Exhibit C

Clackamas River Hydroelectric Project (FERC No. 2195)

Project Operating Plan

Submitted by:

Portland General Electric Company

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PROJECT OPERATING PLAN

FOR CLACKAMAS RIVER HYDROELECTRIC PROJECT

1. Background and Introduction

This Operating Plan ("Plan") describes in detail the operating rules and constraints for the Clackamas Project. This Plan was developed as part of the Clackamas Settlement Negotiations in 2004 and 2005 and is part of the final Settlement Agreement. This Plan has been used to develop draft FERC license articles that will govern Project operation. Specific requirements for water levels, flow rates, and changes in flow are described in this Plan. Where two requirements are described herein that affect the same operating aspect, such as a water level on a given date, the more restrictive of the two requirements will govern.

The final Settlement Agreement includes monitoring of non-power resources that may trigger unique constraints on Project operation. (For example, amphibian studies around Timothy Lake may lead to additional operating constraints.) In these cases the agreed-upon limit on Project operation is described. The reader is referred to other portions of the Settlement Agreement for details of the non-power resource monitoring plans and programs.

Operating plans for Project facilities related to fisheries and other non-power resources, such as fish ladders and downstream fish passage facilities, are not included in this Project Operating Plan. For the operation of these non-power facilities, see the "Fish Passage and Protection Plan," which is also part of the Settlement Agreement. In addition, PGE will conduct various studies or analyses during the term of the new license, the conclusions of which may result in changes to this Operating Plan. These studies will be conducted in consultation with the Fish Committee, and in some cases, with the approval of the Fish Agencies, as those terms are defined in the Settlement Agreement. Specific consultation and approval requirements are specified in the Fish Passage and Protection Plan.

As part of the Operating Plan, PGE will provide a group of operating reports for the Project. These reports will document operating incidents that occur and will provide detailed annual summaries of the Project operation.

This operating Plan describes operating constraints and criteria for the following:

- Timothy Lake and Timothy Dam
- Lake Harriet and Harriet Dam
- Frog Lake and Oak Grove Powerhouse
- North Fork Reservoir and Dam
- Faraday Diversion Dam
- Faraday Forebay and Powerhouse
- Estacada Lake and River Mill Dam
- Annual Project Operations Reports
- River Mill Operation Year-Three Review and Re-Opener
- River Mill Operation Year-Seven Review
- Verification Study for Flows Below River Mill
- Scheduling of Maintenance Activities.

Specific elements of the Licensee's operating proposal for each facility, the operations reports, and the future review provisions are described below.

2. Timothy Lake and Timothy Dam

A. Lake Levels

The water level in Timothy Lake will be managed on a seasonal basis to enhance a variety of aquatic, terrestrial, recreational and cultural resources. PGE shall operate the Project to achieve a spring refill and maintain Timothy Lake water levels, as shown in Table 1.

Table 1. Timothy Lake Operation, Level Constraints, and Monitoring

Date	Lake Elevation, ft	Notes
Memorial Day through Labor Day	3189.0 min, 3191.5 max	Refill goal of 3190.0 or higher by July 1, maximum summer drawdown of 1.5 ft
Day after Labor Day through Day before Memorial Day	3191.9 max, 3170.0 normal min	
Day after Labor Day through Day before Memorial Day	3125 extreme min	Drawdown to the extreme minimum is permitted in extraordinary situations.
Drawdown to elevation 3125 is permitted in the following situations: (1) drawdown needed for safe passage of anticipated flood flows to minimize damage to life and property; (2) drawdown required to complete repairs on Project facilities (including spillway gates, the intake structures, or other dam structures); and (3) power emergencies, as defined in the Western States Coordinating Council Minimum Operating Reliability Criteria (March 8, 1999), as such criteria may be amended during the license term.		
Additional Summer Drawdown Constraints		
1. No drawdown below 3190.0 before August 1 (drawdown below 3190.0 will be delayed to August 15 if amphibian monitoring shows effects on amphibians). 2. Maximum drawdown of 1.5 ft, from the highest lake level achieved after Memorial Day 3. Drawdown after Labor Day is limited by the maximum flow release below Timothy Dam		
Lake Level and Resource Monitoring		
1. Monitor lake level to 0.01 ft increments, on 30 second intervals. 2. Record level on hourly basis. 3. Amphibian monitoring in August, to assess effect of lake levels below 3190.0.		

B. Flows Below Timothy Dam

Flow releases from Timothy Lake are typically made by a combination of the Howell Bunger Valve, the hydro turbine in the dam outlet works, and the spillway gates at the crest of Timothy Dam. PGE will operate this flow control equipment to provide the flows and ramping rates described in Table 2.

Table 2. Timothy Dam Flow Releases, Ramping and Monitoring

Date	Flow Release, cfs		Notes
	Minimum	Maximum	
Memorial Day through Labor Day	60 cfs or inflow, whichever is less	Inflow + 70	
Day after Labor Day through Sept 30		Inflow + 100	
Oct. 1 through Oct 31		Inflow + 150	
Nov. 1 through Nov 30		Inflow +300	Limit of three large scale flow events during this period
Dec. 1 through Feb. 28/29	30 cfs or inflow, whichever is less		
Mar. 1 through day before Memorial Day	40 cfs or inflow, whichever is less	Inflow +100	

Additional Maximum Flow Release Constraints

1. During the period from Nov 1 through Feb 28/29, PGE will allow no more than three large-scale flow events, defined as a day or series of consecutive days in which Timothy Lake outflow exceeds inflow by 200 cfs or more. This limitation would not apply during system power emergencies or equipment failures at Timothy Lake Dam or Oak Grove Powerhouse.

Ramping Rates

1. Ramping rates below Timothy Lake shall be controlled by PGE's operation of the Timothy Lake facilities and shall be measured at the USGS Government Camp gage.

2. PGE shall operate the project with the following limits for stage changes below the Timothy Lake development, except **during** certain extraordinary conditions, including: (1) anticipated flood events; (2) any event that triggers the Project Emergency Action Plan; (3) rapid changes in Timothy Lake inflows, when the rate of inflow change exceeds the stage change limits; (4) periods when flow must be passed through the tainter (spillway) gates because flows exceed the capacity of the Howell Bunger valve; and (5) equipment failures or emergencies at the project facilities. During such extraordinary conditions, the Licensee may deviate from these stage change limits, but shall attempt to minimize the frequency and duration of events when the stage change rate exceeds these limits. If the stage change limits are so modified, the Licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

3. Declines in stream stage at the USGS gage will not exceed 0.2 ft in any 1 hour period year-round, except during extraordinary circumstances.

4. Increases in stream stage at the gage will not exceed 0.2 ft in any one hour period except during extraordinary circumstances and during days associated with inflow events that result in average daily inflows to Timothy Lake exceeding 600 cfs.

Flow Monitoring and Studies
1. To monitor compliance with this requirement, the Licensee shall record the time and stage change at the USGS Government Camp gage and shall report any stage changes that are greater than the stage change limitations identified above to the Fish Committee and the Commission. 2. PGE will improve monitoring of USGS Government Camp gage flows by providing satellite telemeter to USGS gage to access real time data. Use most current USGS rating tables for the flow measurement. 3. PGE will conduct a USGS gaging study below Timothy Dam to establish the relationship between flows immediately below the dam to the USGS gage and to measure the contribution of accretion flows to the USGS gage. The study will be used to measure Timothy Lake releases by accurately adjusting the USGS gage readings.

3. Lake Harriet and Harriet Dam

A. Lake Levels

PGE will maintain the water level in Lake Harriet at the normal reservoir elevation of 2,039 ft. This includes 3.9 ft of flashboards, a one-foot raise over the existing operation. During periods of spill at Harriet Dam the water level in Lake Harriet will exceed the normal maximum level as the spill flow overtops the dam flashboards. The minimum water level of Lake Harriet is 2,020 ft, which could occur during major repairs of the dam or Frog Lake Intake structure.

B. Flows Below Harriet Dam

Flow releases from Harriet Dam will include base flows throughout the year, combined with higher flow releases during winter floods and spring runoff events as described below. Flows will vary to help support a stream restoration strategy for the lower Oak Grove Fork. This strategy is aimed at improving geomorphic processes while increasing the quantity of high quality habitat available for native anadromous species. To establish both base flows and the snowmelt runoff operating characteristics, PGE will predict the snowmelt runoff volume by April 1 of each year. PGE will use this runoff volume estimate to classify the year as WET, NORMAL, or DRY, as defined in Table 3. Within six months of license issuance, PGE will develop a protocol for determining whether a year will be "wet," "normal," or "dry."

Flow releases will typically be made by a new flow release facility at the dam, designed to provide the required baseflows. Winter flood and snowmelt runoff releases will be made by a combination of the new flow release facility and by flows over the dam flashboards. PGE will operate Harriet Dam to provide the baseflows, winter flood flows, snowmelt runoff flows, and ramping rates described in Table 3.

The base flow facility will consist of a pipe tap at the downstream portal of the Frog Lake tunnel, leading to a flow control valve and base-flow pipeline extending to the Oak Grove Fork at a location near the Crack in the Ground site. The system will be sized and designed to accurately release flows in the range of 70 to 100 cfs. The pulse-flood flow release system will consist of a new sharp-crested weir constructed as part of the flashboards at the crest of Harriet Dam and will be used to release flows above the capacity of the base flow system.

If a member of the Fish Committee presents information to the Fish Committee demonstrating a need for fall pulse flow, PGE will consider reducing summer baseflows with consensus of the Fish Committee and with ODEQ approval.

Table 3. Harriet Dam Flow Releases

Date	Base Flow Release, cfs		
	Wet Year	Normal Year	Dry Year
April 1 to June 15	100	90	80
June 16 to August 31	100	90	80
Sept. 1 to Sept. 30	100	90	80
Oct. 1 to Oct. 15	100	100	100
Oct. 16 to Dec. 15	80	80	80
Dec. 16 to March 31	70	70	70

Definition of Wet, Normal, and Dry Water Years	
	Forecasted April 1-September 30 Inflows
Wet	>182,000 acre-ft
Normal	<182,000 acre-ft and >123,000 acre-ft
Dry	<123,000 acre-ft

Winter Flood Flows
1. Between January 1 and March 31, Harriet Dam will be operated to pass all instantaneous peak flows greater than 1,300 cfs for approximately 10 hours (assumed to be an entire day for water volume estimates) and then resume the 600 cfs diversion. Operationally, once instantaneous flows exceed 1,300 cfs, as estimated based on the sum of flows in the Frog Lake pipeline, the base flow release, and spill at Harriet Dam, PGE will shut down the Frog Lake flowline diversion for approximately 10 hours (creating a "full spill event") to allow all flow to pass to the lower Oak Grove Fork. 2. Some years have many high flows greater than 1,300 cfs, so PGE will conduct full spill events for the first four events of the year during the January 1-March 31 window, where full spill events must be at least 5 days apart. After the first four full spill events occur, the Frog Lake flowline diversion will continue at a 600 cfs diversion for all additional flow events greater than 1,300 cfs. If spinning reserve is called upon during the approximately 10-hour "full spill event" period, diversions can be resumed as soon as possible and the full spill event ended. 3. Upon the request of the Fish Committee, PGE shall implement the winter flood protocol described above, beginning in any month from October through January. The Fish Committee must make any such request at the beginning of the calendar year.
Snowmelt Runoff Events
1. PGE will release flows from Harriet Dam to simulate flows that occur during snowmelt runoff events. The specific protocol for these flow releases is as follows: 2. For WET water years, the peak flow release will be 150 cfs for 54 days, then the flow release will be ramped down to baseflows at 10 cfs/day. For NORMAL water years, the peak flow release will be 250 cfs for 3 days, ramping down at 20 cfs/day to 150 cfs, then ramping down to baseflows at 10 cfs/day. For DRY water years, the peak flow release will be 200 cfs for 3 days, ramping down at 20 cfs/day to 150 cfs, then ramping down to baseflows at 10 cfs/day. 3. PGE operators will be given the flexibility to begin a snowmelt runoff event any time from April 20 to May 15 to tier off natural snowmelt runoff events. If no significant natural snowmelt release occurs by May 14, then PGE will begin the snowmelt release by May 15. Spill events that are greater than the release requirement may occur during the snowmelt release; if so, full diversions to Frog Lake can occur until the natural flow, less the diversion to Frog Lake, matches the release requirement at the time when the increased diversion to Frog Lake began, then diversions will be adjusted as necessary to continue to match the release requirement stated above.

C. Gaging in the Lower Oak Grove Fork

PGE will replace the gage on the Oak Grove Fork above Lake Harriet (USGS #14-209000) with a new gage to be located in the vicinity of the Ripplebrook Campground. The new gage will include data acquisition equipment, recording hardware and software as needed to calculate instream flows on a timely basis and to document the flow record.

4. Frog Lake and Oak Grove Powerhouse

A. Lake Levels

PGE will operate Frog Lake in conjuction with the Oak Grove Powerhouse to provide peaking energy when practicable. During high inflow conditions, Frog Lake is typically operated at about El. 1978, to produce the maximum flow in the Frog Lake Flowline. In these conditions there is little fluctuation of Frog Lake and the Oak Grove Powerhouse is running at a constant high load. During low inflow conditions Frog Lake is held full to provide spinning reserve storage. Frog Lake is not fluctuated in these low inflow periods as the nighttime refill of the lake is not possible when inflows are very low. Limits on Frog Lake water surface elevations are shown in Table 4.

Table 4. Frog Lake Operation and Level Constraints

Date	Lake Elevation, ft	Notes
Year-round	1988.0 max, 1970.0 normal min, extreme min of 1958.0	
Notes Regarding Additional Monitoring Requirements		
1. PGE will provide Oak Grove Project monitoring data and geotechnical reports for Frog Lake dam to the USDA-FS, on an annual basis.		

B. Flows Below Oak Grove Powerhouse

Flow releases from Oak Grove Powerhouse will vary with the operation of the powerplant, ranging from no flow release when the powerplant is shut down up to the two-unit maximum discharge of the powerplant. To protect downstream resources PGE will operate the Oak

Grove powerhouse to provide the ramping rates shown in Table 5. Ramping rates will be measured at the Clackamas River Three Lynx gage, USGS gage No. 14209500.

Table 5. Oak Grove Powerhouse Flow Releases, Ramping, and Monitoring

Date	Flow Release, cfs		Notes
	Minimum	Maximum	
year-round	0 (powerhouse shut down)	740 (two-unit maximum flow)	
Ramping Rates			
Date	**Up-ramp, ft in any hour**	**Down-ramp, ft in any hour**	**Notes**
Nov. 1 through Jan. 31	0.4, all year, see note regarding spinning reserve events	0.3	
Feb. 1 through Sept. 30		0.3 if flow ≥ 1200 cfs 0.17 if flow < 1200 cfs	
Oct. 1 to Oct. 31		0.3	May reduce rate based on "October Study" when flows are less than 1200 cfs.
Notes for Ramping Rate Constraints			
1. Up-ramping shall not exceed 0.40 ft in any one hour period except during spinning reserve call events. There will be no limit on up-ramping during spinning reserve call events, which occur approximately 5 to 8 times per year.			
Ramping Rate Related Studies			
1. Two investigations of the risk of stranding juvenile salmonids below Oak Grove Powerhouse will be conducted. The first investigation (the "October Study") will be used to help the Fish Committee determine if the ramp rate in October needs to be more restrictive. If this "October study" shows that unacceptable stranding occurs, the down-ramping rate shall be 0.17 ft in any hour when flows are below 1,200 cfs. A second study will be undertaken, during the period when juvenile salmonids are likely to be present and low-flow conditions increase the risk of stranding (July-September), to verify that the down-ramping rate, agreed-to for flows less than 1,200 cfs, is meeting its intended purpose. The results of this verification study will not trigger a change in PGE operations			

5. North Fork Reservoir and Dam

A. Lake Levels

The water level in North Fork Reservoir is normally operated near the full pool level of Elevation 665.0 ft. Depending on river flows and power demands, the reservoir can be drawn down up to two feet for spinning reserve events and peaking operation.

Table 6. North Fork Reservoir Operation and Level Constraints

Date	Lake Elevation, ft	Notes
Year-round	665.0 max, 660.0 normal min., 640.0 extreme min	The reservoir is normally maintained between 663.0 and 665.0 except in the winter when the reservoir is drawn down as much as 5 feet
PGE may draw North Fork Reservoir down to elevation 640.0 during the following extraordinary situations: (1) drawdown needed for safe passage of anticipated flood flows to minimize damage to life and property; (2) drawdown required to complete repairs on Project facilities (including spillway gates, the intake structures, or other dam structures); and (3) power emergencies, as defined in the Western States Coordinating Council Minimum Operating Reliability Criteria (March 8, 1999), as such criteria may be amended from time to time.		

B. Flows Below North Fork Dam

North Fork Dam and powerhouse are typically operated to pass inflow, with limited peaking operation using the top 1 or 2 feet of storage in North Fork Reservoir. The maximum flow release through the North Fork Powerhouse is currently limited by PGE's water right to 5,400 cfs. Pursuant to the June 18, 2003, license amendment, 103 FERC ¶62,161, Project hydraulic capacity is 6054 cfs.[1] Flows past the dam exceed this value during high flow conditions when inflows are passed by the combined operation of the powerhouse and spillway.

PGE will limit generation at the North Fork powerhouse under certain conditions until the downstream fish passage collector is in operation in the North Fork forebay. These conditions include operation of a guidance net upstream of the North Fork spillway. When the net is in place and its effectiveness has been demonstrated, PGE will limit North Fork generation flow

[1] As part of the necessary reauthorization of PGE's water rights under ORS Chapter 543A, PGE will apply for the appropriate state water law authorization to operate the development at this capacity.

to 3500 cfs when river flows are between 3500 and 7500 cfs. When river flows exceed 7500 cfs the generation flow will be adjusted to maintain a spill flow of 4000 cfs, up to the generating capacity of the powerhouse. Limitations would not be imposed when studies that would be adversely affected by spills are being conducted. These limitations would be implemented as shown in Table 7.

Table 7. North Fork Generation Limitations

Start Date	End Date
Earlier of April 15 or the date on which the 5-day average Chinook count ≥50.	Later of May 31 or the date on which the 5-day average Chinook count drops below 50.
Earlier of November 1 or the date on which the 5-day average Chinook count ≥ 50.	Later of December 15 or the date on which the 5-day average Chinook count drops below 50.
The 5-day average downstream count will be determined based on the total (or expanded, if subsampled) Chinook count at the North Fork downstream counting facility.	

This protocol will continue until the new surface collection facility is installed at North Fork. These conditions are described in more detail in the Fish Passage and Protection Plan for the Project.

After the 1,000 cfs surface collector has been constructed, North Fork generation limitation will be limited to 3500 cfs for flows between 3500 and 7500 cfs from April 1 through June 30, and from October 15 through December 31, if studies that would be adversely affected by spills are not being conducted. The generation limitation will remain in effect until it is demonstrated pursuant to the provisions of the Fish Passage and Protection Plan, that overall Project smolt survival will not be diminished by discontinuing the generation limitation, provided, however, that the generation limitation may be discontinued if the project survival standard has been met and will continue to be met without the spill protocol.

No specific minimum flow is required below North Fork Dam. A minimum flow of 43 cfs is continuously bypassed around the dam to operate the fish ladder.

6. Faraday Diversion Dam

A. Lake Levels

The Faraday Diversion Dam Reservoir level varies up to five feet to re-regulate flows associated with peaking at the North Fork Powerhouse. The operating level limits for Faraday Diversion Dam Reservoir are shown in Table 8.

Table 8. Faraday Diversion Dam Reservoir Operating Levels

Date	Reservoir Elevation, ft	Notes
Year-round	526.0 max, 521.0 normal min, 516.0 extreme min	The top 5 feet of storage is occasionally used to re-regulate peaking operation of North Fork Powerhouse
PGE may draw Faraday Diversion Dam Reservoir down to the extreme minimum elevation of 516.0 during the following extraordinary situations: (1) drawdown needed for safe passage of anticipated flood flows to minimize damage to life and property; (2) drawdown required to complete repairs on Project facilities (including spillway gates, the intake structures, or other dam structures); and (3) power emergencies, as defined in the Western States Coordinating Council Minimum Operating Reliability Criteria (March 8, 1999), as such criteria may be amended from time to time.		

B. Flows Below Faraday Diversion Dam

Flow releases from Faraday Diversion Dam will include year-round base flows, plus scheduled pulsed flows for upstream migrating fish. Base flows will be released from a pipe discharging to the entrance of the North Fork fish ladder when a new control valve capable of passing the base flows has been installed. Pulse flows and minimum flows in excess of the base flows will be released through the drum gates.

Table 9. Faraday Diversion Dam Flow Releases and Ramping Rates

Base Flow Releases		
Date	**Base Flow release, cfs**	**Notes**
Year-round	270 (subject to state instream water right)	Starting in the eighth year after license issuance, PGE may reduce base flows to 250 cfs, if PGE demonstrated, during the preceding year, that spillway entrainment of juvenile steelhead was reduced by at least 50% by the spillway exclusion net at spills up to 4,000 cfs.

A State instream water right would require the following flows below the Faraday Diversion Dam:

Date	Release to Faraday Diversion Reach*
July 1 – Sept. 15	As flows above Faraday Diversion Dam increase above 5290 cfs, moving to 5270 cfs if the condition above in the table is met, the flow in the Faraday Diversion Reach will increase until it reaches 400 cfs to acknowledge the senior status of the State's instream water right. Additional flows above 5420 cfs will be routed through the Faraday Powerhouse.
Sept. 16 – June 30	As flows above Faraday Diversion Dam increase above 5290 cfs, moving to 5270 cfs if the condition above in the table is met, the flow in the Faraday Diversion Reach will increase until it reaches 640 cfs to acknowledge the senior status of the State's instream water right. Additional flows above 5660 cfs will be routed through the Faraday Powerhouse.

* 5290/5270 cfs is the sum of PGE's pre-1968 water rights at Faraday, which total 5020 cfs, plus the base flows of 270 cfs, potentially moving to 250 cfs. The obligation to bypass flows of 400 cfs or 640 cfs, depending on time of year, is triggered when flows exceed 5020 cfs.

Pulsed Flow Releases

Date	Pulse flow rate	Pulse duration	Pulse frequency	Notes
April to October	Will vary, approx 120 to 480 cfs	Will vary, approx 12 to 36 hours	Will vary, approx every 4 days to biweekly	See Pulsed Flow Regime study plan in Fish Passage and Protection Plan.

C. Spill Protocol Below Faraday Diversion Dam

As described in the Fish Passage and Protection Plan, during any periods of unscreened spill at North Fork Dam lasting more than one hour during major smolt migration periods (April 1 through June 30 and October 1 through December 15), 50% of the river's flow will be spilled at the Faraday Diversion Dam. For unscreened spill duration at North Fork Dam lasting from 1 hour to 12 hours with unscreened spill volumes less than 2,000 cfs, spill at Faraday Dam will continue for 24 hours after the cessation of spill at North Fork Dam. During unscreened spills at North Fork Dam that last longer than 12 hours, or spills greater than 2,000 cfs, regardless of duration, spill at Faraday Dam will continue for 48 hours after the cessation of

spill at North Fork Dam. This protocol will remain in effect until the spillway exclusion net has been shown to effectively prevent spillway entrainment at flows of up to 4000 cfs.

After the spillway exclusion net has been shown to effectively prevent spillway entrainment at flows of up to 4000 cfs, half of the river's flow will be spilled at Faraday when spill at North Fork exceeds the capacity of the spillway exclusion net. For unscreened spill duration at North Fork Dam lasting from 1 hour to 12 hours and with unscreened spill volumes less than 2,000 cfs, PGE shall continue to spill at Faraday Dam for 24 hours after the cessation of unscreened spill at North Fork Dam. During unscreened spills at North Fork Dam that last longer than 12 hours, or during unscreened spills greater than 2,000 cfs, regardless of duration, PGE shall continue to spill at Faraday Dam for 48 hours after the cessation of unscreened spill at North Fork Dam. The spill protocol will remain in effect at Faraday Diversion Dam until it is demonstrated that overall Project smolt survival will not be diminished by the change, provided, however, that the spill protocol may be discontinued if the project survival standard has been met and will continue to be met without the spill protocol.

7. Faraday Forebay and Powerhouse

A. Forebay Levels

The water level in Faraday Forebay (Faraday Lake) is normally maintained near the full pool elevation to maximize head for power generation. The operating limits for Faraday Forebay are shown in Table 10.

Table 10. Faraday Forebay Operating Levels

Date	Forebay Elevation, ft	Notes
Year-round	520.2 max, 515.0 normal min., 510.2 extreme min	

B. Flows Below Faraday Powerhouse

Faraday Powerhouse will typically operate to pass inflow, with some re-regulation of flows when the North Fork Powerhouse is operated in a peaking mode. Maximum flow through the powerhouse is 5,020 cfs, the water right for the Faraday Development. Pursuant to the June 18, 2003, license amendment, 103 FERC ¶62,161, Project hydraulic capacity is 5704 cfs.[2] The minimum operating flow through the powerhouse is 120 to 150 cfs, based on the minimum flow operating limit of the Faraday turbines.

8. Estacada Lake and River Mill Dam

A. Lake Levels

The water level in Estacada Lake is maintained near full, at the top of the dam flashboards, for power generation and non-power resources in the lake area. Flashboards increase maximum water level elevation from 386 to 389. High inflow events will trip the dam flashboards resulting in periods of days to weeks when the lake level is reduced by roughly three feet, until the Project operating staff can re-set the flashboards. Flashboard are typically knocked down by high flows once or twice per year in the winter and spring. The operating levels for Lake Estacada are shown in Table 11.

Table 11. Estacada Lake Operating Levels

Date	Lake Elevation, ft	Notes
Aug. 1 through Dec. 15 (except as noted)	389.0 max, 387.0 normal min, flashboards up, 384.5 min, flashboards down	
Dec. 15 to Dec. 31	389.0 max, 386.0 min	If the Fish Committee determines that the drawdown limit of elevation 386.0 from December 15 to December 31 is not providing sufficient protection to redds, PGE will not draw down Lake Estacada below elevation 387.0 feet from December 15 to December 31.

[2] As part of the necessary reauthorization of PGE's water rights under ORS Chapter 543A, PGE will apply for the appropriate state water law authorization to operate the development at this capacity.

Jan. 1 to May 15	389.0 max, 387.0 min	
May. 16 to July 31	389.0 max, 386.0 min	
July 31 to Oct. 31	382.5 extreme min.	PGE may draw Estacada Lake down to an extreme minimum of 382.5 during the following extraordinary situations: (1) drawdown needed for safe passage of anticipated flood flows to minimize damage to life and property; and (2) drawdown required to complete repairs on Project facilities (including spillway gates, the intake structures, or other dam structures).

Notes Regarding Estacada Lake Water Levels

1. These drawdown limitations shall not apply when the flashboards are tripped, in which event the Licensee may draw down Lake Estacada Lake to elevation 384.5 to facilitate replacement of the flashboards.

2. The maximum elevation does not apply during release of flows over the flashboards, when water levels will exceed elevation 389.0.

3. If the Fish Committee determines that spring Chinook or coho spawning is occurring prior to December 15 and that a drawdown to elevation 384.5 is not providing sufficient protection to redds in Estacada Lake, the Licensee shall, in consultation with the Fish Committee, determine (i) the appropriate minimum surface water elevation for drawdown, which may be between water surface elevation 384.5 feet and 387.0 feet, and (ii) the appropriate time period to which the drawdown limitation applies.

B. Flows Below River Mill Dam

1. Overview

Flows below River Mill Dam will be controlled to minimize flow-related effects of the Project below River Mill Dam. The following text describes: the intent of these operating criteria; pertinent definitions used in the criteria; specific criteria for River Mill operation; and reporting and future operations review requirements.

2. Intent of Operating Criteria

PGE will operate River Mill Dam and powerhouse to release flows from Estacada Lake that are as close as possible to the flows that would occur if the Clackamas Project facilities from North Fork Dam through River Mill Dam did not exist. PGE will use River Mill Dam, when needed, to re-regulate flows from North Fork and Faraday, ensuring that River Mill flow releases are free of flow changes related to upstream peaking operation or other Project-caused variations. Ramping of flows for power operations of the River Mill development or the "pass-through" of peaking flows from upstream developments is explicitly forbidden.

The fundamental objective of River Mill operation is to release flows from River Mill that match the River Mill unregulated inflow (see definitions that follow). With the exception of certain necessary maintenance operations, and certain emergencies, PGE will not intentionally release flows that are different than inflow. However, release from River Mill cannot be controlled so that outflow precisely equals unregulated inflow; as there is a limit to both the accuracy of measuring inflow and the precision possible in controlling flow releases.

Inaccuracies in the inflow estimate are primarily related to the measurement of water levels in the four reservoirs from North Fork down to Lake Estacada. The inherent error in inflow measurement is approximately 40 to 70 cfs for low flow conditions (flows below 1000 cfs). Error in the inflow measurement for higher flows will be greater, in the range of 100 cfs or more, depending on the specific time period used to average the inflow estimates.

Inaccuracies in the control of flow releases from River Mill powerhouse are primarily related to: the minimum flow capabilities of the five generating units in the powerhouse; the inability to directly measure the River Mill development flow release; and the inability to precisely control flows during the starting and stopping of these units. The operating characteristics of each turbine-generator are unique. Thus, in the course of normal operation, particularly as the specific units are started, stopped, or adjusted to meet changing conditions, PGE's ability to precisely match outflow to unregulated inflow is limited.

Because of the inaccuracies in estimating inflow and the limits on controlling flow releases with the equipment at River Mill Dam and powerhouse, PGE cannot control flows more closely than to within 10% or 100 cfs of the estimated inflow value, whichever is greater. As a result, this 10% or 100 cfs limit forms the basic criteria for control of flow releases.

Since River Mill flow releases will follow unregulated inflow, there is no need for a uniformly applied ramping requirement for the flow release. The flows that are released will be, within the limits of measurement and control, equal to the River Mill unregulated inflow in accordance with the operating criteria described below. The only time a specific ramping requirement is needed is during maintenance events that affect flows, such as when Estacada Lake is drawn down and refilled.

3. Definitions Applicable to River Mill Operating Criteria

a. River Mill Unregulated Inflow (RMU Inflow). The River Mill Unregulated Inflow is the unregulated flow at the River Mill dam site. This is the flow that would exist if the Harriet, North Fork, Faraday, and River Mill dams did not exist. The RMU Inflow is essentially the same as the North Fork reservoir inflow.

b. Ramping for Power. Ramping for power is defined as any sustained flow setting above inflow followed by sustained flow settings below inflow, such that River Mill power generation is shifted from low value periods (typically nights or weekends) into higher value periods (typically 6 am to 10 pm M-F). "Sustained flow settings" shall mean periods of 30 minutes or greater.

c. Emergencies. The term "emergencies" means (1) any event that triggers the Project Emergency Action Plan; (2) power emergencies, as defined in the Western States Coordinating Council Minimum Operating Reliability Criteria (March 8, 1999), as such criteria may be amended during the license term; or (3) reservoir drawdowns needed for safe passage of anticipated flood flows to minimize damage to life and property.

d. Flow Deviation. The Flow Deviation is the calculated change in the total water volume stored in the North Fork reservoir, Faraday Diversion Dam reservoir, Faraday forebay, and Estacada Lake, all measured over a time interval of one to several hours and expressed as "cfs."

4. River Mill Operating Criteria

a. PGE will operate the Project in an inflow-matching mode to provide flow releases below River Mill Dam that equal the RMU Inflow. Ramping for power operations will not be permitted.

b. PGE will develop a flow and level monitoring system to estimate the RMU Inflow. This will likely be based on measured flows at the USGS Estacada gage, and water level measurements in North Fork, Faraday Diversion, Faraday forebay and Estacada Lake. The water level data will be used to estimate the deviation between inflow and outflow in

the system (the "Flow Deviation"). The RMU Inflow estimate and the calculated Flow Deviation system will be used as the basis for control of the River Mill development's flow releases.

c. The Flow Deviation and the USGS Estacada gage flow will be recorded. The quotient of the two (the flow deviation expressed as a percentage of the USGS Estacada gage flow) will be the basis for license compliance.

d. PGE will control the River Mill development flow release to hold the Flow Deviation within 10% or 100 cfs (whichever is greater) of the USGS Estacada gage flow, for all river flows, except during emergencies, equipment failures that affect river flows below River Mill or during scheduled maintenance activities that affect river flows below River Mill or that require reservoir level changes in the North Fork to River Mill reach. Flows during scheduled maintenance activities shall be subject to Paragraph 4e. To account for errors in measurement of levels and flows and the inability to precisely control flow releases, PGE shall be allowed to exceed the allowed Flow Deviation for not more than two successive 30 minute measurements at the USGS gage. This protocol will be reassessed during the Three-Year Review and Reopener detailed in Section 10, below.

e. During scheduled maintenance activities that affect river flows below River Mill or that require reservoir level changes in the North Fork to River Mill reach, PGE shall not reduce flows below River Mill to less than 500 cfs or inflow, whichever is less.

f. When flows below River Mill are adjusted before and after maintenance events, flows shall not be adjusted more than 50 cfs in any hour. If, during this flow adjustment period, the RMU Inflow changes at a rate of 50 cfs per hour or greater, in the same direction desired for maintenance, then the ramping of flows for maintenance will stop and the flow release will follow inflow. Example: a down-ramp of 50 cfs per hour in the River Mill flow release is scheduled to begin a reservoir refill. During this period the RMU Inflow declines at a rate of 70 cfs per hour for several hours. As required by this criterion, the River Mill flow release is reduced at a rate of 70 cfs per hour (following inflow) and the reservoir refill is postponed until inflows do not drop at a rate greater than 50 cfs per hour.

g. PGE will periodically review and adjust its inflow estimating methods to obtain good correlation between the USGS Estacada gage record and the inflow estimate record.

C. Spill Protocol Below River Mill Dam

As described in the Fish Passage and Protection Plan, during any periods of unscreened spill at North Fork Dam lasting more than one hour during major smolt migration periods (April 1 through June 30 and October 1 through December 15), spill at the River Mill Dam will be a

minimum of 400 cfs. For unscreened spill duration at North Fork Dam lasting from 1 hour to 12 hours during major smolt migration periods (April 1 through June 30 and October 1 through December 15) with unscreened spill volumes less than 2,000 cfs, spill at River Mill Dam will commence with spill at North Fork Dam and continue for 36 hours after cessation of spill at North Fork Dam. During unscreened spills at North Fork Dam that last longer than 12 hours, or spills greater than 2,000 cfs, regardless of duration, during major smolt migration periods (April 1 through June 30 and October 1 through December 15), spill at River Mill Dam will continue for 60 hours after the cessation of spill at North Fork Dam. This protocol will remain in effect until the spillway exclusion net has been shown to effectively prevent spillway entrainment at flows of up to 4000 cfs and the River Mill downstream migrant bypass system is operational. After the spillway exclusion net has been shown to effectively prevent spillway entrainment at flows of up to 4000 cfs, the spill protocol will remain in effect at River Mill Dam until it is demonstrated that overall Project smolt survival will not be diminished by the change, provided, however, that the spill protocol may be discontinued if the project survival standard has been met and will continue to be met without the spill protocol.

9. Project Operations Reports

PGE will provide the following reports to document that the Project is being operated in compliance with the Settlement Agreement and FERC license. In each case, the reports will be transmitted to FERC and to those agencies that request inclusion for these reports according to the Project's reporting structure protocol.

Preliminary Incident Reports. Whenever PGE determines or suspects that operating constraints required by the Settlement Agreement and FERC license, such as minimum flows, ramp rates, reservoir elevations, etc., appear to have been violated, PGE will issue a preliminary incident report. The preliminary incident report shall be issued within 15 days of PGE first becoming aware of the incident or problem. The incident report shall briefly describe: (i) operating conditions and operator actions surrounding the incident; (ii) relevant flows, water levels, ramping rates, control settings, weather, etc., for 7 days prior to and 24 hours after the apparent incident; (iii) a preliminary description of the nature of the incident and its possible causes; and (iv) actions being taken by the Licensee to prevent re-occurrence of the problem.

Final Incident Reports. Within 45 days following an apparent incident PGE will publish a Final Incident Report, describing in detail the subject incident. This report will include the relevant flow, water level, control settings and other operating data surrounding the event in such a way that a comprehensive understanding of the sequence of events leading up to and following the incident is presented. Descriptions of corrective actions taken (if needed) by PGE to prevent re-occurence of similar incidents shall be included in the report.

Annual Project Operations Report. Before April 1 of each year PGE will file with the Commission an annual Project operations report that describes the operating history of the Project over the previous calendar year. This report will include a general summary of the hydrologic conditions, overall project operation, and unusual events or conditions that occurred during the year. Charts shall be included which graphically show the Project's operating parameters over the prior year, such as: calculated Timothy Lake and RMU Inflows; outflow from Timothy Dam and River Mill Dam; days of operation at "or inflow" at Timothy Dam and River Mill Dam; and lake levels.

Annual charts showing the inflow to Harriet Dam and the corresponding flow releases below Harriet Dam will be included, with notation of the year class (i.e., wet, normal, or dry) and the start and end dates of winter flood and snowmelt runoff events. Annual charts showing the variation between RMU Inflow and River Mill outflow (based on the USGS Estacada Gage flow) will be included, with notation of all maintenance events, emergencies, and equipment failures that affected the River Mill outflow. Charts will be included showing the maximum hourly ramping rates each day at the Estacada gage, with a comparison to ramping rates calculated for the RMU Inflow. A listing of the spinning reserve call events that affected ramping rates below Oak Grove Powerhouse will be included. A listing and brief narrative description of maintenance events that caused the River Mill flow release to deviate from the inflow-following mode will be included.

Operating incidents that occurred during the year shall be listed and briefly described, and the Final Incident Reports for these events shall be included as an appendix to the annual report. Monthly average data for the following parameters shall be included: 1) flow releases from Timothy Lake and flows recorded by the USGS Government Camp, Oak Grove Fork above Powerplant Intake, Three Lynx and Estacada gages; 2) estimated RMU inflow; 3) water levels in Timothy Lake; and 4) generation by development.

Hourly data for the following parameters will be published on electronic media as an attachment to the report:

- Water levels recorded at Timothy Lake, North Fork Reservoir, and Estacada Lake
- Flows as recorded at the USGS Government Camp, Three Lynx, and Estacada gages
- Calculated flow releases at Timothy Dam
- Flow releases from the base-flow release facility, the pulse-flow release system, and the flashboards at Harriet Dam
- Calculated hourly ramping rates at the USGS Government Camp, Three Lynx, and Estacada Gages
- Estimated hourly River Mill Flow Deviation and hourly RMU Inflow
- Calculated hourly ramping rate for the RMU Inflow
- Hours in which the Flow Deviation exceeded 10% or 100 cfs

10. River Mill Operations Year-Three Review and Re-Opener

Within two months after the third annual operations report is filed with FERC, the Licensee shall consult with the Fish Committee regarding that portion of the Operating Plan governing operation of the River Mill Development. During this consultation, the Licensee shall prepare an analysis of the operating results that are described iin annual operating reports of the the first two calendar years of the license when the River Mill flow level and monitoring system is in place. The consultation shall include, but need not be limited to, an evaluation whether operation of the River Mill Development requires the allowance to exceed the allowed Flow Deviation (as defined in the Operating Plan) for not more than two successive 30-minute measurements at the USGS Estacada Gage. The consultation shall include the results of this evaluation. The Licensee shall file the results of this consultation, which shall include a protocol for measuring the allowed Flow Deviation as well as any other agreed upon changes to the Operating Plan, with FERC. Following approval by FERC, the Licensee shall implement the changes. The requirement to conduct this two-year review does not require that the use of two successive 30-minute measurements at the Estacada Gage be revised, if PGE determines, after consultation with the Fish Committee, that this is the appropriate measurement protocol.

11. River Mill Operations Year Seven Review

Within two months after the seventh annual operations report is filed with FERC, the Licensee shall consult with the Fish Committee regarding Project operations over the first seven calendar years of operation. The Licensee shall file the results of this consultation with FERC, including any agreed upon changes to the Operating Plan. Following approval by FERC, the Licensee shall implement the changes.

12. Evaluation of Stranding Below River Mill

PGE will, in consultation with the Fish Committee, design a verification study to evaluate the risk of juvenile salmonid stranding in the lower Clackamas River associated with flow releases below River Mill Dam pursuant to the terms of the New License. This study will be conducted by a contractor, which could be ODFW, selected by the Fish Committee, during the period from 3 to 7 years after the new FERC license is issued. If the Fish Committee does not select a contractor, PGE will conduct the study. PGE has agreed to fund implementation of this study up to a maximum cost of $50,000. It is understood that, if parties want further action based on the study results, they would have to petition FERC.

13. Scheduling of Maintenance Activities

Within twelve months of license issuance, PGE will, after consultation with the Fish Committee, develop and file a plan and schedule for conducting maintenance operations on Project facilities, other than fish passage facilities, in a manner that minimizes adverse impacts on fish. The maintenance and operation of fish passage facilities will be governed by plans filed pursuant to the Fish Passage and Protection Plan.