

Yale Hydroelectric Project  
FERC Project No. 2071

Exhibit H - Response to Information

PacifiCorp  
Portland, Oregon  
April 1999

## EXHIBIT H CONTENTS

1.0 INTRODUCTION.....	1
2.0 APPLICANT’S QUALIFICATIONS TO OPERATE THE PROJECT .....	1
2.1 COMPANY AND PROJECT OVERVIEW.....	1
2.2 FINANCIAL RESOURCES .....	3
3.0 NEED FOR PROJECT ELECTRIC GENERATION.....	4
3.1 PACIFICORP’S 1995 INTEGRATED RESOURCE PLANNING PROCESS ...	4
3.2 ENERGY AND COST IMPLICATIONS OF LICENSE DENIAL .....	5
4.0 ALTERNATIVE POWER SOURCES .....	5
4.1 CAPACITY AND ENERGY REQUIREMENTS.....	5
4.2 COST OF ALTERNATIVE SOURCES OF POWER .....	9
4.2.1 Natural Gas-fired Resources .....	9
4.2.2 Cogeneration .....	9
4.2.3 Wind.....	9
4.2.4 Geothermal.....	10
5.0 INDIAN TRIBES POTENTIALLY AFFECTED BY THE PROJECT.....	10
6.0 EFFICIENCY IMPROVEMENT PROGRAM.....	11
7.0 HISTORICAL AND DAILY PROJECT OPERATION.....	11
7.1 PROJECT OPERATION DURING FLOOD CONDITIONS .....	13
7.2 PROJECT SAFETY .....	13
7.3 RECORD OF PROJECT HISTORY .....	14
7.4 PROJECT OUTAGES.....	14
7.5 STATEMENT OF LICENSE COMPLIANCE .....	14
8.0 LITERATURE CITED.....	15

FIGURES

Figure 3.2-1. Yale Project transmission area. .... 7

TABLES

Table 2.2-1. Statements of consolidated income and retained earnings..... 3  
Table 4.1-1. Total forecasted energy and peak load requirements for the PacifiCorp  
system..... 6  
Table 4.2-1. Capital cost of alternative supply-side resources..... 9  
Table 7.4-1. Yale Project forced outages. .... 15

## 1.0 INTRODUCTION

PacifiCorp owns and operates the Yale Hydroelectric Project (FERC Project No. 2071). The initial license was issued on April 30, 1951 and expires on April 30, 2001. PacifiCorp seeks a new license for the project. This application for new license is submitted in 3 volumes which contain the following:

Volume I	Initial Statement and Exhibits A, B, C, D, F, G, and H.
Volume II	Exhibit E
Volume III	Appendices to Exhibit E

Exhibit H presents the response to information required by the FERC as described in 18 CFR Section 16.10 (a) and (b).

Following this introduction, Section 2.0 describes the applicant's ability to operate the project. Section 3.0 discusses the need for project power, and Section 4.0 provides data describing alternative power sources. Section 5.0 lists Indian tribes potentially affected by the project. Section 6.0 describes PacifiCorp's electricity consumption efficiency improvement program. Finally, Section 7.0 provides information on project operations.

## 2.0 APPLICANT'S QUALIFICATIONS TO OPERATE THE PROJECT

### 2.1 COMPANY AND PROJECT OVERVIEW

PacifiCorp owns and operates 53 hydroelectric plants and serves as operator for 2 additional projects. These facilities are located throughout several states including Oregon, Washington, California, Idaho, and Utah. The projects contain a total of 91 turbine generator units which represent an installed capacity of approximately 1,100 MW, or about 12.8 percent of PacifiCorp's current total generating capacity.

The company employs 168 people to operate, maintain, and provide support for the hydroelectric generation facilities. This group, which is called the Hydro Resources Department, includes operations and maintenance personnel located at various project sites, as well as engineering and administrative support staff located in Portland, Oregon and Salt Lake City, Utah. Twenty-five people are employed at the Lewis River hydroelectric projects.

All Hydro Resources Department personnel are required to attend safety and training programs. Staff located in the Portland office attend 4 safety meetings per year. In addition, staff refresh their skills by attending additional training courses provided by the Company. Staff located at the Lewis River projects attend monthly safety and training meetings.

The Yale Hydroelectric Project is located on the North Fork Lewis River at River Mile (RM) 34. The site is approximately 23 miles east of Woodland, Washington and 45 miles northeast of Portland, Oregon. The North Fork Lewis River is a tributary to the Columbia River. Proceeding downstream, the Yale Project is the third hydroelectric project in a string of 4 facilities on the Lewis River. Swift Hydroelectric Projects No. 1 and 2 are located upstream at RM 47 and RM 44, respectively, and the Merwin Project is located downstream at RM 21. Swift No. 1 is owned and operated by PacifiCorp. Swift No. 2 is owned by the Cowlitz County Public Utility District and maintained and operated by PacifiCorp. The Merwin Project is owned and operated by PacifiCorp.

PacifiCorp is the major private landowner with about 3,300 acres in the Yale project vicinity. A small portion of PacifiCorp's land is within the Mount St. Helens National Volcanic Monument. Other adjacent lands in public ownership are managed by the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), the Washington Department of Natural Resources (DNR), and Clark County. PacifiCorp pays approximately \$35,000 in land use fees annually to the FERC.

PacifiCorp's operation of electrical systems (including the operation of the Yale plant) is coordinated using guidelines prescribed by the region's Northwest Power Pool (NWPP). PacifiCorp provides generation to the Northwest Power Grid following these guidelines. Generally power generated at Yale is utilized in the communities of Clark County, Washington; if additional electrical power is needed in the service area, it is wheeled in on Bonneville Power Administration (BPA) lines with an associated wheeling fee.

PacifiCorp is continually examining ways to improve plant operations and increase generation at its powerplants. PacifiCorp conducted a Resource Utilization Study (RUS) for the Yale Project in 1995, which evaluated the potential to increase generation and assessed the condition of existing project facilities. The focus of the study was to make the most effective use of the water resources available for power generation. Results of the study identified 2 major alternatives: upgrade current systems and/or project expansion. The upgrade alternative included review of upgrading 9 civil systems, 13 mechanical systems, and 14 electrical systems. The project expansion alternative identified adding new generation units in a second powerhouse and constructing a pump-storage facility as ways to significantly add capacity to the Yale Project.

Each of the alternatives has been evaluated by PacifiCorp. Evaluation criteria included a variety of factors such as environmental and recreation impacts, and cost-effectiveness to develop a balanced proposal for use of the waterway. The company has made the decision not to pursue the project expansion alternative; however, several system upgrades are still being considered. Such upgrades would not result in a major modification to the Yale Project but would address future maintenance and performance issues.

The Yale Project, as proposed in this License Application, is the best plan for developing the waterway as stated in Section 10(a)(1) of the Federal Power Act. The application represents a cost-effective, efficient, and environmentally balanced use of the water resources of the Lewis River.

## 2.2 FINANCIAL RESOURCES

PacifiCorp's sources of financing and annual revenues are adequate to meet the continuing operation and maintenance needs of the project. PacifiCorp is a utility with broad experience in the construction, operation, and maintenance of hydroelectric projects. The consolidated balance sheet from PacifiCorp's 1997 Annual Report is shown in Table 2.2-1.

**Table 2.2-1. Statements of consolidated income and retained earnings.**

Millions of dollars, except per share amounts for the year	1997	1996	1995
Revenues	\$6,278.0	\$3,803.7	\$2,806.8
Expenses			
Operations and maintenance	4,394.0	1,949.3	1,291.6
Administrative and general	334.4	244.8	186.6
Depreciation and amortization	476.9	423.8	333.7
Taxes, other than income taxes	99.8	99.4	104.3
Special charges	170.4	--	--
Total	5,475.5	2,717.3	1,916.2
Income from operations	802.5	1,086.4	890.6
Interest expense and other			
Interest expense	439.5	415.0	336.4
Interest capitalized	(12.5)	(11.4)	(14.9)
Minority interest and other	40.6	16.2	(24.7)
Total	467.6	419.8	296.8
Income before income taxes	334.9	666.6	593.8
Income taxes	109.5	236.4	191.8
Income from continuing operations before extraordinary item	225.4	430.2	402.0
Discontinued operations (less applicable income tax expense)	454.3	74.7	103.0
Extraordinary loss from regulatory asset impairment (less applicable income tax expense)	(16.0)	--	--
Net income	663.7	504.9	505.0
Retained earnings, January 1	782.8	632.4	474.3
Cash dividends declared			
Preferred stock	(20.0)	(29.1)	(38.4)
Common stock per share of \$1.08	(320.0)	(317.9)	(306.6)
Preferred stock retired	(0.2)	(7.5)	(1.9)
Retained earnings, December 31	\$1,106.3	\$782.8	\$632.4
Earnings on common stock (net income less preferred dividend requirement)	\$640.9	\$475.1	\$466.3
Average number of common shares outstanding (thousands)	296,094	292,424	284,272
Earnings per common share	\$2.16	\$1.62	\$1.64

### 3.0 NEED FOR PROJECT ELECTRIC GENERATION

#### 3.1 PACIFICORP'S 1995 INTEGRATED RESOURCE PLANNING PROCESS

On a periodic basis, PacifiCorp completes a comprehensive analysis of future load growth, the ability of existing power plants to meet customers' electric energy service needs, and the need for new resources, including new power plants and customer efficiency programs. This process, referred to as the Resource and Market Planning Program (RAMPP), provides a long-range plan and framework for evaluating alternative resource and market decisions. The RAMPP also complies with regulatory commission requirements for integrated resources planning.

The fifth and most recent RAMPP report (RAMPP-5) was completed in December 1997. The discussion below is a summary of detailed information which is provided in that document (PacifiCorp 1997).

The 1997 RAMPP-5 process used a comprehensive simulation model to forecast scenarios of customer future electricity needs for the period 1998 to 2007. The forecasts of load growth range from a high of 2.06 percent in the winter to a low of 1.92 percent in summer. Based on demographic and economic indicators, a medium annual growth of about 2.02 percent is considered the most likely future scenario.

Assuming a medium level of growth, the analysis indicates that PacifiCorp will need to add approximately 1,154 MW of baseload resources in the next 10 years. As with the RAMPP-4, the RAMPP-5 analysis demonstrated that the least-cost supply-side resource alternative for meeting this projected baseload need is gas-fired cogeneration, followed by gas-fired combined cycle combustion turbine. Coal-fired resources cost about 2 mills/kWh more, and renewables are even more expensive.

Based on the RAMPP-5 least-cost planning results, combined with expected cost-effectiveness, an action plan was developed with the following components:

- **Demand Side Management (DSM):** Implement the amount of demand side activity consistent with a competitive utility environment, considering cost, financial, and price impacts. Continue with ongoing DSM activity, finding the most cost-effective areas for investment. Achieve 9 to 13.5 megawatt average (MWa) of installed cost-effective savings in 1998, and an additional 9 to 13.5 MWa in 1999.
- **Existing System:** Continue to make cost-effective improvements to the existing generation, transmission, and distribution systems.
- **Other Opportunities:** Pursue cost-effective resource acquisition opportunities that meet the future needs of the Company.

### 3.2 ENERGY AND COST IMPLICATIONS OF LICENSE DENIAL

The Yale Project is largely used to provide peak period energy requirements. This operation levelizes the remaining load that other generating resources must meet, allowing baseload resources to operate at full capacity for a longer period of time, enhancing overall system efficiency.

PacifiCorp's current plan for meeting retail customer demand includes the generation associated with the Yale Project. Should this power be unavailable, its replacement would be required to meet current customer demand. Over the short-term, replacement power would have to be purchased on the open market. Over the long-term, new energy sources would be required to replace lost power.

The cost to replace power lost from the Yale Project can be represented generally using PacifiCorp's Oregon avoided costs. These costs are based on a 30-year levelized energy cost of 25.12 \$/MWH which includes a levelized capacity cost. As previously stated, the levelized cost for the Yale Project is 13.91 \$/MWH.

In general, cost of replacement energy would be proportionately borne by PacifiCorp's wholesale and retail customers. More specifically, however, the loss of project energy would affect PacifiCorp's ability to serve the local load demands in the project area. Power from the Yale Project is used by both residential and commercial customers in communities located in Clark County. Located just north of Portland, Oregon, the county is experiencing a major increase in the construction of new homes and commercial business. This increase in development is expected to continue into the future.

Without the local generation, PacifiCorp would be required to purchase power and wheel it into the community via BPA transmission lines, incurring a fee for purchasing the power and wheeling. The local transmission network is depicted on Figure 3.2-1. The Yale Project also provides voltage control and system stability for the area. This benefit would be lost if PacifiCorp is denied a license to operate the project.

Continued operations at the Yale Project are considered superior to decommissioning at this time.

PacifiCorp uses less than 1 percent of the power associated with the Yale Project for its own industrial facility and/or related operations.

## 4.0 ALTERNATIVE POWER SOURCES

### 4.1 CAPACITY AND ENERGY REQUIREMENTS

PacifiCorp currently provides electricity and related energy services to 1.4 million customers in 7 western states: California, Idaho, Montana, Oregon, Utah, Washington, and Wyoming. Of the total energy sales in 1997, retail sales accounted for approximately 44 percent with the remaining 56 percent accounted from wholesale sales. PacifiCorp's



retail sales are divided between industrial customers (45 percent), commercial customers (26 percent), residential (28 percent), and other (1 percent).

In 1997, PacifiCorp system energy requirements were 50,806,633 MWh. PacifiCorp's system capability (generating capability and firm purchases at time of firm peak) in 1997 was 12,618 MW for the winter and 12,343 MW for the summer. The winter and summer net system peak loads (excluding off-system sales) were 7,960 MW and 7,552 MW, respectively. About 68 percent of the Company's capacity comes from Company-owned thermal generating plants, 13 percent from hydro generation, and 19 percent from power purchases (mainly hydro-based). The company currently meets its energy requirements with about 72 percent thermal generation, 9 percent company-owned hydro, and 19 percent power purchases. Actual amounts of power supply from each source vary year-to-year, depending on water availability and coal-fired plant status. PacifiCorp generally uses its coal plants for most of its baseload needs and uses its hydroelectric resources to respond to hourly, daily, weekly, and seasonal load fluctuations.

PacifiCorp's annual energy requirements in the year 2007 are forecast to range between 6,174 MWa and 6,792 MWa (Table 4.1-1). The winter and summer coincidental peak load forecasts for year 2007 range from 8,418 and 8,400 MWa, respectively, in the 10 percent adjustment case to 9,260 and 9,240 MWa in the without adjustment case. The adjustment case is included as the Company currently anticipates a 10 to 20 percent loss in some regulated retail load over the next few years as a result of open access and increasing competition.

**Table 4.1-1. Total forecasted energy and peak load requirements for the PacifiCorp system.**

	Energy		Winter Peaks		Summer Peaks	
	Avg. Annual Growth Rate %	Total MW at 2007	Avg. Annual Growth Rate %	Total MW at 2007	Avg. Annual Growth Rate %	Total MW at 2007
RAMPP-5	2.02	6,792	2.06	9,260	1.92	9,240
RAMPP-5 10% adjusted	2.02	6,174	2.06	8,418	1.92	8,400

Operation reserve requirements use the Western System Coordinating Council (WSCC) and NWPP guidelines. Operating reserves ensure day-to-day reliability. The guidelines identify spinning and non-spinning reserves. The WSCC requires its members to maintain the following operating reserve: sufficient spinning reserve to provide a regulating margin, plus an additional amount of operating reserve equal to the sum of 5 percent of committed hydroelectric generation and 7 percent of committed thermal generation (at least half of which must be spinning reserve).



Figure 3.2-1. Yale Project transmission area.

PacifiCorp  
Yale Hydroelectric Project  
FERC Project No. 2071

back of color photo

## 4.2 COST OF ALTERNATIVE SOURCES OF POWER

As a part of the RAMPP-5 analysis, a variety of alternative supply-side and demand-efficiency resource acquisitions were evaluated (Table 4.2-1).

**Table 4.2-1. Capital cost of alternative supply-side resources.**

Source	\$/Kw (Total Capital Cost)	Replacement Cost (millions) <sup>1</sup>	Annual O&M Cost (millions) <sup>1</sup>
Relicensing <sup>2</sup>		---	
Natural Gas	390	52.3	2.99
Cogeneration	490	65.7	0.76
Wind	1,215	162.8	9.46
Geothermal	2,376	318.4	2.53

<sup>1</sup> Cost estimates derived from RAMPP-5, Table 4-19 using 134,000 kW project generation.

<sup>2</sup> The cost of relicensing the Yale Project is estimated to be \$6 million for license preparation. Because the Yale Project is part of the alternative approach for relicensing the North Fork Lewis River projects, the cost of implementation and project modification will not be known for several years.

### 4.2.1 Natural Gas-fired Resources

The best available technology for utilizing natural gas is a simple-cycle combustion turbine (SCCT). SCCT technology is mature and commercially available. Construction lead times are about 2 years with another 2 years needed for the necessary permits. Environmental impact is low, with the greatest problem being nitrogen oxide (NO<sub>x</sub>) emissions, but control technologies are available.

The advantages of SCCTs include relatively low capital cost and flexible load shaping capability (i.e., they respond easily to fluctuations in electrical load). The main disadvantages of an SCCT are its high heat rate (i.e., they require more fuel to produce a kWh of electricity than a coal plant, for example) and uncertainty over the future cost and supply of natural gas. Because of higher fuel costs, utilities typically use SCCTs to provide peaking power only. The estimated capital cost for an SCCT unit in Oregon is \$390/kW.

### 4.2.2 Cogeneration

Cogeneration facilities require extraction steam from a factory or industrial plant. The technology is mature and commercially available. Siting a cogeneration plant should be relatively straightforward. The difficulty with this technology is partnering with the industrial user. The estimated capital cost for siting a cogeneration facility in Oregon, Washington, or California is \$490/kW.

### 4.2.3 Wind

Wind turbine technology has changed significantly over the past decade and is now entering a third generation of development and testing. Units in the 50 to 500 kW range

are a proven technology. Advantages of wind power include size flexibility, minimum environmental impact, no fuel cost, and a short lead time for construction.

Disadvantages of wind power include a low capacity factor, variable energy source (i.e., wind), and potential aesthetic and avian impacts. Wind is also a difficult resource to schedule without disrupting existing resources, and requires additional reserves from other resources to offset its output variations. Thus, wind turbines do not provide predictable capacity (or reserves). Potential environmental consequences of wind power development include adverse impacts to aesthetic resources and wildlife concerns, particularly impacts to raptors resulting from collisions with turbine propellers. Noise and public safety are also potential concerns.

Capital cost for wind resource development is estimated at \$1,215/kW for the Oregon, Washington, and California region.

#### 4.2.4 Geothermal

Geothermal facilities require only 2 to 3 years for construction. However, pre-construction studies to confirm the quantity and quality of a geothermal resource are difficult and expensive; long-term reliability of current technology remains uncertain, and site availability is limited. Currently, the PacifiCorp service area includes up to 4 potential geothermal sites, although PacifiCorp does not currently hold geothermal leases for these areas.

Cost estimates for developing geothermal power in the Oregon, Washington, and California area are approximately \$2,376/kW. Actual energy costs for geothermal power will vary considerably from site to site.

## 5.0 INDIAN TRIBES POTENTIALLY AFFECTED BY THE PROJECT

The Yale Project does not occupy any established Indian tribal reservation; however, 2 Pacific Northwest Indian Tribes have treaty-protected rights which may be affected by the Yale Project. To keep the tribes informed on how the project may affect those protected rights, PacifiCorp consulted with the following Indian tribes or organizations:

Yakama Indian Nation  
PO Box 151  
Toppenish, WA 98948

Cowlitz Tribe  
PO Box 2547  
Longview, WA 98632

U.S. Bureau of Indian Affairs  
911 NE 11th Avenue  
Portland, OR 97232-2036

Consultation with the two tribes is described in Section 6.4 of Exhibit E.

## 6.0 EFFICIENCY IMPROVEMENT PROGRAM

PacifiCorp has long been an innovator in energy efficiency programs. In the late 1970s, the Company's zero interest weatherization program helped residential customers overcome the financing hurdle for efficiency improvements. The Hood River Conservation Project, in which PacifiCorp and other suppliers weatherized homes in an entire community, provided a national model for what concerted utility efforts can achieve. The Company sponsored Energy Edge to demonstrate the energy savings possible for new commercial buildings. Similarly, the Super Good Cents program promotes energy-efficient residential construction and the development of new building codes for efficiency. The Energy FinAnswer program allows financing to new commercial customers for peak load reduction measures.

PacifiCorp views an appropriately sized demand-side management (DSM) program as a means of deferring the need for investments in new plants and as a means to help the Company in meeting the challenges of an increasingly competitive environment. PacifiCorp's RAMPP-5 Action Plan includes achieving 9 to 13.5 MWa of installed cost effective savings in 1998, and an additional 9 to 13.5 MWa in 1999. The range is a reasonable target based on a load loss of 10 to 30 percent due to open access and competition by the year 2002.

The Company is concerned about its ability to achieve DSM targets because of growing reluctance on the part of industrial customers to implement or pay the up-front capital costs for DSM projects. With direct access pilots and the market opening in California, customers are requesting price reductions in the form of access to open markets rather than remaining concerned about long-term power costs. However, PacifiCorp continues to support ongoing programs to achieve DSM goals.

## 7.0 HISTORICAL AND DAILY PROJECT OPERATION

The Yale Hydroelectric Project is 1 of 4 hydroelectric projects on the North Fork of the Lewis River. Yale, in conjunction with the Swift and Merwin projects, is normally operated during the day as a peaking project. This means that the project is operated to provide energy during times of peak customer energy load, usually from 6:00 a.m. to 10:00 p.m. Daily inflows to the North Fork of the Lewis River system are utilized by the hydroelectric projects to meet the generation system peaking requirements while maintaining project minimum flow, reservoir level, and storage constraints.

The Yale Project is visited daily. The powerhouse can be remotely operated from Merwin. Merwin is staffed 24 hours a day with at least 1 operator per shift. The Yale operators live in a village near the Yale powerhouse and are available for local control on short notice.

Power schedule requirements are determined by the Portland Dispatch Center and relayed via the SCADA system to the Merwin control center. The Yale units are then operated from the Merwin control center. The Yale units can be operated in any 1 of 3 control modes, as follows:

- Local Manual Operation - To start a unit on local manual, the operator verifies that the lube oil pump for the turbine guide bearing is operating and the bearing oil level is normal. The operator can then push the start button, and the unit will roll and come up to speed. Once up to speed, the operator turns on the synchroscope and manually synchronizes the unit to the line, and closes the breaker to connect the unit to the system. The output and voltage can then be adjusted manually as required by the Merwin or Yale operator.
- Local Auto Operation - To start a unit on local auto, the operator verifies that the lube oil pump for the turbine guide bearing is operating and the bearing oil level is normal. The operator can then push the start button, and the unit will roll, come up to speed, synchronize, and close the breaker automatically. The output and voltage can then be adjusted by the Merwin or Yale operator.
- Remote Auto Operation - To start in remote auto, the selector switch located at the Yale plant must be in the "remote auto" position, and the unit auxiliaries must be functioning normally. The Merwin operator can then send a start signal via the SCADA system, and the unit will roll, come up to speed, synchronize, and close the breaker automatically. The Merwin operator can then adjust the load as required or put the unit on load control. When the unit is on load control, the Portland Dispatch Center computer controls the load directly.

Yale Lake is operated in conjunction with Swift Reservoir and Lake Merwin and PacifiCorp's Standard Operating Procedures (SOP) Manual to schedule system generation and provide for flood storage during periods of high runoff. PacifiCorp further restricts Yale Lake level fluctuations during summer for recreational considerations. The Yale Lake operating levels are as follows:

- Maximum - 490.0 feet
- Minimum Summer - 480.0 feet
- Normal Minimum Operating - 470.0 feet
- Minimum Operating - 430.0 feet (per USGS)
- Minimum of Record (February 1957) - 435.65 feet
- Minimum Pool - 430.0 feet

Normal plant operation consists of receiving megawatt requirements on the load controller from Portland Dispatch Center via the SCADA system at the Merwin control center. The Yale units are then operated from the Merwin control center to meet

Portland's request. The load controller, if selected to run the units, can automatically change the Yale plant output as required to meet the demand from Portland. When the Yale Project is no longer required to meet demand, Portland provides a zero megawatt requirement on the load controller and calls the Merwin control center to have the Yale units unloaded and taken off-line. During periods of high runoff and large streamflows, the plant is typically operated 24 hours a day to maintain reservoir level requirements.

## 7.1 PROJECT OPERATION DURING FLOOD CONDITIONS

The Yale Project, although operated remotely from the Merwin powerhouse, is routinely visited every day. The Merwin powerhouse is staffed 24 hours per day by an operator who has constant displays of reservoir and tailwater elevations for the 4 Lewis River hydro projects. In addition to the Company's monitoring equipment, the National Weather Service operates a network of river stage and reservoir elevations gages that automatically telemeter events on the Lewis River when the water level rises or falls a predetermined increment. The event data are received at the Cowlitz County Emergency Services office and simultaneously at the National Weather Service offices in Portland and Seattle.

During flood conditions, the project is operated using special guidelines established to manage peak storm runoff. Specific operating procedures are implemented that dictate flood control storage directives for the plant operators. When spill is necessary at the Merwin Project (downstream of Yale Project), PacifiCorp notifies a pre-established list of entities located downstream and the National Weather Service.

The Lewis River hydroelectric projects (Merwin, Yale, and Swift No. 1) Emergency Action Plan (EAP) details the procedures that PacifiCorp will take in the unlikely event of a dam failure (PacifiCorp 1993). The document was prepared in accordance with the FERC Guidelines issued February 22, 1988. The primary purpose of the EAP is to provide maximum early warning to people who may be affected by the sudden release of water caused by natural disaster, accident, or failure of any component of the Lewis River Hydroelectric Projects. Copies of the current EAP are kept at all times at the project and at appropriate company dispatch offices. Copies are also provided to county agencies that deal with emergency services in the project vicinity. The EAP clearly identifies whom PacifiCorp personnel must contact in the event of an emergency. The EAP describes the actions taken to provide public notification. PacifiCorp annually tests the EAP using a simulated emergency and provides training to responsible personnel.

## 7.2 PROJECT SAFETY

The expertise of PacifiCorp personnel is illustrated by the project's safety record. PacifiCorp maintains personnel safety records for a 5-year period as required by state law. In reviewing those records (1992 through 1997), there have been no lost time accidents and no deaths associated with project activities or operations.

The current public safety plan was submitted to the FERC Portland Regional office on September 30, 1992. The plan was subsequently accepted on October 20, 1992.



PacifiCorp has reviewed its records reporting accidental injury or deaths to members of the public. In 1997 there was a drowning on Yale Lake when a small motorized boat carrying 2 people capsized. The survivor went into hypothermia; however, she was able to cling to the boat until rescue. The police report deemed the cause of the accident to be alcohol related. In July 1995, a boy injured his leg while playing at Beaver Bay Park. Two years later in September 1997, there was an altercation between 2 campers at Cougar Campground. One man received minor injuries to his face as a result of the fight. There has been no remedial action required of PacifiCorp. No other injuries or deaths were found in the records for this period.

Fencing restricts public access to hazardous areas near Yale dam and powerhouse. Appropriate warning signs are placed at recreation areas throughout the project. Log booms are in place at the Saddle Dam day use area, and in front of the spillway section and powerhouse intake.

To maintain a safe environment, project facilities are inspected on a regular basis. The powerhouse and dam are inspected daily. The spillway gates and motors are tested each year to pass high flows. The project is inspected by the FERC staff from the Portland Regional Office every 3 years. The last FERC inspection was on August 20, 1997.

### 7.3 RECORD OF PROJECT HISTORY

The Yale Project was constructed from 1951 to 1953. Commercial operation began in September 1953. Since original construction, the project has undergone significant improvements to the No. 1 and No. 2 turbines and generators. A list of other project improvements is included in Exhibit C.

### 7.4 PROJECT OUTAGES

For the 7-year period of 1992 through 1998, Table 7.4-1 lists unscheduled outages at the Yale Project. The table includes duration, cause, and action taken.

### 7.5 STATEMENT OF LICENSE COMPLIANCE

Review of PacifiCorp compliance records shows that the Yale Project has been operated in compliance with the FERC license since it was issued.

**Table 7.4-1. Yale Project forced outages.**

<b>Yale Outages</b>			<b>Action Taken</b>
<b>Date</b>	<b>Total time off</b>	<b>Reason</b>	
<b>1998</b>			
2/6/98	9 hours	Close coil	Replaced bad coil. Unit back online.
3/11/98	30 minutes	System bump	Mechanical overspeed took unit off. Reset ok.
<b>1997</b>			
11/27/97	26 hours	Limb from osprey nest	Cleaned transformer bushings. restarted units.
<b>1996</b>			
1/15/96	30 minutes	Lost Kalama line	Reset 86a and 86n lockouts, put units back on.
11/7/96	1 hour	Undervoltage trip	U.P.S. undervoltage. Changed power source.
<b>1995</b>			
10/30/95	1.5 hours	Overspeed trip	Cause of trip unknown. Reset and started Unit 1.
12/9/95	2 hours	Fault on Lake line	P.U.D. section isolated. Units back on line.
<b>1994</b>			
12/30/94	1.5 hours	Lost Battleground line	Back on when load permitted.
<b>1993</b>			
1/6/93	4 minutes	Sudden press. Relay	Accidental trip by wireman. Units back on.
6/17/93	5 hours	CO2 trip	Found worn sensor wiring. Repairs made immediately.
12/1/93	2 hours	Overspeed trip	Cause unknown. Reset and restarted Unit 1.
<b>1992</b>			
5/23/92	30 minutes	Overvoltage trip	Cause unknown, put Unit 1 back on.

## 8.0 LITERATURE CITED

PacifiCorp. 1997. Resource and Marketing Planning Program. Portland, Oregon.

PacifiCorp. 1993. Lewis River Hydroelectric Projects Emergency Action Plan (EAP). Portland, Oregon.