

PUBLIC UTILITY DISTRICT NO. 1 *of* CHELAN COUNTY
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April 28, 2014

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

Subject: Rocky Reach Hydroelectric Project, FERC No. 2145
Article 401 and Appendix A, Sections 5.6(1), 5.7(1) and 5.7(2) –
Annual Quality Assurance Project Report and QAPP Update

Dear Secretary Bose and Deputy Secretary Davis:

The Federal Energy Regulatory Commission (Commission or FERC) issued the "*Order Modifying and Approving Quality Assurance Project Plan Pursuant to Article 401 and Appendix A*" for the Rocky Reach Hydroelectric Project No. 2145 (Project) on November 3, 2010.[1]

As specified in the Order, the Public Utility District No. 1 of Chelan County (Chelan PUD) is required to file an annual Quality Assurance Project Plan (QAPP) report with the Commission by May 1 of each year for the duration of the license. Chelan PUD is required to file the annual QAPP report to the Washington Department of Ecology (Ecology) by March 1 and provide Ecology a minimum of 30 days to comment on the report. As part of the filing of the annual QAPP report with the Commission, Chelan PUD is required to include documentation of consultation with Ecology and its response to any comments received.

[1] 133 FERC ¶ 62,115

As specified in Paragraph 4 of the Order, Chelan PUD is to conduct water quality monitoring activities at the locations and frequency described below:

Parameter (metric)	**Location(s)**	**Frequency**
Temperature (degrees Celsius)	Rocky Reach forebay and tailrace, Rock Island forebay	Hourly, April-October
Temperature (degrees Celsius)	Juvenile fish bypass, adult fishway	Hourly for one year
Total dissolved gas (TDG) (% saturation)	Rocky Reach forebay and tailrace, Rock Island forebay	Hourly, April-August

TDG monitoring is currently conducted at both the Rocky Reach and Rock Island hydroelectric projects. Therefore, Chelan PUD has collected the required TDG data specified in Paragraph 10 of the Order and has included the annual Gas Abatement Report with this filing (see attachment).

If you have any questions or require additional information, please contact me or Waikele Frantz at (509) 661-4627.

Sincerely,

Michelle Smith
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Enclosure: Annual Quality Assurance Project Report and QAPP Update

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Rocky Reach Fish Forum

ROCKY REACH ANNUAL WATER ASSURANCE PROJECT REPORT AND QAPP UPDATE, 2014

FINAL

ROCKY REACH HYDROELECTRIC PROJECT
FERC Project No. 2145

April 28, 2014

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

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EXECUTIVE SUMMARY

This annual water quality monitoring report (aka Quality Assurance Project Plan or QAPP Report) is being submitted to the Federal Energy Regulatory Commission (FERC) as required by the Order Modifying and Approving the Quality Assurance Project Plan Pursuant to Article 401 and Appendix A issued November 3, 2010.

A draft of this report was provided to the Washington Department of Ecology (Ecology) on February 28, 2014 for review and comment. Ecology provided comments on April 15, 2014. A copy of the consultation record, including Ecology's comments and Chelan PUD responses, is attached as Appendix F.

This report includes:

- the results of all sampling conducted in 2013
- conclusions regarding compliance with the project's water quality standards;
- recommendations for further action, if necessary;
- proposed actions to be implemented in 2014, and
- the annual update to the QAPP.

Total dissolved gas (TDG) data was collected throughout the monitoring season at 15-minute intervals January 1 – December 31 in the Rocky Reach forebay and tailrace and the Rock Island forebay (next downstream dam). The hourly averages of these readings were recorded on a computer located at Chelan PUD headquarters for later use in calculating daily high and the 12 highest consecutive hours.

Data analysis of TDG data during the fish spill season (April 1 – August 31) showed that water coming into the Rocky Reach forebay from upstream-exceeded Washington State water quality criteria of 115% on 12 days. TDG exceeded the modified Washington State water quality TDG criteria on 8 days in the Rocky Reach tailrace (120%), and 14 days in the Rock Island forebay (115%). These exceedances of the water quality criteria did not necessarily result in noncompliance, as many occurred during river flows that exceeded 7Q10 or when forebay TDG levels were above the numeric criteria. For instance some exceedances in the Rocky Reach tailrace and Rock Island forebay occurred when flows exceeded 7Q10. Additionally, some exceedances observed in the Rock Island forebay occurred when the upstream dam's forebay exceeded 115%. After eliminating exceedances that occurred when flows exceeded 7Q10 or the upstream forebay exceeded 115%, the percentage of days TDG criterion was met is shown below:

Monitoring Location	Percent of Days Criteria Were Met
Rocky Reach Tailrace (125%)	100%
Rocky Reach Tailrace (120%)	94.8%
Rock Island Forebay (115%)	98.6%

Between January 1 and March 31, 2013, the non-fish spill criterion of 110% was exceeded 7 hours in the Rocky Reach tailrace , but not for any hours in the Rock Island forebay, resulting in 99.9% and 100% of the days meeting TDG criteria, respectively.

Between September 1 and December 31, 2013, the non-fish spill criterion of 110% was exceeded on only 4 hours in the Rocky Reach tailrace but not for any hours in the Rock Island forebay, resulting in nearly 100% of the day's meeting TDG criteria. However, at the Rocky Reach tailrace there were 707 hours of

data loss due to a failed instrument. Spill at Rocky Reach occurred during 33 of those hours, of which 18 had spill of less than 20 kcfs.

Temperature data were collected April 1 - October 31 and April 1 - October 1 in the Rocky Reach forebay and tailrace, respectively, at 15-minute intervals. These 15-minute intervals were averaged into hourly readings for use in compiling daily averages, daily highs, and 7-DADMax temperature. The Rocky Reach tailrace instrument experienced several failures during the month of October, making it impossible to calculate 7DADMax for the month. Chelan PUD obtained Wells Dam tailrace hourly temperature data for April 1 – October 31 directly from Douglas County PUD.

A summary showing the percentage of days the 7-DADMax temperature criterion was met is shown below:

Location	Data Collection Period	# of Exceedances[1]	% of Days that Criterion was Met
Wells Tailrace	4/1–10/31	75[2]	
Rocky Reach Forebay	4/1– 10/31	14	93.4
Rocky Reach Tailrace	4/1-10/1	0	100

[1]State of Washington's Water Quality Standards designate a temperature criterion for the Project area of 17.5°C, except when a water body's temperature is warmer than 17.5°C and that condition is due to natural conditions, then human actions considered cumulatively may not cause the 7-DADMax temperature of that water body to increase more than 0.3°C. For the purposes of this report, "natural condition" is the background/incoming condition (i.e. Wells tailrace for the Rocky Reach forebay, and the Rocky Reach forebay for the Rocky Reach tailrace.
[2]Wells tailrace "exceedance" is simply an exceedance of the 17.5° criterion. It does not take into account the "natural conditions" in the Wells forebay.

In addition to the annual program monitoring TDG and water temperature at the Project, additional water quality monitoring in the reservoir's shallow water habitats and analysis of different spill gate sequences for abatement of TDG were reported. Shallow water habitats in the reservoir, including macrophyte beds, were monitored for compliance with numeric criteria for dissolved oxygen, pH and water temperature during August and September of 2012. The dissolved oxygen and pH levels were generally within criteria; however, water temperature was frequently outside the criterion of 17.5ºC. However, water temperatures measured in shallow habitats were generally similar to water temperatures measured at the Project. The analysis of alternative spill gate sequences determined that spreading spill through an additional four gates could potentially reduce downstream TDG levels by a small amount, as compared to the standard spill gate sequence used to meet fish passage conditions for upstream migrant salmon and steelhead. Chelan PUD will utilize the standard/fish spill pattern for the 2014 fish spill season, but plans to thoroughly review the study internally to assess the extent of the TDG reduction benefit while still providing juvenile and adult fish passage. If a benefit is identified, Chelan PUD will develop a proposal for the implementation of the alternative spillway operation for review by the Rocky Reach Fish Forum (RRFF) and Habitat Conservation Plan Coordinating Committee (HCP CC). If the RRFF and HCP CC conclude that the alternative spillway operation can be implemented without adverse effects on fish passage, Chelan PUD will then develop a schedule for implementation.

Further water quality monitoring actions include:

- Continue the TDG monitoring program, as conducted in 2013;
- Continue forebay and tailrace temperature monitoring, as conducted in 2013; and
- Temperature monitoring in the upstream fishway.

No update to the QAPP is proposed at this time.

SECTION 1: ***INTRODUCTION***

The Rocky Reach Hydroelectric Project (Project), owned and operated by Chelan County Public Utility District (Chelan PUD), is located on the Columbia River in Chelan County, Washington, approximately seven miles upstream of the city of Wenatchee, Washington (Figure 1). The Project utilizes the waters of the Columbia River, whose drainage basin extends over substantial portions of northern Washington, Idaho, Montana and into Canada. The Project reservoir (Lake Entiat) extends 43 miles to Douglas County PUD's Wells Dam. The Project consists primarily of an 8,235-acre reservoir; a 2,847-foot-long by 130-foot-high concrete gravity dam spanning the river, including a powerhouse and spillway; a juvenile fish bypass system, and hatchery facilities.

FERC issued the Order Modifying and Approving Quality Assurance Project Plan (QAPP) for the Rocky Reach Project on November 3, 2010. The QAPP provided the basic framework for all the water quality monitoring and reporting required in the Rocky Reach 401 Certification.

The 401 Certification requires Chelan PUD to:

- Monitor total dissolved gas (TDG) and temperature in the Project forebay and tailrace annually;
- Monitor temperature in the upstream fishway and juvenile fish bypass system (JFBS) for one year, unless Ecology or the Rocky Reach Fish Forum determines additional monitoring is required;
- Conduct a one-time study to monitor pH, dissolved oxygen (DO), and water temperature in shallow water areas (macrophyte beds) of the Rocky Reach reservoir, including areas that contain dense growths of aquatic macrophytes;
- Conduct a one-time study of Gas Bubble Trauma (GBT), and
- Compile hourly temperature data from the Wells Dam tailrace.

The 401 Certification requires that Quality Assurance Project Plans (QAPP) for the studies mentioned above (does not include Wells Dam tailrace temperature) be submitted for Ecology review and written approval.

Section 5.7(8) of the 401 Certification requires the submittal of an annual report of water quality monitoring results, along with a summary report by March 1 of each year to WDOE. WDOE will use the monitoring results to track the Project's progress toward meeting and remaining in compliance with the state water quality standards. Additionally, the FERC Order Modifying and Approving the QAPP requires the submittal of the same report to the FERC by May 1 of each year.

Figure 1-1. Location of the Rocky Reach Hydroelectric Project on the Columbia River

SECTION 2: *MONITORING PROCEDURES*

2.1 Forebay and Tailrace TDG and Temperature

TDG and temperature were monitored in the Project forebay and tailrace on an hourly basis, 1 January – 31 December.

The forebay fixed monitoring station (FMS) is located on the upstream side of the dam (Figure 2), the standpipe affixed to the corner between the powerhouse and spillway, approximately mid-channel. Consistent with the 401 Water Quality Certification (Ecology, April 4, 2006), the tailrace fixed monitoring station is located approximately 0.38 mile downstream of the dam (Figure 2). The standpipe is affixed to the downstream side of a pier nose supporting the juvenile bypass system outfall pipe. This location is east of mid-channel, and is minimally impacted by powerhouse flows when the project is passing water over the spillway (Schneider and Wilhelms, 2005). This location was chosen because it was the most feasible location near the end of the aerated zone, which is the compliance point for the Mid-Columbia TDG TMDL.

Forebay and tailrace TDG and temperature data were collected using instruments that can immediately transmit the data to Chelan PUD headquarters, allowing for real-time data recording. A multi-parameter instrument (Minisonde) developed by Hydrolab, Inc., equipped with TDG and temperature sensors, was lowered down the standpipe at each site and submerged to depth of approximately 15 feet.

TDG and temperature measurements were recorded throughout the monitoring season at 15-minute intervals. These 15-minute intervals were averaged into hourly readings for use in compiling daily and 12-hour averages for TDG and daily averages and daily highs for temperature. All hourly data were forwarded to Chelan PUD headquarters building and then onto the US Army Corps of Engineers Reservoir Control Center (RCC) and posted at their site on the World Wide Web.

2.1.1 Alternative Spillway Operations

In 2011, high flow volumes and high levels of TDG in the Columbia River provided an opportunity for Chelan PUD to implement a test of spillway operations not previously tested under the high-flow conditions. The purpose was to evaluate the effectiveness of alternative operations using gates 2-12, to determine whether TDG levels could be reduced without adverse effects on fish passage. The testing utilized four spill configurations: standard (also referred to as “fish spill”), TDG Spill Pattern, Shallow Arc Spill, and Flattened Spill Pattern. This testing did not require any modifications to the TDG monitoring conducted on an annual basis.

The study was conducted from early June to the end of July while river flows were high. The testing schedule established that each configuration was to be run for 24 hours at a time (midnight to midnight, until the end of June; and 0700 -0700 until the end of the study). Upon the completion of one scenario, another would begin.

The data from this first year of testing showed some promise, but not enough data was collected to make a determination as to which, if any, of the three alternate configurations would be effective at minimizing TDG without adversely affecting fish passage. For this reason, Chelan PUD conducted another round of testing in 2012.

The same three alternate configurations were tested, along with the Standard (“fish spill”) configuration in 2012. However, the testing schedule was revised such that the alternate (not Standard) spill configurations were tested for 12 hrs from 0710 hrs to 1910 hrs Monday – Friday during the course of the

study. The Standard Spill pattern was utilized between 1910 hrs and 0710 hrs Monday-Friday and all day Saturday and Sunday.

In 2013 Chelan PUD contracted with Parametrix to analyze the data collected during the two seasons of testing to determine if any of the tested configurations had the potential to reduce TDG. Results of the study are summarized in Section 3.1.1.

2.2 Fishway and Juvenile Fish Bypass Temperature

The required one year of temperature monitoring in the Juvenile Fish Bypass System (JFBS) was conducted in 2012. Thermographs were installed in the upstream fishway in February 2014.

2.3 Wells Dam Tailrace Temperature

Chelan PUD obtained Wells Dam tailrace hourly temperature data directly from Douglas County PUD.

2.4 GBT

No GBT study was conducted in 2013.

2.5 Macrophyte Bed DO, pH, and Temperature

Shallow water habitats in the reservoir, including macrophyte beds, were monitored for compliance with numeric criteria for dissolved oxygen, pH and water temperature during August and September of 2012. Monitoring procedures and equipment were identified in the Quality Assurance Project Plan Update for Shallow Water/Macrophyte Bed Sampling, July 2012. Continuous monitoring at four fixed-sites produced a total of 4,215 valid data points for dissolved oxygen, 3,923 valid data points for pH, and 4,232 valid data points for water temperature. Data editing consisted of removing readings from log files that occurred when the monitoring instrument was out of the water for recalibration or battery changes, bad data when battery voltage was low, and seven anomalous data readings (4 DO, 3 pH, 1 temperature) that were not credible based on the range of values preceding and following these data. Mobile survey monitoring produced over 500 valid data points for each of the three parameters in this study.

Figure 2-1. Location of the forebay and tailrace FMSs, and the JFBS SC entrances

2.6 Data Evaluation and Completeness (QA/QC)

2.6.1 Representativeness

TDG and temperature data were collected from locations required by the 401 Certification and the Mid-Columbia River and Lake Roosevelt TDG TML. Data was collected hourly, which is at a frequency sufficient to determine trends and if water quality standards are being met.

2.6.2 Comparability

TDG and temperature were monitored using standard units of measurement at fixed locations, and therefore data is comparable to data collected historically by Chelan PUD.

2.6.3 Completeness

TDG

Data collection, QA/QC, and analyses of TDG followed those described in the QAPP. Table 2.1 shows the number of values that were omitted from the dataset due to QA/QC issues compared to the total number of available hours. Overall data loss in the 2013 monitoring season (April 1 – August 31) was 5 hours of the combined 11,016 available hours, which was well within the 90% data completeness decision quality objective as specified in the QAPP.

Table 2.1 Overview of total dissolved gas data set during 2013 fish spill season.

Location	Available data collection hours	Number of omitted/ lost hourly readings	Percent data completeness (%)
RRFB FMS	3,672	1	99.9%
RRTR FMS	3,672	0	100%
RIFB FMS	3,672	4	99.9%
Total	**11,016**	**5**	**99.9%**

Temperature at Rocky Reach Facilities

Data collection, QA/QC, and analyses of water temperature followed those described in the QAPP. Table 2-2 shows the number of values that were omitted from the dataset due to QA/QC issues compared to the total number of available hours. Overall data loss in the 2013 monitoring season was 852 hours (851 of which was at the Rocky Reach tailrace) of the combined 10,272 available hours, which was within the 90% data completeness decision quality objective as specified in the QAPP.

Table 2.2 Overview of temperature data set during the 2013 monitoring period (April 1–October 31).

Location	Available data collection hours	Number of omitted/ lost hourly readings	Percent data completeness (%)
FB FMS	5,136	1	99.9
TR FMS	5,136	851	86.4
Total	**10,272**	**852**	**91.7**

2.6.4 Precision

The TDG and temperature monitoring program implemented in 2013 used the same type of equipment to monitor water quality over a small spatial and temporal regime at all sites. Additionally, duplicate sampling occurred during monthly calibrations. See Appendix C for the calibration reports.

2.6.5 Bias

Bias was minimized by following standard protocols for calibration and maintenance.

As discussed in the QAPP, the accuracy/bias of the temperature sensors is ±0.1°C. During 14 instrument maintenance/calibrations, instrument temperature was compared to a standard. Of these 14 comparisons, 11 met the data quality objective of ±0.1°C (Appendix C). The three remaining comparisons (all ±0.2°C) did not meet the measurement data quality objective (MQO) as discussed in the QAPP; however the criteria may be overly strict and may need to be revised. Since completion of the QAPP, Chelan PUD has received input from WDOE that it is not recommended to use the instrument's manufacturer specification for MQOs because expected instrument error alone can cause a failure of meeting the QA criteria. With this recommendation in mind, Chelan PUD has determined that the data from these instruments appears acceptable for use.

2.6.6 Sensitivity

All of the sensors used for the monitoring program have sensitivities that are better than required to determine compliance with water quality standards.

2.6.7 Calibration and Maintenance

Forebay and Tailrace TDG and Temperature

Section 5.7.3 of the 401 Certification requires Chelan PUD to maintain a TDG monitoring program that is at least as stringent as the QA/QC calibration and monitoring procedures and protocols developed by the USGS monitoring methodology for the Columbia River.

Chelan PUD has developed its QA/QC protocols following established protocols by other resource agencies conducting similar monitoring programs, such as the USGS, U.S. Army Corps of Engineers, and other mid-Columbia River Dam operators, as well as HydroLab Corporation's recommendations. These QA/QC protocols are included in Chelan PUD's approved QAPP (Appendix A).

Chelan PUD entered into a Professional Services Agreement with Columbia Basin Environmental to perform monthly calibrations and equipment maintenance on the forebay and tailrace TDG/temperature instruments. Quality Assurance/Quality Control measures were accomplished through training in instrument maintenance, operation, and factory prescribed calibration methods. A detailed log was maintained for all work done on the monitoring equipment, including monthly maintenance, calibration, exchange of instruments, and any other pertinent information. Redundant measurements with a mobile instrument to verify the accuracy of the in-situ instruments were conducted during the monthly calibrations. Calibration reports are included as Appendix D of the 2013 Annual Gas Abatement Report (Appendix B).

Upstream Fishway Temperature

Instruments were recently installed in the upstream fishway. Calibration and maintenance of these instruments will be reported in the 2014 Annual Report.

GBT

No studies were conducted during 2013.

DO/pH

Macrophyte bed DO, pH, and temperature data were collected mid-August to late-September 2012. Monitoring procedures and equipment were identified in the Quality Assurance Project Plan Update for Shallow Water/Macrophyte Bed Sampling, July 2012.

SECTION 3: ***RESULTS AND DISCUSSION***

3.1 TDG

Refer to the 2013 Gas Abatement Annual Report (Appendix B) for detailed information about TDG during the fish spill season (1 April – 31 August).

Between January 1 and March 31, 2013, the non-fish spill criterion of 110% was exceeded 7 hours in the Rocky Reach tailrace , but not for any hours in the Rock Island forebay, resulting in 99.9% and 100% of the days meeting TDG criteria, respectively.

Between September 1 and December 31, 2013, the non-fish spill criterion of 110% was exceeded on only 4 hours in the Rocky Reach tailrace but not for any hours in the Rock Island forebay, resulting in nearly 100% of the days meeting TDG criteria. However, at the Rocky Reach tailrace there were 707 hours of data loss due to a failed instrument. Spill at Rocky Reach occurred during 33 of those hours, of which 18 had spill of less than 20 kcfs.

3.1.1 Alternative Spillway Operations

Chelan PUD contracted with Parametrix to analyze the data collected during the two seasons of testing. The analysis of alternative spill gate sequences determined that spreading spill through an additional four gates could potentially reduce downstream TDG levels by a small amount, as compared to the standard spill gate sequence used to meet fish passage conditions for upstream migrant salmon and steelhead. Ecology has reviewed the report completed by Parametrix and provided comments in a letter dated Feb 5, 2014.

3.2 Temperature

State of Washington's Water Quality Standards designate a temperature criterion for the Project area of 17.5°C, except when a water body's temperature is warmer than 17.5°C and that condition is due to natural conditions, then human actions considered cumulatively may not cause the 7-DADMax temperature of that water body to increase more than 0.3°C. For the purposes of this report, "natural condition" is the background/incoming condition (i.e. Wells tailrace for the Rocky Reach forebay, and the juvenile fish bypass entrance for the sampling facility). Compliance, for the purpose of this report, was calculated by first determining if the7-DADMax temperature of 17.5°C was exceeded at each monitoring location. If temperatures exceeded 17.5°C, at the Rocky Reach forebay or Rocky Reach tailrace, those temperatures were compared to the "background" temperatures in the Wells tailrace and Rocky Reach forebay, respectively.

3.2.1 Forebay, Tailrace, and Wells Dam tailrace

Daily maximum temperatures from the three sites were used to determine the 7-DADMax. Figures 3-1 and 3-2 present graphical displays of the 1-DMax and 7-DADMax values. In general, water temperatures peaked during the months of July through September. Table 3-1 below summarizes the number of exceedances of the 7-DADMax criteria and percent days criterion were met for each monitoring site.

Section 5.5(1)(c) of the 401 Certification, states this data will be used to run the CE-QUAL-W2 model in Year 5 of the License to evaluate the Project compliance with numeric temperature criteria. However, in a letter April 21, 2014 Ecology, in accordance with Section 5.1(8) of the 401 Certification, recommended that modeling temperature in the Rocky Reach pool be postponed until such time as it is determined to be appropriate by Ecology. It is hoped that the modeling effort may be coordinated with a more regional effort.

Table 3.1 Summary of days meeting temperature criterion in the Rocky Reach forebay, Rocky Reach tailrace, and Wells tailrace, 2013.

Location	Data Collection Period	# of Exceedances[1]	% of Days that Criterion was Met
Wells Tailrace	4/1—10/31	75[2]	
Rocky Reach Forebay	4/1—10/31	14	93.4
Rocky Reach Tailrace	4/1—10/1	0	100

[1]State of Washington's Water Quality Standards designate a temperature criterion for the Project area of 17.5°C, except when a water body's temperature is warmer than 17.5°C and that condition is due to natural conditions, then human actions considered cumulatively may not cause the 7-DADMax temperature of that water body to increase more than 0.3°C. For the purposes of this report, "natural condition" is the background/incoming condition (i.e. Wells tailrace for the Rocky Reach forebay, and the Rocky Reach forebay for the Rocky Reach tailrace.
[2]Wells tailrace "exceedance" is simply an exceedance of the 17.5° criterion. It does not take into account the "natural conditions" in the Wells forebay.

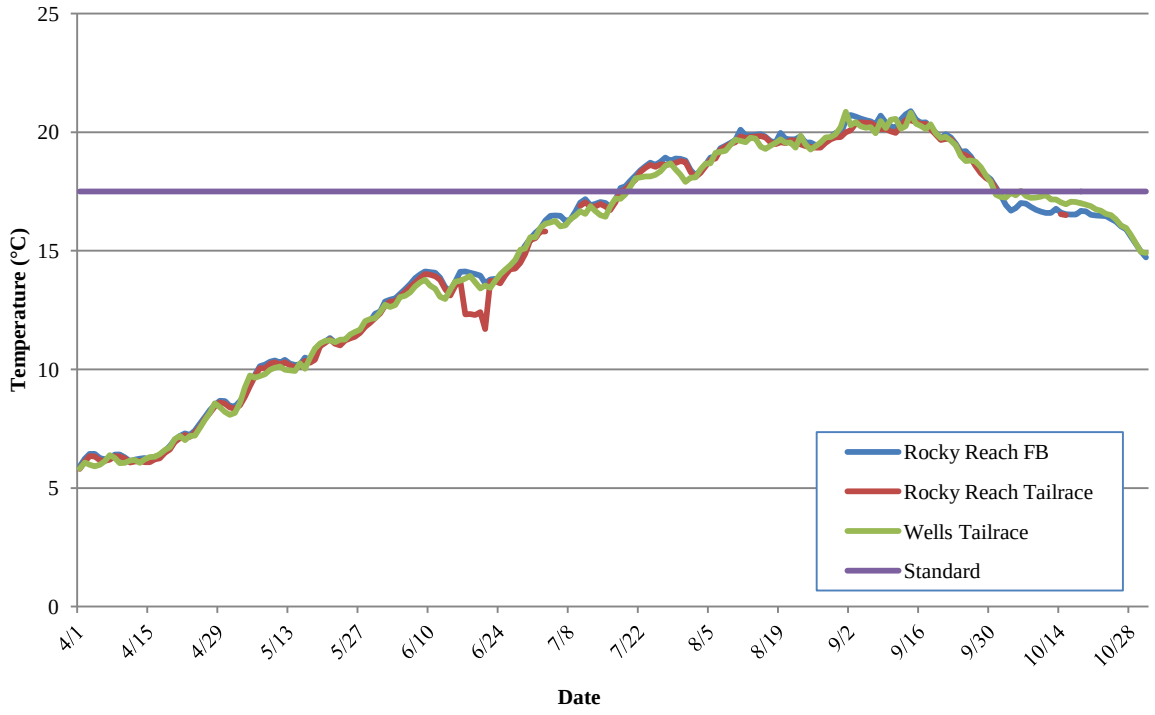

Figure 3-1. Daily maximum water temperature values recorded at each site in 2013.

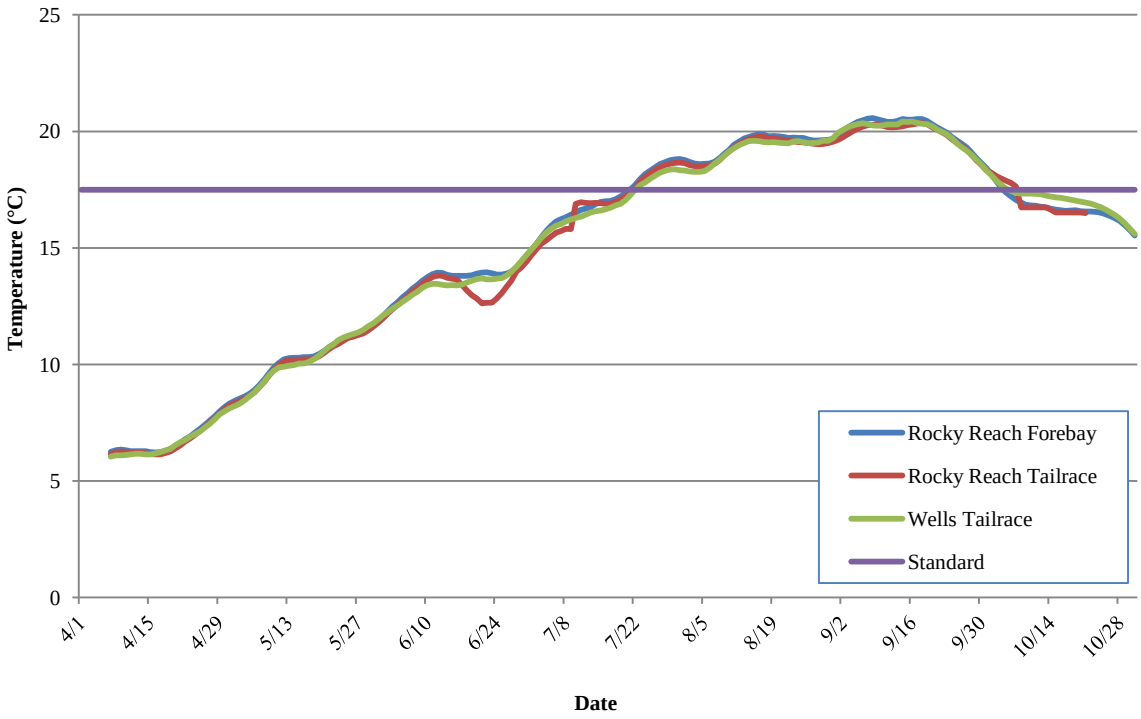

Figure 3-2. Seven day rolling average of daily maximum temperature values recorded at each site in 2013.

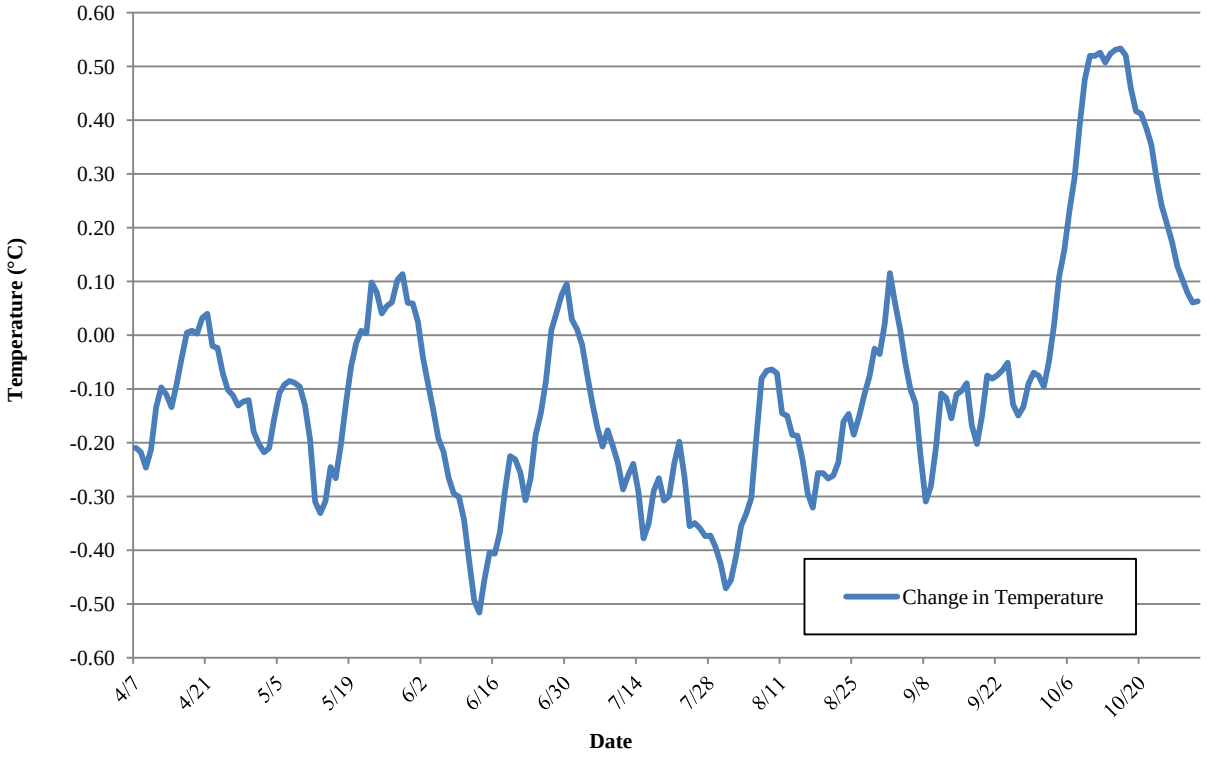

Figure 3-3. Change in 7DADMax temperature from the Wells Dam tailrace to the Rocky Reach Dam forebay.

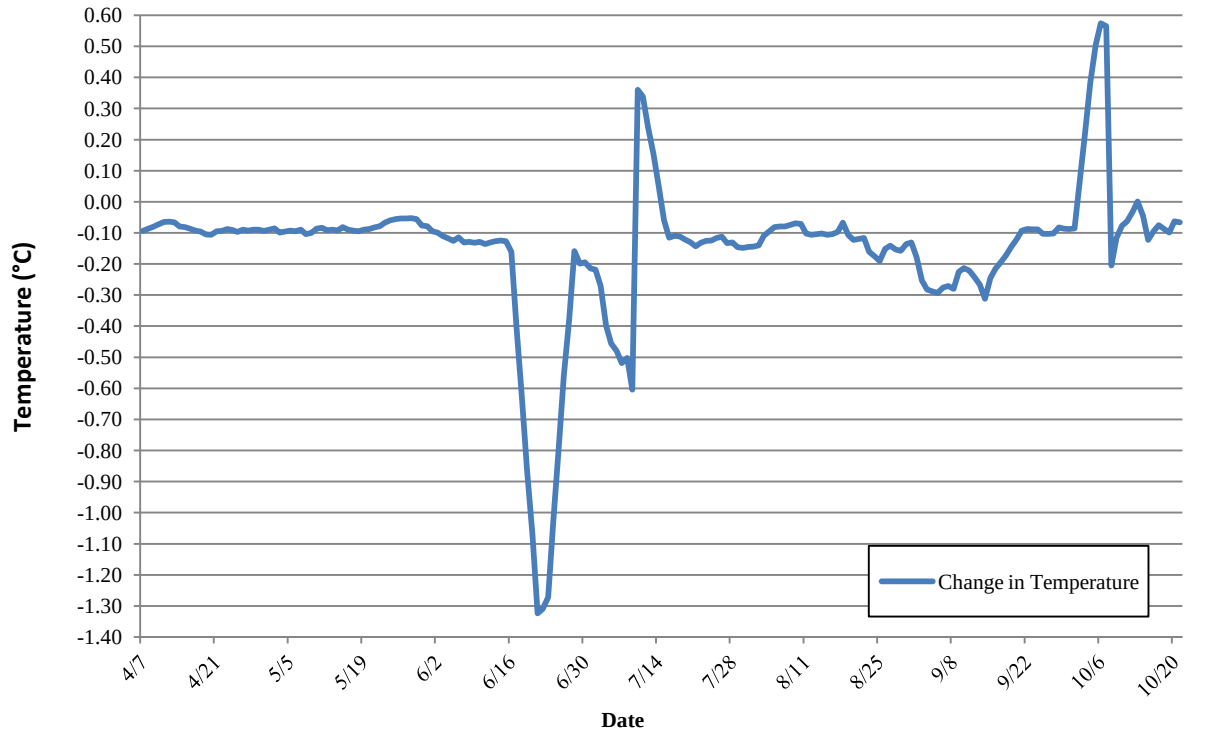

Figure 3-4. Change in the 7DADMax temperature from the Rocky Reach Dam forebay to the Rocky Reach Dam tailrace.

3.2.2 Upstream Fishway

Instruments have recently been installed in the fishway. Data collected will be reported in the 2014 annual report.

3.2.3 JFBS Entrance and Sampling Facility

Because the required one year of data was collected in 2012, no temperature data was collected in the JFBS Entrance or Sampling Facility in 2013.

3.3 GBT

No studies were conducted in 2013.

3.4 Shallow Water Habitat Dissolved Oxygen, pH and Water Temperature

At both the fixed site and during mobile surveys, the dissolved oxygen and pH levels were generally within criteria; however, water temperature was frequently outside the criterion of 17.5ºC. However, water temperatures measured in shallow habitats were generally similar to main channel river water temperatures measured at the Project. Since the mobile surveys were conducted during daylight, there were few dissolved oxygen measurements below the 8.0 mg/l criterion. The near surface measurements did pick up some higher water temperatures than observed with the fixed-site monitoring.

At the fixed sites, relatively few dissolved oxygen measurements fell below the criterion of 8.0 mg/l (151/4215 = 3.6%) and none were below the 6.5 mg/l criterion for the designated use category Salmonid Rearing and Migration Only (substrates and flow velocities in the shallow habitats were not suitable for salmon spawning). Exceedances of the pH criterion of 8.5 were common at one, very shallow fixed-site and frequent in the mobile surveys in similar shallow, dense macrophyte beds. However, pH levels above 8.5 were uncommon at the other fixed-sites (59/2538 = 2.3%).

While the macrophyte beds can have high pH levels and some reductions in dissolved oxygen levels due to plant respiration and photosynthesis, this type of habitat provides important cover for small fish and a food source due to the insects that are associated with the plant life. These small fish, in turn, serve as food for larger fish, birds and aquatic mammals. Also, the pondweed species provide important food for waterfowl during the summer and winter. Large flocks of Canada geese were often observed grazing on the macrophyte beds during the mobile survey data collection. Despite minor deviations from water quality criteria, the benefits provided by these habitats, which comprise less than five percent of the area of Rocky Reach reservoir, likely outweigh the infrequent deviations from water quality criteria.

SECTION 4: ***PROPOSED 2014 ACTION PLAN***

4.1 TDG

Chelan PUD plans to continue the TDG monitoring program conducted in 2013.

4.1.1 Alternative Spillway Operations

Chelan PUD has viewed the investigation into the use of alternative spillway configurations as a two phased approach, with the first phase being the completion of the alternative spill configuration study and report. The second phase will be to thoroughly review the study internally to assess the extent of the TDG reduction benefit while still providing juvenile and adult fish passage. If a benefit is identified, Chelan PUD will develop a proposal for the implementation of the alternative spillway operation for review by the Rocky Reach Fish Forum (RRFF) and Habitat Conservation Plan Coordinating Committee (HCP CC). If the RRFF and HCP CC conclude that the alternative spillway operation can be implemented without adverse effects on fish passage, Chelan PUD will then develop a schedule for implementation.

4.2 Temperature

4.2.1 Forebay and Tailrace

Chelan PUD plans to continue the forebay and tailrace temperature monitoring program conducted in 2013.

4.2.2 Fishway and juvenile fish bypass system

Temperature instruments have recently been installed in the upstream fishway. Data collected will be reported in the 2014 annual report. Because the one year of required temperature monitoring was conducted in the JFBS in 2012, Chelan does not plan to monitor temperature in the JFBS in 2014.

4.3 GBT

Per Section 5.4(1)(c) of the 401 Certification, Chelan PUD shall conduct a one-time study of GBT. However, in a letter dated April 21, 2014 Ecology recommended, in accordance with Section 5.1(8) of the 401 Certification, that Chelan PUD postpone any gas bubble trauma study until such time as it is determined to be appropriate by Ecology.

SECTION 5: ***PROPOSED CHANGES TO QAPP***

Chelan PUD does not propose any changes to the QAPP at this time.

APPENDIX A: FINAL QUALITY ASSURANCE PROJECT PLAN

The final Quality Assurance Project Plan can be found at the following link:

http://www.chelanpud.org/departments/licensingCompliance/rr_implementation/ResourceDocuments/33937.pdf

The 2012 Quality Assurance Project Plan Update for Shallow Water/Macrophyte Bed Sampling can be found at the following link:

http://www.chelanpud.org/departments/licensingCompliance/rr_implementation/ResourceDocuments/38585.pdf

APPENDIX B: 2013 ANNUAL GAS ABATEMENT REPORT

The 2013 Annual Gas Abatement Report can be found at the following link:

http://www.chelanpud.org/departments/licensingCompliance/rr_implementation/ResourceDocuments/41754.pdf

APPENDIX C: DAILY MAXIMUM TEMPERATURE AND 7-DAY ROLLING AVERAGE OF THE DAILY MAXIMUM TEMPERATURES

	Daily Maximum Temperatures				7-Day Average of Daily Maximum Temperatures		
Date	Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace		Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace
1-Apr	5.82	5.92	5.81				
2-Apr	6.08	6.24	6.11				
3-Apr	5.97	6.43	6.34				
4-Apr	5.91	6.44	6.33				
5-Apr	5.99	6.26	6.17				
6-Apr	6.13	6.21	6.14				
7-Apr	6.39	6.27	6.20		6.04	6.25	6.16
8-Apr	6.26	6.41	6.35		6.10	6.32	6.24
9-Apr	6.05	6.41	6.33		6.10	6.35	6.27
10-Apr	6.07	6.29	6.25		6.11	6.33	6.25
11-Apr	6.15	6.13	6.08		6.15	6.28	6.22
12-Apr	6.19	6.20	6.12		6.18	6.27	6.21
13-Apr	6.06	6.23	6.14		6.17	6.28	6.21
14-Apr	6.21	6.26	6.09		6.14	6.27	6.19
15-Apr	6.30	6.15	6.08		6.15	6.24	6.16
16-Apr	6.32	6.33	6.21		6.19	6.23	6.14
17-Apr	6.43	6.33	6.26		6.24	6.23	6.14
18-Apr	6.61	6.55	6.48		6.30	6.29	6.20
19-Apr	6.73	6.78	6.63		6.38	6.38	6.27
20-Apr	7.06	7.03	6.94		6.52	6.49	6.38
21-Apr	7.20	7.19	7.10		6.66	6.62	6.53
22-Apr	7.02	7.30	7.24		6.77	6.79	6.69
23-Apr	7.20	7.24	7.15		6.89	6.92	6.83
24-Apr	7.21	7.43	7.34		7.00	7.07	6.98
25-Apr	7.54	7.71	7.59		7.14	7.24	7.14
26-Apr	7.87	7.99	7.90		7.30	7.41	7.32
27-Apr	8.18	8.29	8.17		7.46	7.59	7.50
28-Apr	8.57	8.50	8.43		7.66	7.78	7.69
29-Apr	8.41	8.67	8.61		7.85	7.98	7.89
30-Apr	8.21	8.66	8.55		8.00	8.18	8.09
1-May	8.08	8.46	8.39		8.12	8.33	8.24
2-May	8.16	8.44	8.35		8.21	8.43	8.34
3-May	8.60	8.67	8.49		8.32	8.53	8.43
4-May	9.23	8.94	8.85		8.47	8.62	8.53
5-May	9.74	9.36	9.30		8.63	8.74	8.65
6-May	9.65	9.79	9.71		8.81	8.90	8.81
7-May	9.72	10.13	10.05		9.03	9.11	9.02
8-May	9.80	10.20	10.04		9.27	9.36	9.26
9-May	9.99	10.32	10.25		9.53	9.63	9.53
10-May	10.07	10.38	10.30		9.74	9.87	9.79
11-May	10.13	10.28	10.21		9.87	10.06	9.98

	Daily Maximum Temperatures				7-Day Average of Daily Maximum Temperatures		
Date	Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace		Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace
12-May	9.98	10.41	10.30		9.91	10.22	10.12
13-May	9.95	10.24	10.18		9.95	10.28	10.19
14-May	9.93	10.19	10.09		9.98	10.29	10.20
15-May	10.25	10.21	10.13		10.04	10.29	10.21
16-May	10.02	10.49	10.37		10.05	10.31	10.22
17-May	10.50	10.39	10.28		10.11	10.32	10.22
18-May	10.88	10.50	10.41		10.22	10.35	10.25
19-May	11.09	11.04	10.97		10.38	10.44	10.35
20-May	11.20	11.18	11.12		10.55	10.57	10.48
21-May	11.23	11.32	11.26		10.74	10.73	10.65
22-May	11.14	11.13	11.09		10.87	10.86	10.78
23-May	11.26	11.07	11.02		11.04	10.94	10.88
24-May	11.26	11.27	11.21		11.15	11.07	11.01
25-May	11.47	11.36	11.30		11.23	11.19	11.14
26-May	11.58	11.43	11.38		11.30	11.25	11.20
27-May	11.67	11.60	11.54		11.37	11.31	11.26
28-May	12.04	11.84	11.79		11.49	11.39	11.33
29-May	12.11	12.03	11.96		11.63	11.51	11.46
30-May	12.16	12.34	12.15		11.76	11.70	11.62
31-May	12.42	12.43	12.36		11.92	11.86	11.78
1-Jun	12.73	12.86	12.69		12.10	12.08	11.98
2-Jun	12.63	12.95	12.86		12.25	12.29	12.19
3-Jun	12.71	12.99	12.86		12.40	12.49	12.38
4-Jun	13.04	13.18	13.08		12.54	12.68	12.57
5-Jun	13.10	13.39	13.26		12.69	12.88	12.75
6-Jun	13.25	13.60	13.48		12.84	13.06	12.94
7-Jun	13.49	13.85	13.66		12.99	13.26	13.13
8-Jun	13.67	14.01	13.85		13.13	13.42	13.29
9-Jun	13.77	14.13	14.02		13.29	13.59	13.46
10-Jun	13.53	14.11	13.99		13.41	13.75	13.62
11-Jun	13.40	14.07	13.92		13.46	13.88	13.74
12-Jun	13.06	13.87	13.78		13.45	13.95	13.82
13-Jun	12.96	13.47	13.39		13.41	13.93	13.80
14-Jun	13.36	13.29	13.12		13.40	13.85	13.72
15-Jun	13.69	13.68	13.51		13.40	13.80	13.68
16-Jun	13.74	14.12	13.77		13.39	13.80	13.64
17-Jun	13.83	14.13	12.33		13.44	13.80	13.40
18-Jun	13.94	14.07	12.33		13.51	13.80	13.17
19-Jun	13.67	14.02	12.30		13.60	13.83	12.96
20-Jun	13.41	13.96	12.41		13.66	13.89	12.82
21-Jun	13.54	13.63	11.70		13.69	13.94	12.62

	Daily Maximum Temperatures				7-Day Average of Daily Maximum Temperatures		
Date	Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace		Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace
22-Jun	13.44	13.79	13.73		13.65	13.96	12.65
23-Jun	13.72	13.82	13.72		13.65	13.92	12.65
24-Jun	14.00	13.73	13.63		13.67	13.86	12.83
25-Jun	14.20	14.05	13.96		13.71	13.86	13.07
26-Jun	14.38	14.32	14.22		13.81	13.90	13.34
27-Jun	14.62	14.50	14.24		13.99	13.98	13.60
28-Jun	15.04	14.91	14.49		14.20	14.16	14.00
29-Jun	15.10	15.22	14.87		14.44	14.36	14.16
30-Jun	15.57	15.52	15.45		14.70	14.61	14.41
1-Jul	15.57	15.76	15.53		14.92	14.90	14.68
2-Jul	15.96	15.93	15.81		15.17	15.16	14.95
3-Jul	16.14	16.28	15.81		15.43	15.44	15.17
4-Jul	16.19	16.48			15.65	15.73	15.33
5-Jul	16.26	16.49			15.83	15.95	15.50
6-Jul	16.03	16.48			15.96	16.13	15.65
7-Jul	16.07	16.26			16.03	16.24	15.72
8-Jul	16.33	16.31			16.14	16.32	15.81
9-Jul	16.47	16.64			16.21	16.42	15.81
10-Jul	16.66	17.03	16.89		16.29	16.53	16.89
11-Jul	16.55	17.17	17.04		16.34	16.63	16.96
12-Jul	16.87	16.92	16.86		16.43	16.69	16.93
13-Jul	16.68	16.98	16.87		16.52	16.76	16.91
14-Jul	16.50	17.06	16.98		16.58	16.87	16.93
15-Jul	16.43	17.02	16.86		16.60	16.97	16.92
16-Jul	16.86	16.85	16.72		16.65	17.00	16.89
17-Jul	17.20	17.14	17.05		16.73	17.02	16.91
18-Jul	17.19	17.65	17.50		16.82	17.09	16.98
19-Jul	17.38	17.72	17.58		16.89	17.20	17.08
20-Jul	17.72	17.96	17.79		17.04	17.34	17.21
21-Jul	18.05	18.18	18.00		17.26	17.50	17.36
22-Jul	18.09	18.39	18.32		17.50	17.70	17.57
23-Jul	18.14	18.57	18.49		17.68	17.94	17.82
24-Jul	18.13	18.72	18.62		17.81	18.17	18.04
25-Jul	18.20	18.62	18.53		17.96	18.31	18.19
26-Jul	18.35	18.75	18.64		18.10	18.46	18.34
27-Jul	18.58	18.93	18.62		18.22	18.59	18.46
28-Jul	18.68	18.80	18.64		18.31	18.68	18.55
29-Jul	18.43	18.88	18.70		18.36	18.75	18.61
30-Jul	18.22	18.87	18.78		18.37	18.80	18.65
31-Jul	17.90	18.81	18.74		18.34	18.81	18.66
1-Aug	18.08	18.40	18.32		18.32	18.78	18.63

	Daily Maximum Temperatures				7-Day Average of Daily Maximum Temperatures		
Date	Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace		Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace
2-Aug	18.09	18.19	18.10		18.28	18.70	18.56
3-Aug	18.43	18.38	18.29		18.26	18.62	18.51
4-Aug	18.68	18.64	18.57		18.26	18.60	18.50
5-Aug	18.68	18.93	18.84		18.30	18.60	18.52
6-Aug	19.13	18.97	18.89		18.43	18.62	18.54
7-Aug	19.17	19.32	19.25		18.61	18.69	18.61
8-Aug	19.22	19.43	19.39		18.77	18.84	18.76
9-Aug	19.46	19.54	19.50		18.97	19.03	18.96
10-Aug	19.68	19.68	19.57		19.14	19.22	19.14
11-Aug	19.63	20.11	19.82		19.28	19.43	19.32
12-Aug	19.58	19.86	19.75		19.41	19.56	19.45
13-Aug	19.77	19.86	19.80		19.50	19.69	19.58
14-Aug	19.72	19.88	19.82		19.58	19.77	19.66
15-Aug	19.38	19.91	19.83		19.60	19.84	19.73
16-Aug	19.29	19.81	19.78		19.58	19.87	19.77
17-Aug	19.42	19.61	19.56		19.54	19.86	19.77
18-Aug	19.55	19.58	19.50		19.53	19.79	19.72
19-Aug	19.69	19.97	19.58		19.55	19.80	19.70
20-Aug	19.55	19.72	19.54		19.52	19.78	19.66
21-Aug	19.57	19.69	19.66		19.49	19.76	19.64
22-Aug	19.35	19.70	19.65		19.49	19.73	19.61
23-Aug	19.84	19.83	19.49		19.57	19.73	19.57
24-Aug	19.48	19.57	19.42		19.58	19.72	19.55
25-Aug	19.27	19.56	19.38		19.54	19.72	19.53
26-Aug	19.42	19.46	19.34		19.50	19.65	19.50
27-Aug	19.56	19.45	19.35		19.50	19.61	19.47
28-Aug	19.78	19.67	19.55		19.53	19.61	19.45
29-Aug	19.80	19.78	19.70		19.59	19.62	19.46
30-Aug	19.92	19.97	19.78		19.60	19.64	19.50
31-Aug	20.21	19.90	19.79		19.71	19.69	19.55
1-Sep	20.86	20.50	19.99		19.93	19.82	19.64
2-Sep	20.30	20.73	20.07		20.06	20.00	19.75
3-Sep	20.42	20.65	20.35		20.18	20.17	19.89
4-Sep	20.26	20.58	20.41		20.25	20.30	20.01
5-Sep	20.18	20.51	20.39		20.31	20.41	20.11
6-Sep	20.22	20.46	20.39		20.35	20.48	20.20
7-Sep	19.96	20.34	20.26		20.31	20.54	20.27
8-Sep	20.47	20.70	20.13		20.26	20.57	20.29
9-Sep	20.17	20.40	20.13		20.24	20.52	20.29
10-Sep	20.53	20.25	20.03		20.25	20.46	20.25
11-Sep	20.56	20.19	19.96		20.30	20.41	20.18

	Daily Maximum Temperatures				7-Day Average of Daily Maximum Temperatures		
Date	Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace		Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace
12-Sep	20.15	20.54	20.28		20.29	20.41	20.17
13-Sep	20.25	20.76	20.51		20.30	20.45	20.19
14-Sep	20.82	20.89	20.49		20.42	20.53	20.22
15-Sep	20.35	20.53	20.43		20.40	20.51	20.26
16-Sep	20.27	20.40	20.34		20.42	20.51	20.29
17-Sep	20.14	20.41	20.34		20.36	20.53	20.34
18-Sep	20.34	20.20	20.13		20.33	20.53	20.36
19-Sep	19.96	19.98	19.91		20.30	20.45	20.31
20-Sep	19.75	19.74	19.67		20.23	20.31	20.19
21-Sep	19.80	19.92	19.72		20.09	20.17	20.08
22-Sep	19.65	19.78	19.71		19.99	20.06	19.97
23-Sep	19.44	19.51	19.44		19.87	19.93	19.84
24-Sep	18.99	19.17	19.11		19.71	19.76	19.67
25-Sep	18.78	19.20	19.02		19.48	19.61	19.51
26-Sep	18.80	18.96	18.89		19.32	19.47	19.36
27-Sep	18.75	18.63	18.56		19.17	19.31	19.21
28-Sep	18.52	18.33	18.26		18.99	19.08	19.00
29-Sep	18.18	18.17	18.07		18.78	18.85	18.76
30-Sep	17.90	18.01	17.94		18.56	18.64	18.55
1-Oct	17.37	17.68	17.63		18.33	18.43	18.34
2-Oct	17.26	17.35			18.11	18.16	
3-Oct	17.24	16.93			17.89	17.87	
4-Oct	17.44	16.69			17.70	17.59	
5-Oct	17.33	16.80			17.53	17.37	
6-Oct	17.53	17.01			17.44	17.21	
7-Oct	17.31	16.99			17.36	17.06	
8-Oct	17.23	16.85	16.74		17.34	16.95	
9-Oct	17.24	16.73			17.33	16.86	
10-Oct	17.28	16.65			17.34	16.82	
11-Oct	17.35	16.59			17.32	16.80	
12-Oct	17.17	16.59			17.30	16.77	
13-Oct	17.16	16.77			17.25	16.74	
14-Oct	17.04	16.61	16.54		17.21	16.69	
15-Oct	16.96	16.54	16.50		17.17	16.64	
16-Oct	17.06	16.53			17.15	16.61	
17-Oct	17.05	16.52			17.11	16.59	
18-Oct	17.00	16.67			17.06	16.61	
19-Oct	16.95	16.67			17.03	16.62	
20-Oct	16.88	16.52			16.99	16.58	
21-Oct	16.75	16.49			16.95	16.56	
22-Oct	16.69	16.48			16.91	16.56	

	Daily Maximum Temperatures				7-Day Average of Daily Maximum Temperatures		
Date	Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace		Wells Tailrace	Rocky Reach Forebay	Rocky Reach Tailarace
23-Oct	16.55	16.46			16.84	16.55	
24-Oct	16.51	16.33			16.76	16.52	
25-Oct	16.32	16.23			16.66	16.46	
26-Oct	16.08	16.03			16.54	16.36	
27-Oct	15.96	15.91			16.41	16.28	
28-Oct	15.67	15.59			16.25	16.15	
29-Oct	15.30	15.27			16.06	15.98	
30-Oct	14.94	14.97			15.83	15.76	
31-Oct	14.90	14.72			15.60	15.53	

APPENDIX D: SPILL DATA EVALUATION ROCKY REACH DAM 2011-2012

The Spill Data Evaluation report can be found at the following link:

http://www.chelanpud.org/departments/licensingCompliance/rr_implementation/ResourceDocuments/42306.pdf

APPENDIX E: SHALLOW WATER/MACROPHYTE BED WATER QUALITY MONITORING REPORT

The Shallow Water/Macrophyte Bed Water Quality Monitoring Report can be found at the following link:

http://www.chelanpud.org/departments/licensingCompliance/rr_implementation/ResourceDocuments/41594.pdf

APPENDIX F: CONSULTATION RECORD

PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY
P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
(509) 663-8121 • Toll free 1-888-663-8121 • www.chelanpud.org

To: Patricia Irle, Washington State Department of Ecology
Chris Coffin, Washington State Department of Ecology
Charlie McKinney, Washington State Department of Ecology

From: Waikele Frantz, Environmental Permit Coordinator
Public Utility District No. 1 of Chelan County (Chelan PUD)

Re: Rocky Reach Hydroelectric Project No. 2145
License Article 401 – Water Quality Annual Report

Ms. Irle, Mr. Coffin, and Mr. McKinney:

As per Section 5.7(8) of the 401 Water Quality Certification for Rocky Reach, Chelan PUD hereby submits the Draft 2013 Annual Water Quality Monitoring Report for your review.

Please review and submit your comments on or before 5:00 p.m., April 2, 2014 to me via email at waikele.frantz@chelanpud.org or via fax to (509) 661-8203.

Pursuant to the FERC Order Modifying and Approving Quality Assurance Project Plan, Chelan PUD will file the Final Water Quality Report with FERC by May 1, 2014.

All received comments will be appended to the final report with a description of how each comment or recommendation was incorporated in the report, or, if the licensee does not adopt a recommendation, the filing with the FERC will include the licensee's reasons, based on project-specific information for not adopting such recommendation.

If you have any questions, please do not hesitate to contact me.

Thank you,
Waikele Frantz
509-661-4627

From: Irle, Pat (ECY) [mailto:PIRL461@ECY.WA.GOV]
Sent: Tuesday, April 15, 2014 12:36 PM
To: Frantz, Waikele M.
Cc: McKinney, Charlie (ECY); Coffin, Chris (ECY)
Subject: RE: 2013 Annual Water Quality Monitoring Report

Hi, Waikele –

Primary comment:
3.1.1 If I understood correctly, Chelan PUD proposes to ask the HCP CC to apply the flattened spill configuration at all spill levels, as soon as the PUD has addressed issues of higher urgency. Did I understand this correctly? If so, this section would need a minor modification.

Relatively minor comments:

Primary Additions
Figure 3-2: Could you prepare a graph showing the difference (delta) in the 7DADMax temperature between the tailrace of Wells and the forebay of Rocky Reach [on the y-axis, with dates on the x-axis]? And a second graph that show the difference in the 7DADMax temperature between the forebay and tailrace? Please use a scale such that we can see when the delta exceeds 0.3oC.

Minor Additions
Could you include a horizontal line on each of the figures 3-1 and 3-2 showing water temperature data showing the 17.5oC standard? This will help us better see when temperatures start to exceed 17.5 and again when they fall below that value.

Thanks for a good report.

Sincerely,
Pat Irle

WDOE Comment	Chelan PUD Response
Section 3.1.1 If I understood correctly, Chelan PUD proposes to ask the HCP CC to apply the flattened spill configuration at all spill levels, as soon as the PUD has addressed issues of higher urgency. Did I understand this correctly? If so, this section would need a minor modification.	Chelan PUD has viewed the investigation into the use of alternative spillway configurations as a two-phased approach, with the first phase being the completion of the alternative spill configuration study and report. The second phase will be to thoroughly review the study internally to assess the extent of the TDG reduction benefit while still providing juvenile and adult fish passage. If a benefit is identified, Chelan PUD will develop a proposal for the implementation of the alternative spillway operation for review by the Rocky Reach Fish Forum (RRFF) and Habitat Conservation Plan Coordinating Committee (HCP CC). If the RRFF and HCP CC conclude that the alternative spillway operation can be implemented without adverse effects on fish passage, Chelan PUD will then develop a schedule for implementation. The above has been added as a new Section 4.1.1.
Figure 3-2: Could you prepare a graph showing the difference (delta) in the 7DADMax temperature between the tailrace of Wells and the forebay of Rocky Reach [on the y-axis, with dates on the x-axis]? And a second graph that show the difference in the 7DADMax temperature between the forebay and tailrace? Please use a scale such that we can see when the delta exceeds 0.3oC.	Requested graphs have been added; see Figure 3-3 and 3-4.
Could you include a horizontal line on each of the figures 3-1 and 3-2 showing water temperature data showing the 17.5oC standard? This will help us better see when temperatures start to exceed 17.5 and again when they fall below that value.	A horizontal line marking the 17.5°C standard has been added to each figure 3-1 and 3-2.

Document Content(s)