



PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY

P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
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November 25, 2009

VIA ELECTRONIC FILING

Honorable Kimberly D. Bose, Secretary
Nathaniel J. Davis, Sr., Deputy Secretary
FEDERAL ENERGY REGULATORY COMMISSION
888 First Street, NE
Washington, DC 20426

RE: Lake Chelan Hydroelectric Project No. 637
Report on Minimum Flow Deviation for Chelan River – Reach 4

Dear Secretary Bose and Deputy Secretary Davis:

This letter is to provide you with Public Utility District No. 1 of Chelan County's (Chelan PUD) follow-up report on an instream flow deviation that occurred over the weekend of October 24 – 26, 2009 on newly constructed fish habitat within Reach 4 of the Chelan River. This deviation was first reported by email to the Federal Energy Regulatory Commission (FERC) Portland Office and Washington Department of Ecology (Ecology) Central Regional Office on October 28, 2009.

Summary

Minimum spawning period flows for salmon spawning in Reach 4 of the Chelan River were not met for a number of hours over a three-day period between October 24-26, 2009. Failure to maintain the minimum flow of 320 cfs was determined to be caused by a problem with the pump station control system, which shut off one of the five pumps by tripping a protective circuit breaker. The flows in Reach 4 were reduced to levels between 273 cfs – 279 cfs during this time period. The pump was returned to service Monday morning (October 26) before 9:00 am and the 320 cfs minimum flows have been maintained since that date, within a plus/minus 10 cfs range of measurement accuracy. There was no evidence of any adverse biological effect since the flow reduction resulted in only about a one inch reduction in water levels and velocities were still adequate for salmon spawning at the reduced flows, which remained greater than 85 percent of the desired minimum flow rate. Failure to restart the pump over the weekend was due to several factors, including that the facility was new and had only been in operation for 10 days, training of personnel on rotating shifts regarding alarm

response procedures had not been completed, and the Lake Chelan powerhouse is unmanned and operated remotely from 4:00 pm – 8:00 am daily and during weekends.

License Requirement

Article 405 requires Chelan PUD to implement the instream flows, ramping rates, and tailrace flows as set forth in Article 7 of the Lake Chelan Settlement Agreement and Chapter 7 of the Comprehensive Plan attached to the settlement agreement. The specific flow requirement that is the subject of this deviation report is to maintain a minimum flow of 320 cfs into Reach 4 of the Chelan River for salmon spawning from October 15 – November 30.

Minimum flows in the Chelan River were initiated on October 14, 2009, as required under the FERC Order on Offer of Settlement and Issuing New License issued November 6, 2006, and as modified by Order Granting Extension of Time Under Article 408 and Ecology 40I Water Quality Certification Condition III.A.(ii) issued March 20, 2008. The extension of time allowed Chelan PUD until November 6, 2010, to complete construction and initiate minimum flows. Chelan PUD expedited construction efforts and initiated minimum flows over one year early in order to not miss a biological window for salmon spawning.

In accordance with FERC's Order Modifying and Approving Operations Compliance and Monitoring Plan, Article 405, issued November 30, 2007, when a flow deviation occurs, Chelan PUD is required to notify FERC and Ecology of the deviation within 48 hours of the time that Chelan PUD became aware of the deviation. FERC and Ecology were notified via electronic submittal on October 28, 2009. Following the initial notification, Chelan PUD is required to file a report, as follows:

“The licensee shall file a report with the Commission within 30 days of any deviation from minimum flow requirements, lake levels or ramping rates. The report shall, to the extent possible, identify the cause, severity, and duration of the incident, and any observed or reported adverse environmental impacts resulting from the incident. The report shall also include: 1) operational data necessary to determine compliance with the respective license requirements regarding minimum flows, lake levels, and ramping rates, as appropriate; 2) a description of any corrective measures implemented at the time of occurrence and the measures implemented or proposed to ensure that similar incidents do not recur; and 3) comments or correspondence, if any, received from the resource agencies and others regarding the incident.”

Record of Chelan River Flows into Reach 4

Minimum flows were provided by releasing 80 cfs into Reach 1 of the Chelan River from the Low Level Outlet (LLO) and 240 cfs or greater flow of tailrace water provided from the Pump Station into Reach 4. The combination of these flows meet the minimum flow

requirement of 320 cfs during the salmon spawning period. Daily average flows in Reach 4 have met or exceeded 320 cfs since initiation of the minimum flows, within a plus/minus 10 cfs range of measurement accuracy, with the exception of October 25 and October 26 (Table 1).

Table 1. Daily Average Flows (cfs) in Reach 4 of the Chelan River

<u>Date</u>	<u>Pump Flow</u>	<u>LLO Flow</u>	<u>Reach 4 Flow</u>
10/15/2009	257	80	337
10/16/2009	262	80	342
10/17/2009	261	80	341
10/18/2009	261	80	341
10/19/2009	262	80	342
10/20/2009	261	80	341
10/21/2009	261	80	341
10/22/2009	261	80	341
10/23/2009	260	80	340
10/24/2009	247	80	327
10/25/2009	197	80	277
10/26/2009	237	80	317
10/27/2009	260	80	340
10/28/2009	260	80	340
10/29/2009	251	80	331
10/30/2009	235	80	315
10/31/2009	234	80	314
11/1/2009	238	80	318
11/2/2009	246	80	326
11/3/2009	247	80	327
11/4/2009	247	80	327
11/5/2009	249	80	329
11/6/2009	250	80	330
11/7/2009	251	80	331
11/8/2009	250	80	330
11/9/2009	248	80	328
11/10/2009	247	80	327
11/11/2009	247	80	327
11/12/2009	242	80	322
11/13/2009	246	80	326
11/14/2009	245	80	325
11/15/2009	247	80	327
11/16/2009	248	80	328
11/17/2009	252	80	332

<u>Date</u>	<u>Pump Flow</u>	<u>LLO Flow</u>	<u>Reach 4 Flow</u>
11/18/2009	249	80	329
11/19/2009	246	80	326
11/20/2009	247	80	327
11/21/2009	245	80	325
11/22/2009	249	80	329

Cause of the Deviation

On the dates of the deviation from the daily average flow requirement of 320 cfs, problems with Pump Station control systems resulted in hourly flows that were below the level necessary to meet flow requirements, beginning on October 24, for a four-hour period, 0600-1000 hours, and then continuously from 1600 hours on October 24 to 0800 hours on October 26. Hourly average flows (end of hour) from the Pump Station during the incidents from October 24-26, shown in Table 2, remained above 150 cfs. The reduced flows resulted from pump 4 being out of service due to a tripped circuit breaker, in addition to other pumps being turned off in rotation, one at a time, for air burst cleaning cycles on the intake screens.

Table 2. Hourly Pump Station Flows (cfs) from October 24 – October 26 at 1000 Hours.

24-Oct-09 01:00:00	258	25-Oct-09 01:00:00	196	26-Oct-09 01:00:00	195
24-Oct-09 02:00:00	257	25-Oct-09 02:00:00	196	26-Oct-09 02:00:00	196
24-Oct-09 03:00:00	259	25-Oct-09 03:00:00	197	26-Oct-09 03:00:00	199
24-Oct-09 04:00:00	261	25-Oct-09 04:00:00	195	26-Oct-09 04:00:00	197
24-Oct-09 05:00:00	261	25-Oct-09 05:00:00	196	26-Oct-09 05:00:00	197
24-Oct-09 06:00:00	260	25-Oct-09 06:00:00	196	26-Oct-09 06:00:00	197
24-Oct-09 07:00:00	258	25-Oct-09 07:00:00	196	26-Oct-09 07:00:00	197
24-Oct-09 08:00:00	249	25-Oct-09 08:00:00	197	26-Oct-09 08:00:00	197
24-Oct-09 09:00:00	249	25-Oct-09 09:00:00	198	26-Oct-09 09:00:00	217
24-Oct-09 10:00:00	249	25-Oct-09 10:00:00	197	26-Oct-09 10:00:00	262
24-Oct-09 11:00:00	249	25-Oct-09 11:00:00	199	26-Oct-09 11:00:00	260
24-Oct-09 12:00:00	248	25-Oct-09 12:00:00	198	26-Oct-09 12:00:00	261
24-Oct-09 13:00:00	248	25-Oct-09 13:00:00	197	26-Oct-09 13:00:00	260
24-Oct-09 14:00:00	248	25-Oct-09 14:00:00	198	26-Oct-09 14:00:00	261
24-Oct-09 15:00:00	246	25-Oct-09 15:00:00	199	26-Oct-09 15:00:00	261
24-Oct-09 16:00:00	247	25-Oct-09 16:00:00	197	26-Oct-09 16:00:00	248
24-Oct-09 17:00:00	247	25-Oct-09 17:00:00	198	26-Oct-09 17:00:00	258
24-Oct-09 18:00:00	248	25-Oct-09 18:00:00	198	26-Oct-09 18:00:00	258
24-Oct-09 19:00:00	249	25-Oct-09 19:00:00	198	26-Oct-09 19:00:00	258
24-Oct-09 20:00:00	250	25-Oct-09 20:00:00	196	26-Oct-09 20:00:00	259
24-Oct-09 21:00:00	248	25-Oct-09 21:00:00	193	26-Oct-09 21:00:00	260
24-Oct-09 22:00:00	248	25-Oct-09 22:00:00	194	26-Oct-09 22:00:00	261
24-Oct-09 23:00:00	195	25-Oct-09 23:00:00	195	26-Oct-09 23:00:00	262
24-Oct-09 24:00:00	195	25-Oct-09 24:00:00	195	26-Oct-09 24:00:00	259

Biological and/or Environmental Impacts:

Visual inspection of Reach 4 and the spill overflow channel did not detect any adverse effects on the Chinook salmon spawning in Reach 4. No stranded fish were observed and spawning activity in Reach 4 and the tailrace was robust. A spawning survey conducted on Friday, October 23, counted 63 fish and 20 redds in the Reach 4 habitat channel and 98 fish and 64 redds in the tailrace area. Subsequent surveys observed additional spawning, with Reach 4 habitat channel redd counts peaking at 60 observed on the October 30 survey. Spawning in the tailrace habitat, completed in 2009, had a peak redd count of 129 redds. Total salmon redds in the Chelan River, including the pre-existing spawning areas in the confluence with the Columbia River, peaked at 259 redds.

No adverse environmental effects were observed and ramping rates were not exceeded during the flow deviation. Reduction of Pump Station flow by one pump results in approximately a 50 cfs flow reduction into the pool at the head of Reach 4. On October 26 at 1500 hours, a test was conducted to determine the amount of water level change in Reach 4 when a pump shuts off. Pump Station flows were at 260 cfs when one pump was turned off, with measured Pump Station flow ranging from 198 cfs – 215 cfs during the 15-minute test. Water levels in Reach 4 only declined by one inch during the test, which is less than the ramping rate allowance of two inches per hour. The shallowest redds were still 6-8 inches or more below the water surface, even at the reduced flow.

Corrective Measures

The exact cause of the breaker trip on pump 4 is unknown, but suspected to be related to excessive cycling of the air burst system. The air burst cleaning system has been placed on manual control until the cause of excessive cycling of the system has been determined. Investigations into the cause of the pump breaker trip and air burst cycling are ongoing and corrective programming measures are being implemented to prevent future occurrences. Operational plans call for release of additional water from the LLO in the event that pump failure(s) occurs in the future.

The Pump Station is a new facility, completed just prior to the salmon spawning period. Alarm systems were functioning at the time of the pump failure. However, the Lake Chelan Hydroelectric Station is unmanned and operated remotely from 4:00 p.m. to 8:00 a.m. daily and during weekends. Pump Station alarm status windows at Systems Operations and the Rocky Reach Project control room were somewhat obscure and few personnel had been trained at the time of the deviation. Control systems programmers have subsequently enhanced the visibility of the Pump Station alarms. Training of powerhouse operators and systems operations personnel has been ongoing during October and November. Due to the rotating shifts of these workers and minimum personnel requirements for operations throughout the day, it has been necessary to hold a number of on-site training sessions in order to cover all personnel. Training of all powerhouse and system operators is scheduled to be completed on December 1.


Calibration of flow release structures and comparison with stream channel measurements is ongoing. The LLO flow meter was calibrated with dye injection techniques and Chelan PUD is currently working with USGS to establish a telemetered streamflow gauge in the Chelan River a short distance downstream from the LLO. Currently, flow rates determined from the combination of the LLO gauge and the Pump Station canal gauge are believed to be accurate to within approximately 10 cfs. The results of final calibration will be reported in the 2009 Annual Flow Report, scheduled for submittal to FERC on February 28, 2010.

Conclusion

Minimum flow levels for salmon spawning in the Chelan River Reach 4 habitat channel were initiated on October 14, 2009, over one year prior to the date required by the March 20, 2008, FERC Order Granting Extension of Time. The early completion and initiation of minimum flows provided functional use of the new Reach 4 habitat channel in time for Chinook salmon spawning, and 60 salmon redds were constructed in the habitat channel. A flow deviation of less than 15 percent reduction in the minimum flow occurred over a part of the three-day period of time during the early part of Chinook spawning activity. No adverse environmental effects or disruption of Chinook spawning activity was observed to have resulted from the flow deviation. Corrective actions have been implemented and there have been no additional flow deviations since.

If you have any questions regarding this event, please contact me or Steven Hays at (509) 661-4181.

Sincerely,



Michelle Smith,
Licensing & Compliance Manager
(509) 661-4180
michelle.smith@chelanpud.org

Enclosure: E-mail correspondence with the agencies

cc: Washington Department of Ecology
Chelan River Fishery Forum

Sokolowski, Rosana

From: Sokolowski, Rosana on behalf of Smith, Michelle
Sent: Wednesday, October 28, 2009 11:22 AM
To: 'Regan Pat (FERC)'; 'Erich Gaedeke'; 'pir461@ecy.wa.gov'; Tebb Tom (WDOE)
Cc: 'stephen_lewis@fws.gov'; 'ramartinez@fs.fed.us'; 'Richard.Domingue@noaa.gov'; Yow, Gene; 'jkastenholz@fs.fed.us'; Osborn, Jeff; 'geedee@nwi.net'; Tidd, Scott; 'carlmerkle@ctuir.com'; 'mape461@ecy.wa.gov'; 'parchibald@fs.fed.us'; 'jerry.marco@colvilletribes.com'; Hill, Courtney; 'brose@yakama.com'; 'heinebah@dfw.wa.gov'; 'violaaev@dfw.wa.gov'; Chamberlain, Vern; 'Stan_Zyskowski@nps.gov'; 'brca461@ecy.wa.gov'; Hays, Steve
Subject: Lake Chelan No. 637: Minimum Flow Deviation Notice

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To: Patrick Regan and Erich Gaedeke, FERC-PRO
Pat Irle and Tom Tebb, WDOE

CC: Chelan River Fishery Forum

From: Michelle Smith
Licensing & Compliance Manager
Michelle.smith@chelanpud.org
(888)663-8121, Ext. 4180

Re: Lake Chelan Project No. 637
Minimum Flow Deviation Notice

This email is to provide you notification regarding a minimum flow deviation, which occurred in the Chelan River near Chelan Falls. The preliminary findings report is attached. A final report will be filed within 30 days. If you have any questions or require additional information, please contact Steven Hays at (509)661-4181 or me.

Thank you.



Minimum Flow
Violation _2_.pdf...

Chelan River – Deviations from Minimum Flows for Reach 4, October 15 and 24-26, 2009

Minimum flows of 320 cfs for salmon spawning in Reach 4 of the Chelan River were initiated on October 14, 2009, at 1500 hours. Minimum flows were provided with flow of 80 cfs released into the Chelan River from the Low Level Outlet (LLO) and 240 cfs or greater flow of tailrace water provided from the Pump Station. Daily average flows in Reach 4 have exceeded 320 cfs since initiation of the minimum flows, with the exception of 10/25 and 10/26 (Table 1).

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<u>Date</u>	<u>Pump Flow</u>	<u>LLO Flow</u>	<u>Reach 4 Flow</u>
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10/26/2009	237	80	317
10/27/2009	260	80	340

Problems with pump station control systems have resulted in hourly flows below the minimum level during one hour on October 15, from 1300-1400, and, beginning on October 24, for a number of hours, 0600-1000 and continuously from 1600 on 10/24 – 0800 on 10/26. Hourly average flows (end of hour) from the pump station during the incidents from 10/24-26, shown in Table 2, remained above 150 cfs. The reduced flows resulted from pump 4 being out of service due to a tripped circuit breaker, with other pumps being turned off one at a time for air burst cleaning cycles on the intake screens.

The exact cause of the breaker trip on pump 4 is unknown, but suspected to be related to excessive cycling of the air burst system. The air burst cleaning system has been placed on manual control until the cause of excessive cycling of the system has been determined. Investigations into the cause of the pump breaker trip and air burst cycling are ongoing and corrective measures will be implemented to prevent future occurrences. Operational plans call for release of additional water from the LLO in the event that pump failure(s) occurs in the future.

Reduction of pump station flow by one pump results in approximately a 50 cfs flow reduction into the pool at the head of Reach 4. Currently, with 80 cfs flows coming into the pool from LLO releases, flows from the pump station in excess of 240 cfs are flowing over the hydraulic control structure and down the spill flow channel, thus loss of 50 cfs pump flow does not reduce flows in Reach 4 by the same amount, rather the flow over the hydraulic control structure stops first. On 10/26 at 1500, a test was conducted to determine the amount of water level change in Reach 4 when a pump shuts off. Pump station flows were at 260 cfs when one pump was turned off, with measured pump station flow ranging from 198 cfs – 215 cfs during the 15 minute test. Water levels in Reach 4 only declined by one inch during the test.

Visual inspection of Reach 4 and the spill overflow channel did not detect any adverse effects on the Chinook salmon spawning in Reach 4. No stranded fish were observed and spawning activity in Reach 4 and the tailrace is robust. A spawning survey conducted on Friday, 10/23 counted 63 fish and 20 redds in Reach 4 and 98 fish and 64 redds in the tailrace area. Spawning activity has increased since that date and both areas will be surveyed again on Friday, 10/30.

Table 2. Hourly Pump Station Flows (cfs) from October 24 – October 26.

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