

WATER QUALITY MANAGEMENT PLAN



ENLOE HYDROELECTRIC PROJECT (FERC PROJECT NO. 12569)

FEBRUARY 2012

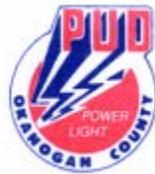


TABLE OF CONTENTS

1.0 INTRODUCTION.....	5
1.1 Project Background	5
1.2 Hydroelectric Project Description	5
1.3 Water Quality Standards	6
1.3.1 Turbidity Criterion	6
1.3.2 pH	7
1.3.3 Water Temperature Criteria	7
1.3.4 Dissolved Oxygen Criteria.....	8
1.3.5 Total Dissolved Gas Criterion.....	8
1.4 Water Quality Protection Plans	8
1.4.1 Background	9
1.4.2 Associated Water Quality Protection Plans	12
2.0 WATER QUALITY MANAGEMENT PLAN GOALS AND OBJECTIVES	14
3.0 WATER QUALITY MONITORING	ERROR! BOOKMARK NOT DEFINED.
3.1 Project Construction Monitoring	Error! Bookmark not defined.
3.2 Project Operations Monitoring	Error! Bookmark not defined.
4.0 ORGANIZATION AND SCHEDULE	14
4.1 Monitoring Schedule	14
4.1.1 Monitoring Schedule	14
4.1.2 Reporting Schedule.....	15
5.0 MONITORING PROGRAM DESIGN	ERROR! BOOKMARK NOT DEFINED.
5.1 Water Temperature	Error! Bookmark not defined.
5.2 Dissolved Gas.....	Error! Bookmark not defined.
5.3 Turbidity	Error! Bookmark not defined.
5.3.1 In-Stream Construction Monitoring	Error! Bookmark not defined.
5.3.2 Upland Monitoring (Discharges to Surface Water Bodies).....	Error! Bookmark not defined.
5.4 Petroleum Compound Sampling.....	Error! Bookmark not defined.
6.0 DOCUMENTATION AND REPORTS	16
7.0 REFERENCES	17

ACRONYMS AND ABBREVIATIONS

7-DADMax	7-day average of the daily maximum
BMP	best management practice
CD	compact disc

CESCL	Certified Erosion and Sediment Control Lead
cfs	cubic feet per second
°C	degrees Celsius
District	Public Utility District No. 1 of Okanogan County
DLA	Draft License Application
DO	dissolved oxygen
DQO	data quality objective
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
GPS	global positioning system
ICD	Initial Consultation Document
LDO	Luminescent Dissolved Oxygen
mg/L	milligrams per liter
Minisonde5	Hydrolab® Minisonde5 multi-parameter meters
mmHg	millimeters of mercury
MQO	measurement quality objective
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric turbidity units
PM&Es	prevention, mitigation, and enhancement measures
PUD	Public Utility District No. 1 of Okanogan County
PVC	polyvinyl chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan

QC	quality control
RM	river mile
RPD	relative percent difference
SOP	Standard Operating Procedure
SVR4	Surveyor4® data logger and display unit
TDG	total dissolved gas
TMDL	total maximum daily load
WAC	Washington Administrative Code
WQMP	Water Quality Management Plan

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The Public Utility District No. 1 of Okanogan County (District) is obtaining a Federal Energy Regulatory Commission (FERC) license to redevelop and operate a hydroelectric power generation project at the existing Enloe Dam site. The Enloe Hydroelectric Project (Project) will be located on the Similkameen River about 3.5 miles northwest of the City of Oroville, in north-central Washington.

1.2 HYDROELECTRIC PROJECT DESCRIPTION

The existing concrete gravity arch dam is owned by the District and was completed in 1920 by the Okanogan Valley Power Company for the purpose of power generation. The dam is a 54-foot high structure designed to be overtopped. The crest of the spillway is at 1,044.3 feet, and replacement of removable 5-foot flashboards by crest gates that will raise the normal water surface elevation to 1,048.3 feet for most of the year except during spring runoff when the gates will be lowered and the water surface elevation will be controlled by the existing spillway crest. Over the years, much of the reservoir has been filled with sediment. The dam now creates a pool approximately two miles long and 200-feet wide with an average depth of nine feet and a surface area of approximately 50 acres.

The Project will redevelop hydroelectric power generation by building a new power plant on the east bank of the river closer to the dam, instead of restoring the existing power plant. The existing plant was decommissioned over 50 years ago. As part of the Project, the existing dam will be refurbished to meet current dam safety requirements and to extend its service life.

The Project will operate in a run-of-river mode, meaning that flow through the turbines will be regulated to match the natural flow in the river so that inflow and outflow from Enloe Reservoir are similar. When river flow exceeds turbine hydraulic capacity (1600 cubic feet per second [cfs]), the surplus will be discharged over the existing spillway. The new proposed Project configuration reduces potential environmental impacts to water quality immediately downstream of the dam by moving the powerhouse upstream closer to the dam and replacing sections of penstock with open channel, thereby reducing the bypass reach from about 900 feet to the roughly 370 feet between the dam and the natural waterfall below it. This modification also provides continuous flow downstream of the falls. Constructing the headworks of the Project will involve excavating an entrance to the approach channel on the northeast bank of the reservoir just upstream from the dam. Preliminary design concepts include a tapered trapezoidal approach channel between the river and an intake structure at the head of two penstocks which deliver water to the new hydro powerhouse. A tailrace channel will return water from the powerhouse to the Similkameen River near the base of the existing waterfall.

Following extensive consultation and analyses to develop a Clean Water Act §401 water quality certification, it was determined that the Project shall provide the following minimum instream flows in the river reach below Enloe Dam and above the Project tailrace: 30 cfs from mid-July to mid-September, and 10 cfs for the rest of the year. To regulate the bypass flows and protect water quality for limited fish use and aesthetic benefits, water is proposed to be released through an existing penstock intake in the west abutment of the dam where it will be piped to a point of discharge to the existing plunge pool at the base of the dam.

1.3 WATER QUALITY STANDARDS

The Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC) were most recently updated effective December 21, 2006 (Ecology 2006), and the standards were approved by the Environmental Protection Agency (EPA) on February 11, 2008. Among the designated uses for the lower Similkameen River¹ are salmonid spawning, rearing and migration. During Project construction, the standard's numerical criteria for turbidity are important for the protection of designated uses.

The numerical criteria that will be most pertinent to operations of the Project are those criteria developed to protect designated uses from potential impacts to water temperature, dissolved oxygen, and total dissolved gas. During both Project construction and operations, narrative water quality standards dictate that aesthetic values must not be impaired by materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste (e.g. an oil sheen from a petroleum fuel or lubricant that enters the river from construction equipment).

1.3.1 Turbidity Criterion

Turbidity is measured in nephelometric turbidity units (NTUs). As summarized in Chapter 173-201A WAC, the turbidity criterion for salmonid spawning, rearing, and migration are as follows:

- Turbidity will not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

Background is defined as being upgradient or outside the area of influence of a discharge.

As stated in Chapter 173-201A WAC, this turbidity criterion “shall be modified, without specific written authorization from the department, to allow a temporary area of mixing

¹ The pool above Enloe Dam does not have a mean water detention time of greater than 15 days, so water quality standards for lakes do not apply to the Project.

during and immediately after necessary in-water construction activities that result in the disturbance of in-place sediments.” This temporary area of mixing is subject to the constraints of WAC 173-201A-400 (4) and (6) and can occur only after state permits and approvals, and after the implementation of appropriate best management practices (BMPs) to avoid or minimize disturbance of in-place sediments and exceedances of the turbidity criteria. Based on historical and expected stream flows (above 100 cfs at the time of construction), the point of compliance is expected to be 300 feet downstream of the activity causing the turbidity exceedance.

For upland discharges, the point of compliance will be at a location designated by the Certified Erosion and Sediment Control Lead (CESCL) based on where construction activities are occurring and/or at a location where storm water is observed to be discharging into the Similkameen River.

1.3.2 pH

For the salmonid spawning, rearing, and migration aquatic use category, pH shall be within the range of 6.5 to 8.5 with a human caused variation of less than 0.5 units. A potential project effect on pH is only anticipated where extensive concrete construction is being conducted where there is contact between newly poured concrete and the waters of the Similkameen River. Under that circumstance, pH sampling would be conducted at the identified upland (or upstream) site discharge points after each 24-hour rainfall events of 0.5 inches or greater or if site discharge is observed.

The point of compliance for upland discharges during storm events will be at a location designated by the CESCL based on where construction activities are occurring and/or at a location where storm water is observed to be discharging into the Similkameen River.

1.3.3 Water Temperature Criteria

The aquatic life maximum temperature criterion to protect salmonid spawning, rearing and migration is 17.5 degrees Celsius (°C), measured by the 7-day average of the daily maximum (7-DADMax) temperatures. When a water body’s temperature is warmer than the criterion and that temperature 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. In applying this standard to hydroelectric projects, Washington State Department of Ecology (Ecology) has interpreted natural conditions to be the water temperature regime before construction of any dams or other human influences. In addition, Ecology has identified the Similkameen River below Enloe Dam as a water body requiring special protection for spawning and incubation (Ecology 2006). This special criterion identifies a maximum 7-DADMax temperature of 13°C at the initiation of spawning for salmon and at fry emergence for salmon and trout. The maximum 0.3°C maximum increase also applies to the seasonal criteria for spawning and incubation. These requirements are applied to the Similkameen River below Enloe Dam from February 15 through June 15.

1.3.4 Dissolved Oxygen Criteria

The one-day minimum dissolved oxygen (DO) concentration for salmonid spawning, rearing and migration is 8.0 milligrams per liter (mg/L) (Ecology 2006). When a water body's DO is lower than this criterion (or within 0.2 mg/L of the criterion) and that DO concentration is due to natural conditions, then human actions considered cumulatively may not cause the concentration to decrease more than 0.2 mg/L.

1.3.5 Total Dissolved Gas Criterion

Total dissolved gas (TDG) shall not exceed 110 percent of saturation at any point of sample collection (Ecology 2006). This TDG criterion does not apply when the river exceeds the 7-day, 10-year frequency flood. The standards provide allowances for the criterion to be adjusted to aid fish passage over hydroelectric dams when consistent with an Ecology-approved gas abatement plan. However, this allowance does not apply to Enloe Dam because the Project will not be providing spillage to aid fish passage.

1.3.6 Petroleum Hydrocarbons

Section 260 of Chapter 173-201A WAC defines narrative criteria for toxics and aesthetic values that apply to all existing and designated uses for fresh and marine water:

- (a) Toxic, radioactive, or deleterious material concentrations must be below those which have the potential, either singularly or cumulatively, to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health.
- (b) Aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.

Accidental leaks and spills of chemicals or fluids (including petroleum-based products) from construction processes, construction equipment, or project operations could release substances containing petroleum hydrocarbons directly to surface water that is protected by the narrative criteria of Chapter 173-201A.260 WAC. Such a release could potentially cause adverse effects to aquatic biota or impair aesthetic values. Actions to be taken during a spill if one should occur are described in the Spill Response Plan (SRP; District 2009b). In addition to equipment inspections during project operations, periodic monitoring will be conducted to determine if there is evidence of any oil sheen on the Similkameen River downriver from the powerhouse.

1.3.7 Background

Water Temperature Measures

Before the license application for the current Project was undertaken, earlier monitoring of the Similkameen River indicated that water temperatures near the Canadian border and at Oroville typically exceeded the freshwater aquatic life numeric criteria during the summer months, and water temperatures increase as the river flows downstream (Ecology 2005; Webber and Stewart 2001).

Ecology and the Colville Confederated Tribes continue to monitor water quality in the Similkameen River near Oroville; water quality data was collected within the Project Area in 2006 studies undertaken by the District. The FLA (District 2008) reached the following conclusions based on 2006 water temperature studies:

- The 17.5°C temperature criterion, measured by the 7-DADMax, was exceeded both upstream and downstream from the Project Area from late June through mid-September in 2006.
- Comparisons of 7-DADMax temperatures measured at the head of the reservoir pool with measurements from the lower reservoir and from below the dam, indicating that water temperatures did not increase through the Project Area more than 0.3°C at any time during the 2006 monitoring season.
- The 7-DADMax temperatures decreased through the Project Area after August 4th, at times by more than 1.6°C.
- The 7-DADMax temperatures in the Similkameen River exceeded the spawning temperature criterion of 13.0°C between June 7 and June 15, 2006, where this criterion applies below the waterfall and at the Oroville Bridge. However, water temperatures did not increase through the Project Area more than 0.1°C during this period (a difference that is insignificant given the accuracy of monitoring equipment).
- The high temperatures recorded upstream near China Rock and the lack of warming through the reservoir pool indicate that exceedances of the 17.5 and 13°C criteria are due to conditions unrelated to Enloe Dam.
- Because the 7-DADMax temperature of the Similkameen River did not increase more than 0.3°C through the Project Area at any time during the study, there were no exceedances of the water quality standards; therefore the presence of Enloe Dam did not contribute to the ambient water quality exceedances.
- Although not used for determining compliance with water quality standards, mean daily temperatures were also examined to see if there was evidence of warming through the reservoir reach during the summer warm period. Similar to the comparison between 7-DADMax temperatures in the upper and lower reservoir, there was no evidence of warming.

To support development of the Clean Water Act §401 water quality certification, temperature rise calculations were performed to provide rough estimates of the maximum daily temperature increases within and below the bypass reach based on conservative estimates and crude modeling assumptions (Pippin 2010). Key observations from this study were summarized as follows:

- Calculations show that the temperature gain within the bypass pool at the base of the dam would at no time be more than 0.3 °C at the proposed instream minimum flow rates, using conservative assumptions and worst-case conditions. Even during the lowest river flow conditions, and assuming that only one-third of the powerhouse discharge circulates up to the base of the Falls and mixes with the bypass flows, the increase in temperature at the base of the Falls would not be measurable.
- Temperature gains that could occur over the face of the dam if water was allowed to sheet-flow over the entire dam can be avoided by piping flows to the base of the Dam. Instream flow outlet works are described in Appendix D of the Construction Sediment Management Plan (CSMP) (District 2012a).

Drawing the bypass flows through an old Project penstock intake located approximately 11 feet below the dam crest is also expected to provide cooler water whenever the reservoir is stratified during the hot summer months.

Dissolved Oxygen

The FLA concluded that DO profile measurements on September 14 and 15, 2006, in the vicinity of Enloe Dam were all in compliance with the 8.0 mg/L minimum water quality standard. Although 2006 monitoring did not find any DO levels less than 8.3 mg/L, monitoring was limited to a short period in mid-September and it is likely that DO dropped below the 8.0 mg/L minimum criterion in mid-summer when the river was warmer – both upstream and downstream from the Project. A mid-August 1990 study found that sites downstream of the dam and waterfall were approximately 1 mg/L higher in DO than upstream sites due to significant aeration at the dam and falls (HDR 1991). To offset the reduced aeration that would otherwise occur with water flowing over the dam, the powerhouse draft tubes will be equipped with aeration vents and operated when required to increase DO during critical periods. As stated in the Operations QAPP (District 2012), adaptive management monitoring will determine when the aeration vents should be opened after high flows have receded in the early summer.

Total Dissolved Gas (TDG)

TDG monitoring in 2006 resulted in the following conclusions regarding water quality impacts:

- TDG levels measured between May 26 and May 30, 2006, remained below the 110 percent saturation water quality criterion in the lower reservoir and between the dam and the waterfall. However, TDG levels exceeded the criterion below the waterfall

and below the railroad trestle at the mouth of the canyon downstream from the Project Area.

- It is unknown whether, before Enloe Dam was constructed, TDG exceeded 110 percent saturation after turbulent river flows passed over the natural waterfall below the dam site.
- TDG concentrations declined each day as the Similkameen River receded from the annual snowmelt peak flows.
- When the Project is diverting up to 1,600 cfs through the powerhouse, those flows will be less aerated than had they passed over the dam. More importantly, the diverted flows will be returned near the water surface rather than plunging deeply over the waterfall where gas bubbles become dissolved. Further, the lower TDG water exiting the powerhouse will dilute whatever higher TDG water has passed over the waterfall. The beneficial reduction in TDG is relative to the proportion of river flow that is diverted through the powerhouse.
- Except when aeration is introduced through a vent, the turbines themselves will not increase TDG. However, the turbines will be designed to allow aeration to be provided in the flow tubes to help increase DO concentrations during the warm summer period after high flows have receded and high TDG is no longer a concern.
- In conclusion, the proposed Project is not expected to degrade water quality from current conditions because the water diverted for power production will be discharged below the waterfall and dilute the high TDG caused by water plunging over the waterfall.

Turbidity

Historical turbidity data are not available in the Similkameen River in the areas where in-stream construction is proposed. However, turbidity data are collected monthly by the Department of Ecology from the Similkameen River at its Oroville monitoring station. This station is located 0.2 miles west of Highway 97 at the bridge on 12th Avenue in Oroville. Turbidity data has been collected monthly at this station since 1960 (Ecology 2011). Data are available from 1960 to 1966, 1975, 1976, and 1978 to 2009.

An evaluation of recent data indicates that in general, turbidity at this station is low (~1 NTU during the late summer, fall, winter, and early spring months). Turbidity is elevated in May, June, and July (typically 30 to 50 NTU; 130 NTU was detected in June 2007). Elevated turbidity measurements are likely due to spring snowmelt and resulting raised surface water flows in the Similkameen River.

1.4 POTENTIAL WATER QUALITY IMPACTS ASSOCIATED WITH CONSTRUCTION

Water quality impacts that could be associated with construction of the Project are changes in turbidity and pH. These impacts would be related to construction of Project features: crest gates, intake channel, penstock intake, penstocks, powerhouse, tailrace, access road, instream flow outlet works and recreation area. Additionally, spills of petroleum fuel or lubricant from construction equipment are possible.

1.4.1 Associated Water Quality Protection Plans

Water Quality Protection Plans associated with this Water Quality Management Plan (WQMP) and the 401 Certification for the Project include the following:

Construction Sediment Management Plan

The Construction Sediment Management Plan (District 2012a) describes proposed construction activities and sediment management measures to be employed during construction of the Project. Proposed activities include construction of the crest gates, intake channel, penstock intake, penstocks, powerhouse, tailrace, access road, instream flow outlet works and recreation area. This plan describes the BMPs that will be utilized to minimize sediment disturbance and maximize sediment containment within the Similkameen River, including the reservoir above the Enloe Dam during construction of the proposed infrastructure related to the Project.

Construction Quality Assurance Project Plan (Construction QAPP)

The Construction Quality Assurance Project Plan (QAPP; District 2012b) is an attachment of the Construction Sediment Management Plan and describes in detail how water quality monitoring is to be implemented during construction. The Construction QAPP identifies the organization, schedule, monitoring approach, and reporting associated with water quality monitoring and management. The Construction QAPP documents provide additional details on the data quality objectives, monitoring designs, sampling design, field and laboratory procedures, quality control, and data quality review protocols. The purpose of the Construction QAPP is to provide detailed procedures to (1) guide the District in determining compliance with water quality standards during construction activities, and (2) inform adaptive management decisions during Project construction.

Erosion and Sediment Control Plan

The Erosion and Sediment Control Plan (District 2008a) describes proposed construction activities and erosion and sediment control measures to be employed during construction of the Project. This plan describes the measures to address or mitigate erosion and provide sediment control during construction. Activities include improvements to existing dam and spillway, construction of the crest gates, intake

channel, penstock intake, penstocks, powerhouse, tailrace, access road, and recreation area. This plan describes the temporary erosion and control measures that may be employed during construction activities including Construction Access BMPs, Control Installation BMPs, Soil Stabilization BMPs, and Slope Protection BMPs.

Spill Response Plan

The Spill Response Plan (SRP) (District 2008b) describes the measures to be taken to prevent, contain, and clean up oil or hazardous waste spills should they occur during construction activities associated with the Project. The purpose of this SRP is to establish procedures, methods, equipment, and other measures to prevent the discharge of oil or hazardous materials to water bodies or upland areas during construction. The SRP details planning and prevention, material handling and storage, spill management, and spill notification responsibilities.

Stormwater Pollution Prevention Plan

A Stormwater Pollution Prevention Plan (SWPPP) (District 2008c) is required for construction sites which meet certain criteria as outlined in the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit issued by the State of Washington Department of Ecology in compliance with the Clean Water Act. The permit requires that a SWPPP must be implemented beginning with “initial soil disturbance and until final stabilization.” The SWPPP must meet the following objectives:

- To implement BMPs to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.
- To prevent violations of surface water quality, ground water quality, or sediment management standards.
- To control peak volumetric flow rates and velocities of stormwater discharges.

Operations Quality Assurance Project Plan (Operations QAPP)

The Operations QAPP (District 2012c) describes in detail how water quality is to be monitored after project construction and during the life of the license. This Operations QAPP identifies the organization, schedule, data quality objectives, sampling design, field and laboratory procedures, quality control, and data management and reporting associated with implementing the WQMP. The purpose of the Operations QAPP is to provide detailed procedures to (1) guide the District in determining compliance with water quality standards, and (2) inform adaptive management decisions during Project operations.

2.0 WATER QUALITY MANAGEMENT PLAN GOALS AND OBJECTIVES

The goal of the WQMP is to protect the quality of the surface waters affected by the Enloe Hydroelectric Project in compliance with the Clean Water Act §401 Certification. The measures presented within the WQMP are designed to meet the following objectives:

Objective 1: Maintain compliance with Washington State Department of Ecology (Ecology) 401 Certification requirements for water temperature. Use monitoring to track compliance with the 401 Certification requirements. And, if information becomes available that suggests non-compliance is occurring or likely to occur, identify reasonable and feasible measures in consultation with the Technical Review Group (TRG).

Objective 2: Maintain compliance with 401 Certification requirements for dissolved oxygen. Use monitoring to aid in tracking compliance with the water quality standards. And, if information becomes available that suggests non-compliance is occurring or likely to occur, identify reasonable and feasible measures in consultation with the TRG.

Objective 3: Maintain compliance with 401 Certification requirements for total dissolved gas. Use monitoring to track compliance with the 401 Certification requirements. And, if information becomes available that suggests non-compliance is occurring or likely to occur, identify reasonable and feasible measures in consultation with the TRG.

Objective 4: Maintain performance standards to achieve compliance with 401 Certification requirements for project-induced changes of turbidity and pH during Project construction. Use monitoring to track compliance with 401 certification conditions. If information becomes available that suggests non-compliance is occurring or likely to occur, the CESCL will work with the construction contractor to identify reasonable and feasible measures (e.g. additional or improved best management practices, modified construction methods or equipment, etc.) to be implemented by the contractor.

Objective 5: Construct and operate the Project in a manner that will avoid, or where not feasible to avoid, minimize, spills of hazardous materials, and implement effective countermeasures in the event of a hazardous materials spill.

3.0 SCHEDULE

This section includes a schedule for monitoring activities and project deliverables.

3.1 MONITORING SCHEDULE

3.1.1 Construction Monitoring Schedule

The first part of the schedule will occur during the construction phase of the project and include water quality measurements daily during any in-stream construction activities.

Monitoring will begin when construction activities commence. Construction monitoring will cease upon substantial completion of the construction work and after all in-stream construction has been completed.

Operations Monitoring Schedule

The operations monitoring will begin as soon as water is diverted from the main river channel for power production, and continue through the life of the license. Monitoring of water quality parameters will begin on April 1 of each year and continue through September 30. TDG will be monitored hourly between April 1 and June 30, the snowmelt runoff season, when TDG has the potential to exceed the water quality criterion. Water temperature and DO will be monitored hourly between July 1 and September 30, the warm season, when historical records indicate that there is a potential for excursions from the water quality criteria for these parameters. Water quality monitoring and reporting requirements will be reviewed by the TRG after year five of operation. The monitoring schedule and adaptive management for the minimum instream flow in the bypass reach is discussed in Section 3.3.1 of the Fish Management Plan (District 2012d).

All monitoring sites are within Project Boundary; however, the District will coordinate with any mining claim holders at the specific locations where monitoring equipment will be deployed. It will also be necessary to secure a Hydraulic Project Approval permit to install and operate the monitoring equipment. Monitoring will continue through the life of the license.

3.1.2 Reporting Schedule

Construction Monitoring Reports

Construction monitoring data will be posted to the District's Project website following sample collection for turbidity and/or pH throughout the construction monitoring period. Evidence of oil sheen, if observed, will be reported by telephone and e-mail within 48 hours after observation. All monitoring data will be summarized each year in an annual construction monitoring data report that will be submitted to Ecology in conjunction with the water quality data report in December. The data will be presented in a format that meets Ecology's approval.

Operations Monitoring Reports

Operations water quality data will be posted to the District's Project website on a monthly basis throughout the monitoring period. The data will be available no later than the 30th of the month following the previous month of monitoring. Water temperature data will include hourly measurements, daily averages, and calculations of the rolling 7-DADMax at each of the four locations. The data presentation will highlight any times when temperature criteria are exceeded. Temperature and DO data will be posted monthly from August through October (i.e. each month after monitoring). DO and TDG data will include hourly measurements and daily averages, and the data presentation

will highlight any time criteria are exceeded. TDG data will be posted monthly from May through July. Evidence of oil sheen, if any, will be reported by telephone and e-mail with 48 hours after observation. All monitoring data will be summarized each year in an annual water quality data report that will be submitted to Ecology in December and posted to the Project website. The data will be presented in a format that meets Ecology's approval.

4.0 DOCUMENTATION AND REPORTS

Thorough documentation and reporting will provide sufficient information to allow independent verification of the monitoring results. All water quality monitoring field activities at the Project will be documented in field notebooks and instrument calibration logs. Evidence of an oil sheen, spill, or excursion from water quality standards, if any, will be reported to Ecology by telephone and e-mail with 48 hours after observation. Electronic copies of raw data files downloaded from the monitoring instruments, and spreadsheet files used for data reduction and analysis, will be available to Ecology on request. Copies of technical memoranda used to document any procedural deviations, data qualifications, or problems identified in the review of monitoring records will also be available for review. Summaries of water quality monitoring results will be posted to the District's Project website on a monthly basis throughout the monitoring period each year. Finally, all monitoring data will be summarized each year in an annual water quality data report that will be submitted to Ecology in December and posted to the Project website.

5.0 REFERENCES

- HDR. 1991. Application for License for Major Unconstructed Project, Enloe Hydroelectric Project, FERC Project No. 10536. Volumes I and II; prepared by HDR Engineering, Inc. for the Public Utility District No. 1 of Okanogan County, Washington.
- HDR. 1991. Application for License for Major Unconstructed Project, Enloe Hydroelectric Project, FERC Project No. 10536. Volumes I and II; prepared by HDR Engineering, Inc. for the Public Utility District No. 1 of Okanogan County, Washington.
- Hurst, D. 2003. Project synopsis: Analysis of sediment samples from the Similkameen River and Palmer Creek, U.S. Prepared by Fulcrum Environmental Consulting for the Confederated Tribes of the Colville Reservation, Environmental Trust Department. Nespelem, Washington. April 17, 2003.
- Pippin, B. 2010. Revised estimates of Enloe Dam bypass temperature increases. Technical memorandum. October 2010.
- Public Utility District No. 1 of Okanogan County (District). 2012a. Construction Sediment Management Program. October 2008, and revised February 2012.
- Public Utility District No. 1 of Okanogan County (District). 2012b. Construction Quality Assurance Project Plan. Enloe Dam Water Quality Monitoring. February.
- Public Utility District No. 1 of Okanogan County (District). 2012c. Operations Quality Assurance Project Plan. Enloe Dam Water Quality Monitoring. February.
- Public Utility District No. 1 of Okanogan County (District). 2012d. Fish Management Plan. Enloe Dam Water Quality Monitoring. February.
- Public Utility District No. 1 of Okanogan County (District). 2010. Letter to Ms. Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, regarding Public Utility District No. 1 of Okanogan County, Enloe Hydroelectric Project, FERC Project No. 12569, 401 Process. Okanogan, Washington. October 28, 2010.
- Public Utility District No. 1 of Okanogan County (District). 2008a. Erosion and Sediment Control Plan. October 2008.
- Public Utility District No. 1 of Okanogan County (District). 2008c. Spill Response Plan. October 2008.
- Public Utility District No. 1 of Okanogan County (District). 2008d. Stormwater Pollution Prevention Plan. July 2008.

- Public Utility District No. 1 of Okanogan County (District). 2008e. Enloe Hydroelectric Project final license application. PUD No. 1 of Okanogan County. Okanogan, Washington. August 2008.
- Public Utility District No. 1 of Okanogan County (District). 2005a. Enloe Hydroelectric Project initial consultation document. PUD No. 1 of Okanogan County. Okanogan, Washington. July 2005.
- Public Utility District No. 1 of Okanogan County (District). 2005b. Enloe Hydroelectric Project initial consultation document supplement. PUD No. 1 of Okanogan County. Okanogan, Washington. October 2005.
- Puget Sound Estuarine Protocols (PSEP). 1997. Recommended Quality Assurance and Quality Control Guidelines for the Collection of Environmental Data in Puget Sound. Seattle, Washington.
- Rashin, E. and C. Graber. 1992. Effectiveness Of Washington's Forest Practice Riparian Management Zone Regulations For Protection Of Stream Temperature. TFW-WQ6-92-001. Washington State Department of Ecology. Olympia, Washington.
- Schuett-Hames, D., A. E. Pleus, E. Rashin, and J. Matthews. June 1999. TFW Monitoring Program Method Manual for the Stream Temperature Survey. Prepared for the Washington State Department of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-005. DNR #107.
- United States Environmental Protection Agency (USEPA). 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA 540-R-04-004. Washington, D.C.
- United States Environmental Protection Agency (USEPA). 190006999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA 540-R-99-008. Washington, D.C.
- Washington State Department of Ecology. 2010. Construction Stormwater General Permit. National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity. December 2010
- Washington State Department of Ecology. 2006. Water quality standards for surface waters of the State of Washington, Chapter 173-201A WAC. <http://www.ecy.wa.gov/biblio/0610091.html>. Olympia, Washington. December 2006.
- Washington State Department of Ecology. 2005. River and stream water quality monitoring: 49B070 – Similkameen R @ Oroville: Continuous temperature

monitoring results.
<http://www.ecy.wa.gov/apps/watersheds/riv/station.asp?theyear=&tab=temperature&scrolly=385&wria=49&sta=49B070>.

Washington State Department of Ecology (Ecology). 2011. Water quality monitoring data, Similkameen River at Oroville. Available online: <http://www.ecy.wa.gov/apps/watersheds/riv/station.asp?sta=49B070>.

Washington State Department of Ecology. 2003. Sediment Sampling and Analysis Plan Appendix. Ecology Publication No. 03-09-043. Olympia, Washington.

Washington State Department of Ecology. 2001. Environmental Monitoring and Trends Section. Stream Sampling Protocols for the Environmental Monitoring and Trends Section. Olympia, Washington. October 2001.

Washington State Department of Ecology. 2001. Water Quality Program Policy, WQP Policy 1-11, "Assessment of Water Quality for the Section 303(d) List." Olympia, Washington. June 2001.

Washington State Department of Ecology. 2001. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Olympia, Washington. February 2001.

Washington State Department of Ecology. 1993. Watershed Assessments Section. Field Sampling and Measurement Protocols for the Watershed Assessments. Olympia, Washington.

Webber, T.N. and A. Stewart. 2001. State of water quality of Similkameen River, 1979-1997. Environment Canada, Aquatic Sciences Section, Pacific and Yukon Region. Victoria, British Columbia. March 2001.