | | | | included | |
| Scroll Case Fill-Drain System | | | | included | |
| Pressure-Regulator System | | | | included | |
| Installation | 1 | LS | 150000 | $150,000 | MECHANICAL |
| | | | | | $1,650,000 |
| ELECTRICAL WORK | | | | | |
| Controls, Instrumentation | 1 | LS | 325000 | $325,000 | ELECTRICAL |
| Flow Monitoring Equipment | 1 | LS | 55000 | $55,000 | |
| | | | | | $380,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $2,030,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 333
WATER WHEELS, TURBINES & GENERATORS
P-1 SUPPORT P-HOUSE IMPR.

6/22/95
H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| Rock Excavation | 50 | CY | 150 | $7,500 | |
| Concrete Removal | 350 | CY | 30 | $10,500 | |
| Foundations and Settings-Unit 1 and 2 | | | | | |
| Concrete Substructure, 1st Stage | 750 | CY | 400 | $300,000 | |
| Concrete, 2nd Stage | 225 | CY | 250 | $56,250 | CIVIL |
| | | | | | $374,250 |
| MECHANICAL WORK | | | | | |
| Miscellaneous Metals | 1 | LS | 3000 | $3,000 | MECHANICAL |
| | | | | | $3,000 |
| ELECTRICAL WORK | | | | | |
| Miscellaneous Improvements | 1 | LS | 10000 | $10,000 | ELECTRICAL |
| | | | | | $10,000 |
| DEMOLITION | | | | | |
| Unit 5 Turbine Removal/Disposal | 1 | LS | 15000 | $15,000 | |
| Unit 1-3 Generator Removal/Disposal | 1 | LS | 25000 | $25,000 | |
| Electric Cables Removal/Disposal | 1 | LS | 25000 | $25,000 | DEMOLITION |
| | | | | | $65,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $452,250 |

SNOQUALMIE FALLS HYDROLECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 334
PLANT 1 ACCESSORY ELECTRIC EQUIPMENT

6/22/95
H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| ELECTRICAL WORK | | | | | |
| Excitation System | | | | | |
| Static Excitation | 2 | EA | 55000 | $110,000 | |
| Excitation Accessories | 1 | LS | 35000 | $35,000 | |
| Generator Main Connections | | | | | |
| Generator Breaker | 2 | EA | 35000 | $70,000 | |
| Protective Relaying | 1 | LS | 25000 | $25,000 | |
| CT's and PT's | 1 | LS | 30000 | $30,000 | |
| Main Connection Accessories | 1 | LS | 15000 | $15,000 | |
| Main Cable | 800 | LF | 105 | $84,000 | |
| Storage Batteries | 1 | LS | 8000 | $8,000 | |
| Station Service Equipment | | | | | |
| Station Service Transformers | 2 | EA | 22000 | $44,000 | |
| Automatic Transfer Switch | 1 | EA | 9500 | $9,500 | |
| Motor Control Center | 1 | LS | 25000 | $25,000 | |
| Station Service Accessories | 1 | LS | 10000 | $10,000 | |
| Station Control System | | | | | |
| Switchboard Control Panels | 2 | EA | 35000 | $70,000 | |
| Plant Controllers | 1 | LS | 65000 | $65,000 | |
| Metering | 1 | LS | 6000 | $6,000 | |
| UPS | 1 | LS | 6500 | $6,500 | |
| Supervisory Control Equipment | 1 | LS | 45000 | $45,000 | ELECTRICAL |
| | | | | | $658,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $658,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 335
MISCELLANEOUS POWER PLANT EQUIPMENT
PLANT 1 SHAFT IMPR.

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| CIVIL WORK | | | | | |
| New Elevator Building | 1 | LS | 65000 | $65,000 | CIVIL |
| Concrete Elevator Shaft | 600 | YD | 425 | $255,000 | |
| | 0 | LS | 0 | $0 | |
| | | | | | $320,000 |
| MECHANICAL WORK | | | | | |
| Elevator Remove/Replace | 1 | LS | 250000 | $250,000 | MECHANICAL |
| | | | | | $250,000 |
| ELECTRICAL WORK | | | | | |
| Generator Bus Duct - 7,200 volt | 975 | LF | 450 | $438,750 | ELECTRICAL |
| Control Cable and Conduits , < 600 volt | 1,680 | LF | 37.5 | $63,000 | |
| | | | | | $501,750 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $1,071,750 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 335
MISCELLANEOUS POWER PLANT EQUIPMENT
POWERHOUSE 1 EQUIPMENT RELOCATION

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| ELECTRICAL WORK | | | | | |
| Disconnect Impulse Turbines | 1 | LS | 100000 | $100,000 | ELECTRICAL |
| | | | | | $100,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $100,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 336
ACCESS ROADS

6/22/95
H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| ELECTRICAL WORK | | | | | |
| General Road Improvements | 1 | LS | 50000 | $50,000 | ELECTRICAL |
| | | | | | $50,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $50,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 353
SUBSTATION EQUIPMENT

6/22/95
H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| ELECTRICAL WORK | | | | | |
| Plant 1 Step Up Transformer | 1 | EA | 450000 | $450,000 | ELECTRICAL |
| | | | | | $450,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $450,000 |

SNOQUALMIE FALLS HYDROELECTRIC PROJECT
ESTIMATED CONSTRUCTION COSTS
FERC ACCOUNT NO. 397
COMMUNICATION EQUIPMENT

H:\HYD\SNOFALL\DEISRESP\COSTEST.XLW
07022-022-002

| HDR ENGINEERING, INC. | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | QUANTITY | UNITS | UNIT COST | TOTAL | SUBTOTALS |
| DIRECT CONSTRUCTION COSTS | | | | | |
| ELECTRICAL WORK | | | | | |
| Communication Equipment | 1 | LS | 125000 | $125,000 | ELECTRICAL |
| | | | | | $125,000 |
| | | | | | |
| SUBTOTAL DIRECT CONSTRUCTION COSTS | | | | | $125,000 |

## *Snoqualmie Falls Refurbished Project*
## *Economic Assumptions*

| | |
|---|---|
| Annual Inflation Rate | 3.10% |
| Levelized Fixed Charge Rate | 13.35% |
| Capital Recovery Factor | 9.31% |
| Federal Tax Rate | 35.00% |
| Construction Period Interest Rates | 7.84% |
| AFUDC Rate | 9.01% |
| Equipment Escalation Factor | 3.00% |
| Structure Cost Escalation Factor | 2.90% |
| Labor Cost Escalation Factor | 4.10% |
| Non-Labor Cost Escalation Factor | 3.00% |
| Revenue Sensitive Taxes | 6.36% |
| Insurance Rate | 0.05% |
| Property Tax Rate | 1.41% |
| Energy Cost Rates | See Avoided Cost Table |
| Puget Power Overhead Rate | 10.00% |

## *Snoqualmie Falls Refurbished Project Improvements*

| | |
|---|---|
| Project Cost (in 1995$) | $30,942,311 |
| Capital Recovery Factor | 9.31% |
| Annual Inflation Rate | 3.10% |
| Inflation Rate from 1995 to 2003 | 27.66% |
| Project Cost in 2003$ | $39,500,954 |
| Existing Plant Balance (in 2003$) | $4,883,847 |
| Total Investment in 2003$ | $44,384,801 |
| Levelized Fixed Charge Rate | 13.35% |
| Levelized Fixed Charge | $5,925,371 |

| Period | Year | LFC ($) | Present Value ($) |
|---|---|---|---|
| 1 | 2003 | $5,925,371 | $5,420,703 |
| 2 | 2004 | $5,925,371 | $4,959,019 |
| 3 | 2005 | $5,925,371 | $4,536,656 |
| 4 | 2006 | $5,925,371 | $4,150,266 |
| 5 | 2007 | $5,925,371 | $3,796,786 |
| 6 | 2008 | $5,925,371 | $3,473,411 |
| 7 | 2009 | $5,925,371 | $3,177,578 |
| 8 | 2010 | $5,925,371 | $2,906,942 |
| 9 | 2011 | $5,925,371 | $2,659,356 |
| 10 | 2012 | $5,925,371 | $2,432,857 |
| 11 | 2013 | $5,925,371 | $2,225,649 |
| 12 | 2014 | $5,925,371 | $2,036,089 |
| 13 | 2015 | $5,925,371 | $1,862,674 |
| 14 | 2016 | $5,925,371 | $1,704,029 |
| 15 | 2017 | $5,925,371 | $1,558,896 |
| 16 | 2018 | $5,925,371 | $1,426,124 |
| 17 | 2019 | $5,925,371 | $1,304,660 |
| 18 | 2020 | $5,925,371 | $1,193,541 |
| 19 | 2021 | $5,925,371 | $1,091,887 |
| 20 | 2022 | $5,925,371 | $998,890 |
| 21 | 2023 | $5,925,371 | $913,814 |
| 22 | 2024 | $5,925,371 | $835,984 |
| 23 | 2025 | $5,925,371 | $764,783 |
| 24 | 2026 | $5,925,371 | $699,646 |
| 25 | 2027 | $5,925,371 | $640,056 |
| 26 | 2028 | $5,925,371 | $585,542 |
| 27 | 2029 | $5,925,371 | $535,671 |
| 28 | 2030 | $5,925,371 | $490,048 |
| 29 | 2031 | $5,925,371 | $448,310 |
| 30 | 2032 | $5,925,371 | $410,127 |
| 31 | 2033 | $5,925,371 | $375,197 |
| 32 | 2034 | $5,925,371 | $343,241 |
| 33 | 2035 | $5,925,371 | $314,007 |
| 34 | 2036 | $5,925,371 | $287,263 |
| 35 | 2037 | $5,925,371 | $262,796 |
| 36 | 2038 | $5,925,371 | $240,414 |
| 37 | 2039 | $5,925,371 | $219,938 |
| 38 | 2040 | $5,925,371 | $201,205 |
| 39 | 2041 | $5,925,371 | $184,069 |
| 40 | 2042 | $5,925,371 | $168,391 |
| | Total (2003$) | | $61,836,515 |

## *Snoqualmie Falls Refurbished Project*
## *O&M Costs*

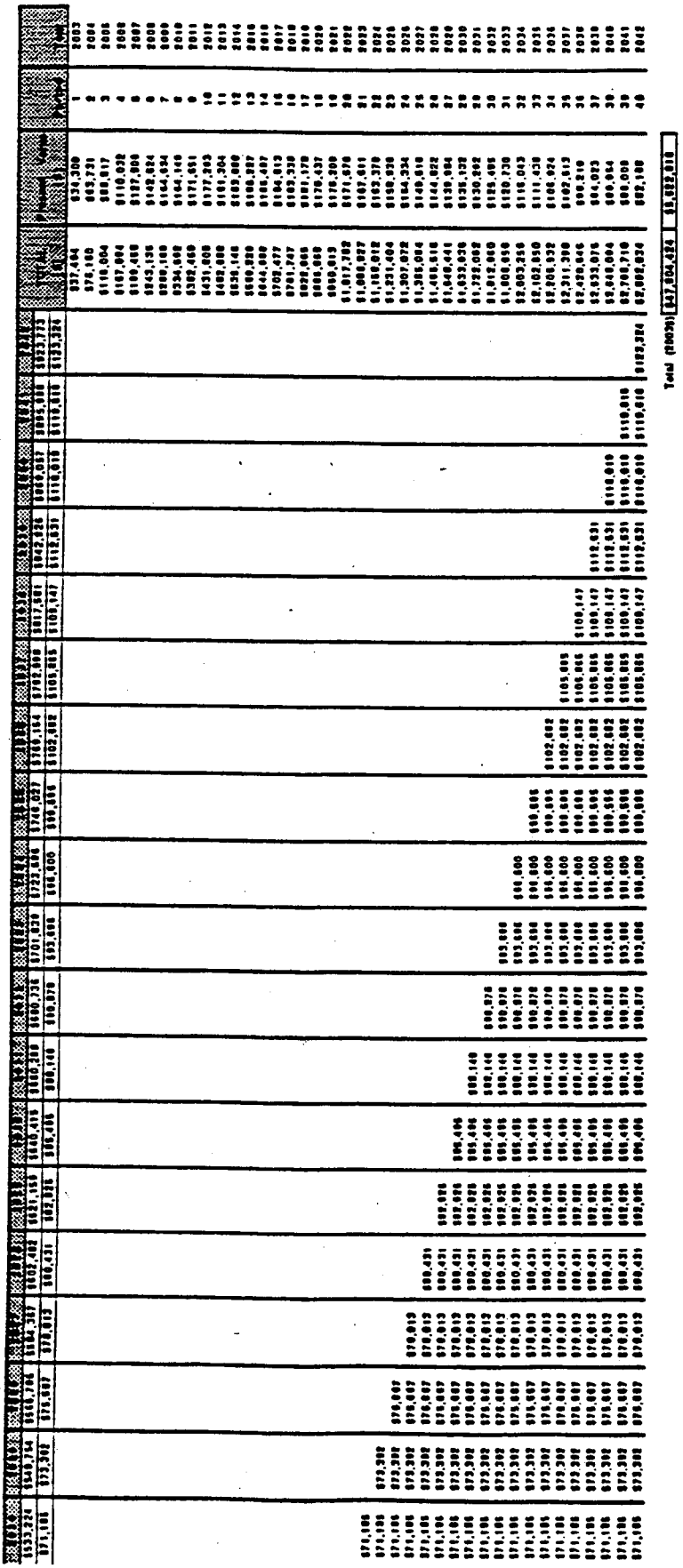
| | | |
|---|---|---|
| O&M in $/MWH (1995$) | 3.2 | $/MWH |
| Inflation % (1995 to 2003) | 27.66% | |
| O&M in $/MWH (2003$) | 4.1 | $/MWH |
| Revenue Sensitive Taxes - Rate | 6.36% | |
| O&M in $/MWH "Grossed up" (2003$) | 4.3 | $/MWH |
| Annual Inflation Rate | 3.10% | |
| Capital Recovery Factor | 9.31% | |

| Period | Year | Inflated O&M ($/MWH) | Generation (MWH) | Annual O&M ($/MWH) | Present Value ($) |
|---|---|---|---|---|---|
| 1 | 2003 | 4.3 | 306,000 | $1,315,800 | $1,203,733 |
| 2 | 2004 | 4.4 | 306,000 | $1,356,590 | $1,135,347 |
| 3 | 2005 | 4.6 | 306,000 | $1,398,644 | $1,070,847 |
| 4 | 2006 | 4.7 | 306,000 | $1,442,002 | $1,010,011 |
| 5 | 2007 | 4.9 | 306,000 | $1,486,704 | $952,632 |
| 6 | 2008 | 5.0 | 306,000 | $1,532,792 | $898,512 |
| 7 | 2009 | 5.2 | 306,000 | $1,580,308 | $847,467 |
| 8 | 2010 | 5.3 | 306,000 | $1,629,298 | $799,321 |
| 9 | 2011 | 5.5 | 306,000 | $1,679,806 | $753,911 |
| 10 | 2012 | 5.7 | 306,000 | $1,731,880 | $711,081 |
| 11 | 2013 | 5.8 | 306,000 | $1,785,569 | $670,684 |
| 12 | 2014 | 6.0 | 306,000 | $1,840,921 | $632,581 |
| 13 | 2015 | 6.2 | 306,000 | $1,897,990 | $596,644 |
| 14 | 2016 | 6.4 | 306,000 | $1,956,827 | $562,748 |
| 15 | 2017 | 6.6 | 306,000 | $2,017,489 | $530,778 |
| 16 | 2018 | 6.8 | 306,000 | $2,080,031 | $500,624 |
| 17 | 2019 | 7.0 | 306,000 | $2,144,512 | $472,183 |
| 18 | 2020 | 7.2 | 306,000 | $2,210,992 | $445,358 |
| 19 | 2021 | 7.4 | 306,000 | $2,279,533 | $420,057 |
| 20 | 2022 | 7.7 | 306,000 | $2,350,198 | $396,193 |
| 21 | 2023 | 7.9 | 306,000 | $2,423,055 | $373,685 |
| 22 | 2024 | 8.2 | 306,000 | $2,498,169 | $352,455 |
| 23 | 2025 | 8.4 | 306,000 | $2,575,612 | $332,432 |
| 24 | 2026 | 8.7 | 306,000 | $2,655,456 | $313,546 |
| 25 | 2027 | 8.9 | 306,000 | $2,737,776 | $295,733 |
| 26 | 2028 | 9.2 | 306,000 | $2,822,647 | $278,933 |
| 27 | 2029 | 9.5 | 306,000 | $2,910,149 | $263,086 |
| 28 | 2030 | 9.8 | 306,000 | $3,000,363 | $248,140 |
| 29 | 2031 | 10.1 | 306,000 | $3,093,375 | $234,043 |
| 30 | 2032 | 10.4 | 306,000 | $3,189,269 | $220,747 |
| 31 | 2033 | 10.7 | 306,000 | $3,288,137 | $208,206 |
| 32 | 2034 | 11.1 | 306,000 | $3,390,069 | $196,378 |
| 33 | 2035 | 11.4 | 306,000 | $3,495,161 | $185,221 |
| 34 | 2036 | 11.8 | 306,000 | $3,603,511 | $174,699 |
| 35 | 2037 | 12.1 | 306,000 | $3,715,220 | $164,774 |
| 36 | 2038 | 12.5 | 306,000 | $3,830,392 | $155,413 |
| 37 | 2039 | 12.9 | 306,000 | $3,949,134 | $146,584 |
| 38 | 2040 | 13.3 | 306,000 | $4,071,557 | $138,256 |
| 39 | 2041 | 13.7 | 306,000 | $4,197,775 | $130,402 |
| 40 | 2042 | 14.1 | 306,000 | $4,327,906 | $122,993 |
| | | | | Total (2003$) | $19,146,437 |

**Snoqualmie Falls Refurbished Project**
**Continuing Expenditures, Page 1 of 2**

| | |
|---|---|
| Amount in 1998 | $260,000 |
| Annual Inflation Rate | 3.10% |
| Inflation Rate from 1998 to 2003 | 27.06% |
| Amount in 2003 | $330,356 |
| Levelized Fixed Charge Rate | 10.26% |
| Capital Recovery Factor | 9.31% |

**Snoqualmie Falls Refurbished Project**
**Continuing Expenditures, Page 2 of 2**



Detailed Cost Information for the Refurbished Project

## *Snoqualmie Falls Refurbished Project*
## *Total Present Value Project Cost*

Project Cost (2003$)

| | |
|---|---|
| Capital Cost (Existing Plant & Improvements) | $61,836,515 |
| Operating & Maintenance Present Value | $19,146,437 |
| Continuing Capital Expenditures Present Value | $5,522,916 |
| Total Present Value Project Cost | $86,505,868 |
| | |
| Levelized Project Cost ($/MWH) in 2003$ | 26.32 |

## *Snoqualmie Falls Refurbished Project*
## *Avoided Cost Calculation Based on 20-Year Contract*

| | | Winter Energy (Sep - Mar) | | | Summer Energy (Apr - Aug) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Period | Year | Energy (MWH) | Avoided Cost ($/MWH) | Value ($) | Energy (MWH) | Avoided Cost ($/MWH) | Value ($) | Total Cost Ceiling ($) | Annual Energy (MWH) | Avoided Cost ($/MWH) |
| 1 | 2003 | 178,500 | 29.66 | $5,294,310 | 127,500 | 23.08 | $2,942,700 | $8,237,010 | 306,000 | 26.92 |
| 2 | 2004 | 178,500 | 30.41 | $5,428,185 | 127,500 | 23.66 | $3,016,650 | $8,444,835 | 306,000 | 27.60 |
| 3 | 2005 | 178,500 | 31.17 | $5,563,845 | 127,500 | 24.25 | $3,091,875 | $8,655,720 | 306,000 | 28.29 |
| 4 | 2006 | 178,500 | 31.95 | $5,703,075 | 127,500 | 24.86 | $3,169,850 | $8,872,725 | 306,000 | 29.00 |
| 5 | 2007 | 178,500 | 32.94 | $5,879,790 | 127,500 | 25.48 | $3,248,700 | $9,128,490 | 306,000 | 29.83 |
| 6 | 2008 | 178,500 | 33.56 | $5,990,460 | 127,500 | 26.11 | $3,329,025 | $9,319,485 | 306,000 | 30.46 |
| 7 | 2009 | 178,500 | 34.40 | $6,140,400 | 127,500 | 26.77 | $3,413,175 | $9,553,575 | 306,000 | 31.22 |
| 8 | 2010 | 178,500 | 35.26 | $6,293,910 | 127,500 | 27.44 | $3,498,600 | $9,792,510 | 306,000 | 32.00 |
| 9 | 2011 | 178,500 | 36.14 | $6,450,990 | 127,500 | 28.12 | $3,585,300 | $10,036,290 | 306,000 | 32.80 |
| 10 | 2012 | 178,500 | 37.05 | $6,613,425 | 127,500 | 28.82 | $3,674,550 | $10,287,975 | 306,000 | 33.62 |
| 11 | 2013 | 178,500 | 37.97 | $6,777,645 | 127,500 | 29.55 | $3,767,625 | $10,545,270 | 306,000 | 34.46 |
| 12 | 2014 | 178,500 | 38.92 | $6,947,220 | 127,500 | 30.28 | $3,860,700 | $10,807,920 | 306,000 | 35.32 |
| 13 | 2015 | 178,500 | 39.90 | $7,122,150 | 127,500 | 31.04 | $3,957,600 | $11,079,750 | 306,000 | 36.21 |
| 14 | 2016 | 178,500 | 40.89 | $7,298,865 | 127,500 | 31.82 | $4,057,050 | $11,355,915 | 306,000 | 37.11 |
| 15 | 2017 | 178,500 | 41.92 | $7,482,720 | 127,500 | 32.61 | $4,157,775 | $11,640,495 | 306,000 | 38.04 |
| 16 | 2018 | 178,500 | 42.96 | $7,668,360 | 127,500 | 33.43 | $4,262,325 | $11,930,685 | 306,000 | 38.99 |
| 17 | 2019 | 178,500 | 44.04 | $7,861,140 | 127,500 | 34.26 | $4,368,150 | $12,229,290 | 306,000 | 39.97 |
| 18 | 2020 | 178,500 | 45.14 | $8,057,490 | 127,500 | 35.12 | $4,477,800 | $12,535,290 | 306,000 | 40.97 |
| 19 | 2021 | 178,500 | 46.27 | $8,259,195 | 127,500 | 36.00 | $4,590,000 | $12,849,195 | 306,000 | 41.99 |
| 20 | 2022 | 178,500 | 47.42 | $8,464,470 | 127,500 | 36.90 | $4,704,750 | $13,169,220 | 306,000 | 43.04 |

Levelized Value ($/MWH) in 2003$ 32.11

## *Snoqualmie Falls Refurbished Project*
## *Generation Value Projected Over 40-Year License*

Capital Recovery Factor 9.31%

| Period | Year | Avoided Cost ($/MWH) | Annual Value ($) | Present Worth ($) |
|---|---|---|---|---|
| 1 | 2003 | 0.00 | $306,000 | $279,938 |
| 2 | 2004 | 0.00 | $306,000 | $256,095 |
| 3 | 2005 | 0.00 | $306,000 | $234,284 |
| 4 | 2006 | 0.00 | $306,000 | $214,329 |
| 5 | 2007 | 0.00 | $306,000 | $196,075 |
| 6 | 2008 | 0.00 | $306,000 | $179,375 |
| 7 | 2009 | 0.00 | $306,000 | $164,098 |
| 8 | 2010 | 0.00 | $306,000 | $150,121 |
| 9 | 2011 | 0.00 | $306,000 | $137,335 |
| 10 | 2012 | 0.00 | $306,000 | $125,638 |
| 11 | 2013 | 0.00 | $306,000 | $114,938 |
| 12 | 2014 | 0.00 | $306,000 | $105,148 |
| 13 | 2015 | 0.00 | $306,000 | $96,193 |
| 14 | 2016 | 0.00 | $306,000 | $88,000 |
| 15 | 2017 | 0.00 | $306,000 | $80,505 |
| 16 | 2018 | 0.00 | $306,000 | $73,648 |
| 17 | 2019 | 0.00 | $306,000 | $67,376 |
| 18 | 2020 | 0.00 | $306,000 | $61,637 |
| 19 | 2021 | 0.00 | $306,000 | $56,388 |
| 20 | 2022 | 0.00 | $306,000 | $51,585 |
| 21 | 2023 | 0.00 | $313,619 | $48,367 |
| 22 | 2024 | 0.00 | $321,429 | $45,349 |
| 23 | 2025 | 0.00 | $329,432 | $42,520 |
| 24 | 2026 | 0.00 | $337,635 | $39,867 |
| 25 | 2027 | 0.00 | $346,042 | $37,379 |
| 26 | 2028 | 0.00 | $354,659 | $35,047 |
| 27 | 2029 | 0.00 | $363,490 | $32,861 |
| 28 | 2030 | 0.00 | $372,540 | $30,810 |
| 29 | 2031 | 0.00 | $381,817 | $28,888 |
| 30 | 2032 | 0.00 | $391,324 | $27,086 |
| 31 | 2033 | 0.00 | $401,068 | $25,396 |
| 32 | 2034 | 0.00 | $411,054 | $23,811 |
| 33 | 2035 | 0.00 | $421,290 | $22,326 |
| 34 | 2036 | 0.00 | $431,780 | $20,933 |
| 35 | 2037 | 0.00 | $442,531 | $19,627 |
| 36 | 2038 | 0.00 | $453,550 | $18,402 |
| 37 | 2039 | 0.00 | $464,844 | $17,254 |
| 38 | 2040 | 0.00 | $476,418 | $16,178 |
| 39 | 2041 | 0.00 | $488,281 | $15,168 |
| 40 | 2042 | 0.00 | $500,439 | $14,222 |
| | | | Total (2003$) | $3,294,195 |

## *Snoqualmie Falls Refurbished Project*
## *Average Cost of Capital Over Construction Period*

| Capital Type | Capital Structure | Marginal Cost | Weighted Forecast Cost Rate |
|---|---|---|---|
| Short-Term Debt | 2.4% | 6.80% | 0.16% |
| Long-Term Debt | 41.2% | 8.08% | 3.33% |
| Preferred Equity | 8.4% | 8.24% | 0.69% |
| Common Equity | 48.0% | 11.20% | 5.38% |
| Estimated Cost of Capital | 100.0% | | 9.56% |

# Cost of Capital from FMS study FE0195

**Structure**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Average |
|---|---|---|---|---|---|---|---|
| LTD | 41.47% | 40.74% | 41.44% | 40.49% | 41.59% | 41.59% | 41.22% |
| STD | 3.49% | 3.16% | 2.30% | 3.08% | 1.85% | 0.48% | 2.39% |
| PFD | 8.59% | 8.70% | 8.56% | 8.29% | 8.05% | 7.97% | 8.36% |
| CMN | 46.46% | 47.40% | 47.71% | 48.13% | 48.52% | 49.96% | 48.03% |
| Total | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**Incremental Cost Rates**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Average |
|---|---|---|---|---|---|---|---|
| LTD | 8.65% | 8.52% | 8.08% | 7.90% | 7.76% | 7.58% | 8.08% |
| STD | 7.37% | 7.19% | 6.67% | 6.56% | 6.53% | 6.48% | 6.80% |
| PFD | 8.76% | 8.64% | 8.30% | 8.06% | 7.91% | 7.78% | 8.24% |
| CMN | 9.95% | 10.49% | 11.64% | 11.91% | 11.54% | 11.67% | 11.20% |

**Incremental Weighted Cost of Capital**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Average |
|---|---|---|---|---|---|---|---|
| LTD | 3.59% | 3.47% | 3.35% | 3.20% | 3.23% | 3.15% | 3.33% |
| STD | 0.26% | 0.23% | 0.15% | 0.20% | 0.12% | 0.03% | 0.17% |
| PFD | 0.75% | 0.75% | 0.71% | 0.67% | 0.64% | 0.62% | 0.69% |
| CMN | 4.62% | 4.97% | 5.55% | 5.73% | 5.60% | 5.83% | 5.38% |
| Total | 9.22% | 9.42% | 9.76% | 9.80% | 9.58% | 9.63% | 9.57% |

## *Snoqualmie Falls Refurbished Project*
## *Existing Plant Balance*

| Category | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| **BOOK COST:** | | | | | | | | | | |
| Snoqualmie Plant #1: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 |
| Other | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 | 4,617,756.06 |
| Transmission | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 | 508,463.12 |
| Total | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 | 5,158,969.63 |
| Snoqualmie Plant #2: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 | 4,349,497.09 |
| Transmission | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 | 495,266.21 |
| Total | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 | 4,844,763.30 |
| Project Total | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 | 10,003,732.93 |
| **ACCUM. DEPRECIATION:** | | | | | | | | | | |
| Snoqualmie Plant #1: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 1,282,885.65 | 1,381,243.85 | 1,479,602.06 | 1,577,960.26 | 1,676,318.47 | 1,774,676.67 | 1,873,034.87 | 1,971,393.08 | 2,069,751.28 | 2,168,109.49 |
| Transmission | 263,650.07 | 269,395.70 | 275,141.34 | 280,886.97 | 286,632.60 | 292,378.24 | 298,123.87 | 303,869.50 | 309,615.14 | 315,360.77 |
| Total | 1,546,535.72 | 1,650,639.56 | 1,754,743.39 | 1,858,847.23 | 1,962,951.07 | 2,067,054.91 | 2,171,158.74 | 2,275,262.58 | 2,379,366.42 | 2,483,470.26 |
| Snoqualmie Plant #2: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 1,489,699.44 | 1,584,953.43 | 1,680,207.41 | 1,775,461.40 | 1,870,715.39 | 1,965,969.37 | 2,061,223.36 | 2,156,477.34 | 2,251,731.33 | 2,346,985.32 |
| Transmission | 193,151.00 | 203,848.75 | 214,546.50 | 225,244.25 | 235,942.00 | 246,639.75 | 257,337.50 | 268,035.25 | 278,733.00 | 289,430.75 |
| Total | 1,682,850.44 | 1,788,802.18 | 1,894,753.91 | 2,000,705.65 | 2,106,657.39 | 2,212,609.12 | 2,318,560.86 | 2,424,512.59 | 2,530,464.33 | 2,636,416.07 |
| Project Total | 3,229,386.16 | 3,439,441.73 | 3,649,497.31 | 3,859,552.88 | 4,069,608.45 | 4,279,664.03 | 4,489,719.60 | 4,699,775.18 | 4,909,830.75 | 5,119,886.32 |
| **NET BOOK VALUE:** | | | | | | | | | | |
| Snoqualmie Plant #1: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 | 32,750.45 |
| Other | 2,734,870.41 | 3,236,512.21 | 3,138,154.00 | 3,039,795.80 | 2,941,437.59 | 2,843,079.39 | 2,744,721.19 | 2,646,362.98 | 2,548,004.78 | 2,449,646.57 |
| Transmission | 244,813.05 | 239,067.42 | 233,321.78 | 227,576.15 | 221,830.52 | 216,084.88 | 210,339.25 | 204,593.62 | 198,847.98 | 193,102.35 |
| Total | 3,012,433.91 | 3,508,330.07 | 3,404,226.24 | 3,300,122.40 | 3,196,018.56 | 3,091,914.72 | 2,987,810.89 | 2,883,707.05 | 2,779,603.21 | 2,675,499.37 |
| Snoqualmie Plant #2: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 2,859,797.65 | 2,764,543.66 | 2,669,289.68 | 2,574,035.69 | 2,478,781.70 | 2,383,527.72 | 2,288,273.73 | 2,193,019.75 | 2,097,765.76 | 2,002,511.77 |
| Transmission | 302,115.21 | 291,417.46 | 280,719.71 | 270,021.96 | 259,324.21 | 248,626.46 | 237,928.71 | 227,230.96 | 216,533.21 | 205,835.46 |
| Total | 3,161,912.86 | 3,055,961.12 | 2,950,009.39 | 2,844,057.65 | 2,738,105.91 | 2,632,154.18 | 2,526,202.44 | 2,420,250.71 | 2,314,298.97 | 2,208,347.23 |
| Project Total | 6,174,346.77 | 6,564,291.20 | 6,354,235.62 | 6,144,180.05 | 5,934,124.48 | 5,724,068.90 | 5,514,013.33 | 5,303,957.75 | 5,093,902.18 | 4,883,846.61 |
| **ANNUAL DEPRECIATION:** | | | | | | | | | | |
| Snoqualmie Plant #1: | Depr. Rates | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 0.00% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 2.13% | 98,358.20 | 98,358.20 | 98,358.20 | 98,358.20 | 98,358.20 | 98,358.20 | 98,358.20 | 98,358.20 | 98,358.20 |
| Transmission | 1.13% | 5,745.63 | 5,745.63 | 5,745.63 | 5,745.63 | 5,745.63 | 5,745.63 | 5,745.63 | 5,745.63 | 5,745.63 |
| Total | | 104,103.84 | 104,103.84 | 104,103.84 | 104,103.84 | 104,103.84 | 104,103.84 | 104,103.84 | 104,103.84 | 104,103.84 |
| Snoqualmie Plant #2: | | | | | | | | | | |
| Hydraulic Production | | | | | | | | | | |
| Land | 0.00% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 2.19% | 95,253.99 | 95,253.99 | 95,253.99 | 95,253.99 | 95,253.99 | 95,253.99 | 95,253.99 | 95,253.99 | 95,253.99 |
| Transmission | 2.19% | 10,897.75 | 10,897.75 | 10,897.75 | 10,897.75 | 10,897.75 | 10,897.75 | 10,897.75 | 10,897.75 | 10,897.75 |
| Total | | 106,151.74 | 106,151.74 | 106,151.74 | 106,151.74 | 106,151.74 | 106,151.74 | 106,151.74 | 106,151.74 | 106,151.74 |
| Project Total | | 210,255.57 | 210,255.57 | 210,255.57 | 210,255.57 | 210,255.57 | 210,255.57 | 210,255.57 | 210,255.57 | 210,255.57 |

# *Snoqualmie Falls Refurbished Project*
# *Original Cost and Net Investment*

| Balances as of 12/31/94 | Book Cost | Accumulated Provision for Depreciation | Book Value |
|---|---|---|---|
| Plant 1 | | | |
| Hydraulic Production | | | |
| Land | 32,750.45 | 0.00 | 32,750.45 |
| Other | 4,017,756.06 | (1,282,885.65) | 2,734,870.41 |
| Transmission | 508,463.12 | (263,650.07) | 244,813.05 |
| | 4,558,969.63 | (1,546,535.72) | 3,012,433.91 |
| Plant 2 | | | |
| Hydraulic Production | | | |
| Land | 0.00 | 0.00 | 0.00 |
| Other | 4,349,497.09 | (1,489,699.44) | 2,859,797.65 |
| Transmission | 495,266.21 | (193,151.00) | 302,115.21 |
| | 4,844,763.30 | (1,682,850.44) | 3,161,912.86 |
| Total (1995$) | 9,403,732.93 | (3,229,386.16) | 6,174,346.77 |