

PUBLIC UTILITY DISTRICT NO. 1 *of* CHELAN COUNTY
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May 13, 2010

VIA ELECTRONIC FILING

Honorable Kimberly D. Bose, Secretary, and
Nathanial J. Davis, Sr., Deputy Secretary
ATTN: OEP/DHAC
FEDERAL ENERGY REGULATORY COMMISSION
888 First Street, NE
Washington, DC 20426

Re: **Rocky Reach Hydroelectric Project No. 2145**
Submittal of Fish Spill Plan per Article 402 – Operations Compliance Monitoring Plan

Dear Secretary Bose and Deputy Secretary Davis:

The Public Utility District No. 1 of Chelan County, Washington hereby files the Final 2010 Fish Spill Plan as required under Article 402, Operations Compliance Monitoring Plan of the Rocky Reach Hydroelectric Project License. This document replaces the draft Fish Spill Plan submitted on February 16, 2010 as Appendix A of the Operations Compliance Monitoring Plan.

Sincerely,

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cc: Patrick Regan (FERC-PRO)
Adan Archuleta (FERC-PRO)
Erich Gaedeke (FERC-PRO)

ROCKY REACH AND ROCK ISLAND 2010 FISH SPILL PLAN

(Operations Compliance Monitoring Plan-Appendix A)

Final

ROCKY REACH HYDROELECTRIC PROJECT
FERC Project No. 2145
ROCK ISLAND HYDROELECTRIC PROJECT
FERC Project No. 943

March 23, 2010

Public Utility District No. 1 of Chelan County
Wenatchee, Washington

Table of Contents

List of Tables

SECTION 1: ***INTRODUCTION***

On June 21, 2004, the Federal Energy Regulatory Commission (FERC) licenses for Rocky Reach and Rock Island were amended to incorporate the respective Habitat Conservation Plans (HCP) into each Project license. In February 2009 Rocky Reach received a new 43-year Federal Energy Regulatory Commission (FERC) operating license, with the HCP incorporated. Fish spill operations in 2010 at Rocky Reach and Rock Island will be implemented by Chelan PUD (District) according to the HCP and the juvenile survival studies conducted with certain Project operations and spill levels at each dam. Spill levels proposed by the District under provisions of the HCPs are summarized in Table 3 of this plan. Chelan PUD holds valid Incidental Take Statements (ITS) from NOAA Fisheries (NOAA) and the United States Fish and Wildlife Service (USFWS) for HCP fish spill operations at the Projects.

For yearling Chinook and steelhead in 2010, the District will operate the juvenile fish bypass (JFB) at Rocky Reach exclusively with no spill, and conduct a Project survival study for yearling Chinook. This study will repeat the day-night release survival study that the District conducted for juvenile sockeye in 2009. The 2009 study evaluated the differences in Project survival for day time and night time releases of tagged sockeye smolts, and the differences in passage and survival rates for tagged smolts passing the dam itself during the day and night. This test included running turbine units in best efficiency mode to evaluate differences in route-specific survival (powerhouse and juvenile fish bypass system), with all available river flow passing through turbines and bypass system. Results showed that survival for sockeye smolts passing Rocky Reach Dam (powerhouse and bypass system) was 98.04% during night time hours, and 96.99% during the day time hours. Survival of tagged smolts passing through powerhouse was significantly higher during night time hours, even though units operated at the same efficiency settings day and night, and river flow did not vary significantly between day and night periods; predation in the immediate tailrace is believed to have caused the survival difference. The Project operated with no spill during the entire study; total study-wide Project survival for juvenile sockeye was estimated to be 95.45%.

During the summer outmigration of subyearling Chinook, the District will spill 9% of day average river flow at Rocky Reach for a duration covering 95% of their outmigration.

At Rock Island Dam in 2010, the District will conduct a third HCP Project Survival study for yearling Chinook, and a second year of study with steelhead smolts, at a 10% Project spill level. Rock Island achieved the necessary 3-year average HCP survival standard in 2009 for juvenile sockeye with a 94.57% survival estimate, yielding a three-year mean survival of 93.27% at a 10% spill level.

Rock Island fish spill will increase to 20% upon onset of the summer outmigration of sub-yearling Chinook. Spill remains the primary means of juvenile salmonid passage as directed in Section 5.4.1(a) of the Rock Island HCP. Spring and summer spill will cover 95% of the juvenile outmigration for steelhead, sockeye, yearling and subyearling Chinook.

SECTION 2: ***SUMMER FISH SPILL OPERATIONS IN 2010***

Juvenile run-timing information at Rocky Reach will be used to determine passage percentiles and the necessary spill duration for subyearling Chinook (0% to 95%). Daily fish counts from index sample periods at the juvenile collection facility, in combination with the University of Washington's Program RealTime run forecaster, will be used to determine spill timing for subyearling Chinook. The Rock Island juvenile bypass trap will provide smolt counts for spring and summer run-percentile estimates to determine when spill will start and end at Rock Island Dam.

SECTION 3: ***RUN-TIMING PREDICTIONS IN 2010***

Since 2003, the University of Washington has provided the District with run-timing predictions for spring and summer out migrating salmon and steelhead using the Program RealTime run-time forecasting model. Program Real-Time provides daily forecasts and cumulative passage percentiles for steelhead, yearling Chinook, sockeye, and subyearling Chinook at both Rocky Reach and Rock Island. The program enables the District to better predict the date when a selected percentage of these species will arrive, or when a given percentage of any stock has passed (e.g. the 5% passage point for spring species at Rock Island to trigger spring spill). The program utilizes daily fish counts from the juvenile sampling facility at Rocky Reach and the juvenile bypass trap at Rock Island. The number of smolts sampled each day and estimates of the program's forecast error in season-long outmigration percentiles are calculated and displayed with the daily predictions at www.cbr.washington.edu/rt/rt.html.

SECTION 4: ***HISTORIC RUN TIMING***

Estimated historical run-times for each species at Rocky Reach and Rock Island are summarized in Table 2. At Rocky Reach, data is summarized from the juvenile bypass system, 2003-2009. The 2.5 percentile for sockeye migrants occurs around May 9 (range May 5 - May 15), and reaches the 97.5 percentile around June 1 on average (Table 1). The summer run (subyearling Chinook) generally begins the first week of June and reaches the 95th percentile sometime around August 11 (range August 4-August 24). Rock Island Dam smolt collections at the bypass trap from 2000 to 2008 indicate that the fifth percentile (5%) of the combined spring migrant run averages around April 21 (range April 12-25). The 97.5 percentile point for the spring migration usually occurs around June 9 (range May 27 - June 22) (Table 1). The subyearling Chinook smolt outmigration at Rock Island generally begins sometime in May (although fry are encountered earlier), and reaches the 95th percentile by about August 13 (range August 5-August 29).

Historic average run-time dates (range in parenthesis) at Rocky Reach and Rock Island dams. Rocky Reach is based on data collected from 2004-2009 at the juvenile bypass system. Rock Island is based on Index counts of smolts at juvenile bypass trap, 2000-2009.

Table 1. History Run-Time Dates

	Percentile			
Stock/species	**2.5%**	**5%**	**95%**	**97.5%**
Rocky Reach				
Sockeye	9-May (5/5 - 5/15)	11-May (5/8 – 5/17)	27-May (5/23 – 6/2)	1-June (5/24 – 6/4)
Subyearling Chinook	8-Jun (6/2 - 6/20)	13-June (6/8 - 6/24)	8-Aug (8/4 - 8/24)	18-Aug (8/11 - 9/4)
Rock Island				
Yearling Chinook	17-Apr (4/5 - 4/29)	18-Apr (4/8 - 4/30)	7-June (5/19 - 6/16)	13-June (5/28 - 6/24)
Steelhead	27-Apr (4/17 - 4/30)	1-May (4/20 - 5/7)	9-June (5/31 - 6/26)	13-June (6/4 - 7/1)
Sockeye	19-Apr (4/10 - 4/28)	26-Apr (4/12 - 5/1)	21-June (5/17 - 7/3)	24-June (5/24 - 8/3)
All Spring migrants	21-Apr (4/12 - 4/21)	17-Apr (4/13 - 4/25)	9-June (5/27-6/22)	16-June (6/3-6/30)
Subyearling Chinook	27-April (4/5 - 6/2)	13-May (5/6 - 5/15)	13-Aug (8/1 - 8/26)	18-Aug (8/5 - 8/29)

SECTION 5: ***ROCKY REACH***

5.1 2010 Rocky Reach Index Sampling

The District will operate the Rocky Reach JFB seven days per week (normal operation) in 2010 to obtain the necessary index samples for run timing analysis, and to collect fish for survival and passage route studies. During "index sample hours" (0800-1130 hours) a 30-minute sample will be taken at the start of each hour. For each hour outside of the "index period", a 20 minute

sample will be taken for 30 continuous days in May and early June. This will provide a second year of data to determine the diel (24-hour) passage timing for the various species of smolts at Rocky Reach

Sampling protocols at the JFB in 2010 will remain consistent with those used in 2009. Smolts will be sub-sampled daily from the bypass (Monday through Sunday) for four 30-minute "index periods" at 0800, 0900, 1000, and 1100 hours (Table 2). The sample target for each 30-minute period will be 350 fish combined for the spring migrating species, and 125 fish for summer migrating species (subyearling Chinook). If fish numbers are high in the first few minutes of a sampling period (300-350 fish), the sampling screen will be retracted and the number (collected) will be linearly expanded to the entire 30-minute period.

Index sampling times and fish collection targets at the Rocky Reach juvenile fish bypass system in 2010.

Table 2. Sampling Times

Hours	Minutes	Spring	Summer	Schedule
0800 – 0830	30	350	125	Monday - Sunday
0900 - 0930	30	350	125	Monday - Sunday
1000 – 1030	30	350	125	Monday - Sunday
1100 - 1130	30	350	125	Monday - Sunday

*Sample duration may be less than 30 minutes if fish numbers are met prior to that time.
*Fish number will be proportionately expanded to account for Index samples shorter than 30 minutes.

5.2 Rocky Reach 2010 Survival Study without Project Spill

In 2010, the District is proposing a yearling Chinook survival study while operating the fish bypass system only, without designated fish spill. The study duration will be 30 days from late April through May. Unavoidable spill for reservoir headwater control may occur during the Chinook study at Rocky Reach in 2010. Information on this study proposal is summarized below. This study is currently being review by the HCP Coordinating Committee.

5.3 2010 Day/Night Release Survival Study for Yearling Chinook

Chelan PUD will conduct a survival study in 2010 at Rocky Reach to compare differences in reservoir and dam survival for acoustic tagged yearling Chinook that are released into the river below Wells Dam during day time hours, and during night time hours. The purpose of the study is to determine if survival differences exist for Chinook passing through the reservoir and the dam at night, versus those passing under lighted conditions during the day. The District's 2009 diel passage study showed that yearling Chinook have a tendency to pass Rocky Reach Dam in greater numbers at night, compared to the day. Tagged Chinook will be released day and night below Wells Dam, and in the Rocky Reach tailrace, to conduct the paired release study. Predation (pikeminnow and avian predators) rates are believed to be much lower during night time hours when more run of river juvenile Chinook are passing the Project, and higher during the day when potentially fewer smolts are passing.

5.4 Eliminating Potential Biases in Survival Study Methods

A negative "survival study bias" (an unintended effect that artificially results in a flawed survival estimate for the smolt population being tested) may be introduced if all tagged study fish are released only during the day when predation rates are highest, when in fact juvenile Chinook are known to migrate at night (Steig et al. in press). The 2010 experimental design will determine if a differential survival effect is present for night vs. day migrating tagged Chinook smolts, and help to determine when study fish should be released to yield a non-biased survival estimate that accurately represents survival for out-migrating juvenile salmon populations. During the entire study, the Rocky Reach powerhouse will be operated with turbine units operated under best-efficiency settings. The goal of this study is to determine if significant survival differences exist for day time and night time released Chinook smolts under consistent powerhouse turbine operations to determine the effects of predation. The study will be designed to determine the effects of predation on study fish and the time of day that these fish pass through the reservoir and the dam. During the test, Chinook smolts will have the option to pass through the either the juvenile bypass system (surface collector or bypass screens), or the powerhouse only.

5.5 Rocky Reach 2010 Summer Spill

Summer spill at Rocky Reach for subyearling Chinook will be 9% of day average river flow following completion of the yearling Chinook survival test, sometime in the first week of June. Spill will continue through the 95 percentile passage point for the subyearling migrants. The no-spill condition for the 2010 yearling Chinook test will not be shortened by the potential early arrival of subyearling Chinook at Rocky Reach. Spill for subyearling Chinook may commence only after study requirements are met (all test fish are released upstream and all tags verified at downstream detection points) for the tagged Chinook. The guidelines for starting summer spill at Rocky Reach are as follows:

1. Summer spill will start upon verification that the spring sockeye study is complete by and all tagged yearling Chinook have passed necessary detection points at the dam and downstream (likely sometime in the first week of June). S*ubyearling* Chinook will be defined as any Chinook having a fork length from 75 mm to 150 mm.

2. Summer spill season will generally end no later than August 15, or when subyearling index counts from the juvenile collector are 0.3% or less of the cumulative run for three out of any five consecutive days (same protocol used in 2009) and Program Real-time shows the 95% passage percentile has been reached.

SECTION 6: ***ROCK ISLAND***

6.1 Rock Island 2010 Spring Spill

In 2010, under Section 5.3.3 of the Rock Island HCP, the District will re-evaluate Project Survival for yearling Chinook and steelhead under a 10% spill operation. The 10% spill level will begin no later than April 17, and end after completion of the 10% spring spill study (generally sometime in the first week of June). The Rock Island bypass trap will be operated seven days per week by Chelan PUD personnel to provide daily juvenile index counts. The trap will operate from April 1 through August 31. Index counts will provide the basis for comparison to determine the start and end of seasonal spill periods. Guidelines to start and end the spring spill program at Rock Island are proposed as follows:

1. The Rock Island spring spill program will begin when the Rock Island daily passage index (expanded counts) exceeds 400 fish for more than 3 days (this corresponds to the historic 5% passage date), or no later than April 17, as outlined in Section 5.4.1. (a) of the Rock Island HCP. Wenatchee River smolt trap counts (at Monitor) will be used to help validate a decision to start spring spill prior to April 17.

2. Rock Island spring spill will end following completion of the 2010 yearling Chinook and steelhead survival study, and after arrival of subyearling Chinook at the Project.

6.2 Rock Island 2010 Summer Spill

Rock Island will spill 20% of the daily average river flow over 95% of the summer out migration. Daily sub-yearling Chinook samples at the bypass trap will provide the basis for decisions to the start and stop spill periods at Rock Island Dam. The proposed guidelines to start and stop the summer spill at Rock Island are outlined as follows:

1. Rock Island summer spill in 2010 will begin after completion of the spring survival study at 10% spill. The summer spill level will be 20% and continue for a duration covering 95 percent of the subyearling outmigration.

2. Spill will generally end no later than August 15th, or when subyearling counts from the Rock Island trap are 0.3% or less of the cumulative run total for any three out of five consecutive day period (same protocol used in 2005-09).

SECTION 7: ***SPILL SHAPING AT ROCKY REACH AND ROCK ISLAND***

Table 3 shows the proposed fish spill percentages and hourly shaping of spill at Rock Island and Rocky Reach in 2010. The District will again shape spill volumes on a daily basis according to the observed diel passage of smolts at each project. The different spill percentages, or spill blocks, are calculated by time such that the summation of water volume from all spill blocks

within the day will equal the volume of water that would have been spilled under a constant, unshaped spill level (for instance 9% spill at Rocky Reach with no shaping). This spill strategy attempts to optimize spill water volume to maximize effectiveness for passing smolts. Spill shape will be consistent with shaping from 2003-2009. Table 4 summarizes juvenile outmigration dates, spill percentages, and run-coverage for both Projects, and dates of operation for the Rocky Reach Juvenile Fish Bypass (JFB) in 2010.

Spill percentages and hourly spill shaping for Rocky Reach and Rock Island in 2010.

Table 3. Spill Percentages

Project/Season	Daily Spill Average	Spill Levels	Duration (# of hours)	Time of Day	Spill Shape %
Rocky Reach Spring (Chin 1, steelhead, sockeye)	None	No Spill Survival Study Chinook	_	_	None
Rock Island Spring (all)	10%	High	4	0000-0400	12.5
		Med	2	0400-0600	10.0
		Low	5	0600-1100	6.0
		Med	9	1100-2000	10.0
		High	4	2000-0000	12.5
Rocky Reach Summer (subyearling Chins)	9%	Med	1	0000-0100	9.0
		Low	6	0100-0700	6.0
		Med	2	0700-0900	9.0
		High	6	0900-1500	12.0
		Med	9	1500-0000	9.0
Rock Island Summer (subyearling Chins)	20%	High	1	0000-0100	23.0
		Med	1	0100-0200	19.0
		Low	8	0200-1000	15.0
		Med	1	1000-1100	19.0
		High	13	1100-0000	23.0

Summary of spill percentages and Rocky Reach Juvenile Fish Bypass operation dates, with approximate outmigration dates and percent of runs covered by spill.

Table 4. Summary of Spill Percentages

Rocky Reach	**Steelhead**	**Yearling Chinook**	**Sockeye**	**Subyearling Chinook**
Percent Spill	0	0	0	9%
Percent of run covered w/spill	0	0 (No Spill CH-1 Survival Test)	0 (No spill Survival Test)	95% (0% - 95%)
~ Run dates	--4/20 – 5/30	-4/20 – 5/30	5/5 - 6/10	6/1 - 8/6
RR JFB Operating?	Yes 4/1 – 8/31	Yes 4/1 – 8/31	Yes 4/1 – 8/31	Yes 4/1 – 8/31
Rock Island	**Steelhead**	**Yearling Chinook**	**Sockeye**	**Subyearling Chinook**
Percent Spill	10%	10%	10%	20%
Percent of run covered w/spill	95% (5% - 100%)	95% (5% - 100%)	95% (5% - 100%)	95% (0% - 95%)
~ Run dates	4/17 - 7/12	4/19 - 7/15	4/25 - 7/21	6/1 - 8/11

SECTION 8: ***SPILL PROGRAM COMMUNICATION***

The District's fish spill coordinator will contact the HCP Coordinating Committee (HCPCC) not less than once per week when fish passage numbers indicate that specific triggers for starting or stopping spill are likely to occur in the immediate future. The District will also contact the HCPCC regarding any unforeseen issues that pertain to the spill program as the season progresses. Communications with the HCPCC will generally be made by email, conference calls, and scheduled meetings.

SECTION 9: ***LITERATURE CITED***

Steig, T.W., P.A. Nealson, K.K. Kumagai, B.J. Rowdon, J.R. Selleck and C. Tunnicliffe. 2009. Route specific passage of juvenile Chinook, sockeye and steelhead salmon using acoustic tag methodologies at Rocky Reach and Rock Island Dams in 2009. Draft report for Chelan County Public Utility District No. 1, Wenatchee, WA., by Hydroacoustic Technology, Inc. Seattle, WA.