

Commissioners:
T. JAMES DAVIS
LYNN M. HEMINGER
RONALD E. SKAGEN

General Manager:
WILLIAM C. DOBBINS



Public Utility District No. 1 of Douglas County

1151 Valley Mall Parkway • East Wenatchee, Washington 98802-4497 • 509/884-7191 • FAX 509/884-0553 • www.douglaspud.org

Via Electronic Filing

Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 1st Street N.E.
Washington, D.C. 20426

June 21, 2013

Subject: **Wells Hydroelectric Project – FERC Project No. 2149
Quality Assurance Project Plan for Water Temperature and Total Dissolved
Gas – License Article 401 (a)**

Dear Secretary Bose:

Public Utility District No. 1 of Douglas County, Washington (Douglas PUD), licensee for the Wells Hydroelectric Project No. 2149, respectfully submits for approval the Quality Assurance Project Plan for Water Temperature and Total Dissolved Gas (QAPP) for the Wells Project.

Article 401(a) of the license requires Douglas PUD to file all QAPPs with the FERC for approval. The final QAPP for water temperature and total dissolved gas (TDG) monitoring is attached as Appendix A to this letter and was reviewed and approved by all of the parties to the Aquatic Settlement Agreement (ASA) including Ecology, the National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), U.S. Bureau of Land Management (BLM), Washington State Department of Fish and Wildlife (WDFW), the Confederated Tribes of the Colville Reservation (CCT) and the Confederated Tribes and the Bands of the Yakama Nation (YN). The Bureau of Indian Affairs (BIA) was also provided an opportunity to review and comment on the QAPP during the ASA comment period. The BIA is currently a non-voting observer within the ASA process.

The enclosed QAPP is consistent with (1) Article 401(a) of the license issued by the FERC; (2) the Water Quality Management Plan that is contained within the ASA and Condition 6.7(7)(a) of Ecology's Clean Water Act section 401 Water Quality Certification (401 Certification) and (3) the NMFS Endangered Species Act Incidental Take Statement (ITS) Reasonable and Prudent Measure No. 2 for the Wells Project. The pre-filing consultation record supporting the review and approval of the QAPP is attached as Appendix B to this letter.

If you have any questions or require further information regarding the enclosed QAPP or the consultation record supporting the approval and coordination of these plans, please feel free to contact Andrew Gingerich at (509) 881-2323, andrewg@dcpud.org.

Sincerely,



Shane Bickford
Natural Resources Supervisor

Enclosure: 1) Appendix A – Quality Assurance Project Plan for Water Temperature and
 Total Dissolved Gas for the Wells Hydroelectric Project
 2) Appendix B – Pre-filing consultation record for the Quality Assurance Project
 Plan for Water Temperature and Total Dissolved Gas

Cc: Mr. Douglas Johnson – FERC, Portland
 Mr. Erich Gaedeke – FERC, Portland
 Wells Aquatic Settlement Work Group
 Mr. Andrew Gingerich – Douglas PUD

APPENDIX A

**QUALITY ASSURANCE PROJECT PLAN FOR WATER TEMPERATURE AND
TOTAL DISSOLVED GAS FOR THE WELLS HYDROELECTRIC PROJECT**

**QUALITY ASSURANCE PROJECT PLAN FOR WATER TEMPERATURE
AND TOTAL DISSOLVED GAS**

WELLS HYDROELECTRIC PROJECT

FERC NO. 2149

February 2013

Prepared by:
Andrew Gingerich
Public Utility District No. 1 of Douglas County
East Wenatchee, WA

Prepared for:
Washington Department of Ecology
Yakama, WA

For copies of this plan, contact:

Public Utility District No. 1 of Douglas County
Attention: Natural Resources
1151 Valley Mall Parkway
East Wenatchee, WA 98802-4497
Phone: (509) 884-7191
E-Mail: andrewg@dcpud.org

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TERMS AND ABBREVIATIONS

401 Certification	Wells Dam 401 Certification issued by the Washington Department of Ecology as part of the Federal Power Act requirement
7-DADMax	7-day average of the daily maximum temperatures
7Q-10 Flow	highest calculated flow of a running seven consecutive day average, using the daily average flows that may be seen in a 10-year period
12C-High	average of the 12 highest consecutive hourly readings in any 24-hour period
ASA	Aquatic Settlement Agreement
Aquatic SWG	Aquatic Settlement Work Group
BP	barometric pressure
cfs	cubic feet per second
CROHmS	Columbia River Operational Hydromet System
CWA	Clean Water Act
DART	Data Access in Real Time
DO	dissolved oxygen
Douglas PUD	Public Utility District No. 1 of Douglas County
DQO	decision quality objectives
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FSU	field services unit
GAP	Gas Abatement Plan
GBT	gas bubble trauma
HCP	Wells Anadromous Fish Agreement and Habitat Conservation Plan
kcfs	thousand cubic feet per second
mg/L	milligrams per liter
mmHg	millimeters of mercury
MSL	mean sea level
MQO	measurement quality objectives
MS	Microsoft
MW	megawatt
N/A	not applicable
NEMA	National Electrical Manufacturers Association
NIST	National Institute of Standards and Technology
NMFS	National Marine Fisheries Service
Project	Wells Hydroelectric Project
QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control

RM	river mile
TDG	total dissolved gas
TMDL	total maximum daily load
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
WQMP	Water Quality Management Plan
WQS	Water Quality Standards

EXECUTIVE SUMMARY

The Wells Hydroelectric Project (Wells Project) 401 Water Quality Certification (401 Certification) issued by the Washington Department of Ecology (Ecology) requires that Public Utility District No. 1 of Douglas County (Douglas PUD) develop a Quality Assurance Project Plan (QAPP) to support the implementation of a water quality monitoring program (for temperature and TDG). This QAPP describes a systematic approach for collecting high quality and reliable data that may be used to determine compliance of these parameters with the State of Washington's Water Quality Standards (WQS) for the Wells Project. Information provided in this QAPP includes the following:

1. Background
2. Project Description
3. Organization and Schedule
4. Quality Objectives
5. Sampling Process Design (Experimental Design)
6. Measurement Procedures
7. Quality Control
8. Data Management Procedures
9. Audits and Reports
10. References

Adaptive management, as defined by the Aquatic Settlement Agreement (ASA), will be employed when updating this QAPP. Any required updates will be vetted with those parties as required by the 401 Certification and the FERC License.

1.0 BACKGROUND

1.1 Relicensing and 401 Certification

As part of the relicensing process for the Wells Hydroelectric Project (Wells Project or Project), Public Utility District No. 1 of Douglas County (Douglas PUD) obtained a 401 Water Quality Certification (401 Certification) from the Washington Department of Ecology (Ecology). On September 30, 2010, Douglas PUD submitted to Ecology an application for a 401 Certification pursuant to the provisions of 33 USC §1341 (§401 of the Clean Water Act). On September 12, 2011, Douglas PUD withdrew its request and reapplied. On February 27, 2012, Ecology concluded that the Wells Project, as conditioned by its 401 Certification/Order No. 8981, complied with all applicable provisions of 33 USC 1311, 1312, 1313, 1316, 1317 and appropriate requirements of Washington State law.

According to the Wells Project 401 Certification section 7(a), Douglas PUD is required to prepare a Quality Assurance Project Plan (QAPP) for water quality measures:

- i) Douglas PUD shall prepare study plans that include a quality assurance project plan (QAPP) for each water quality parameter to be monitored in each plan. The QAPPs shall follow the Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (July 2004 Ecology Publication Number 04-03-030) or its successor. The QAPPs shall contain, at a minimum, a list of parameter(s) to be monitored, a map of sampling locations, and descriptions of the purpose of the monitoring, sampling frequency, sampling procedures and equipment, analytical methods, quality control procedures, data handling and data assessment procedures and reporting protocols.*
- ii) Douglas PUD shall review and update the QAPPs annually based on a yearly review of data and data quality. Ecology may also require future revisions to the QAPP based on monitoring results, regulatory changes, changes in Project operations, and/or the requirements of TMDLs. The initial QAPPs and any changes shall be submitted to the ASWG for review and are subject to approval by Ecology. Implementation of the monitoring program shall begin upon Ecology's written approval of the QAPP, unless otherwise provided by Ecology.*

On November 9, 2012 the Federal Energy Regulatory Commission (FERC) issued a new operating license for the Wells Project. All 401 Certification requirements were adopted in the License Order, including those pertaining to the QAPP (License Article 401(a)).

1.2 Total Dissolved Gas Regulatory Framework

Washington Administrative Code (WAC) Chapter 173-201A defines standards for the surface waters of Washington State. Section 200(1)(f) defines the water quality standards (WQS) for total dissolved gas (TDG), and subsection (ii) defines the TDG criteria adjustment for fish passage (Ecology 2011).

Under the WQS, TDG shall not exceed 110 percent at any point of measurement in any state water body. However, the standards exempt dam operators from this TDG standard when the river flow exceeds the highest calculated flow of a running seven consecutive day average, using the daily average flows that may be seen in a 10-year period (7Q-10 flow). The 7Q-10 total river flow for the Wells Project was computed using the hydrologic record from 1974 through 1998, coupled with a statistical analysis utilizing data from 1930 through 1998. These methods are consistent with the United States Geological Survey (USGS) Bulletin 17B, "Guidelines for Determining Flood Flow Frequency" and determined that the 7Q-10 flow value at Wells Dam is 246,000 cubic feet per second (cfs; Lombard and Kirchmer 2004).

In addition to allowances for natural flood flows, Ecology may approve, on a per application basis, an interim adjustment to the TDG standard (110 percent) to allow spill for juvenile fish passage past dams on the Columbia and Snake rivers. Such an adjustment requires the development of an Ecology-approved Gas Abatement Plan (GAP). This plan must be accompanied by fisheries management and physical and biological monitoring plans and is required annually or as otherwise determined by Ecology. The increased levels of spill resulting in elevated TDG levels are authorized by Ecology to allow salmonid smolts a non-turbine downstream passage route that is less harmful to fish populations than turbine fish passage. This TDG adjustment provided by Ecology is based on a risk analysis study conducted by the National Marine Fisheries Service (NMFS; NMFS 2000). Ecology-approved fish-passage adjustments comprise three separate standards to be met by dam operators:

- 1) TDG shall not exceed 125 percent in any one-hour period in the tailrace of a dam;
- 2) TDG shall not exceed 120 percent in the tailrace of a dam; and
- 3) TDG shall not exceed 115 percent in the forebay of the next dam downstream.

Compliance criteria 2 and 3 are measured as an average of the 12 highest consecutive hourly readings in any 24-hour period (12C-High).

A significant portion of the Wells Reservoir occupies lands within the boundaries of the Colville Reservation. Wells Project operations do not affect TDG levels in tribal waters, where the Colville Tribes' TDG standard is a maximum of 110 percent, year-round, at all locations. This TDG standard is also the U.S. Environmental Protection Agency's (EPA) standard for all tribal waters on the Columbia River, from the Canadian border to the Snake River confluence. TDG levels on the Colville Reservation portion of the mainstem Columbia River within Wells Reservoir are determined by the operations of upstream federal dams but in particular, the U.S. Army Corps of Engineer's (USACE) Chief Joseph Dam (located approximately 30 miles upstream of Wells Dam) and the U.S. Bureau of Reclamation's Grand Coulee Dam (located approximately 51 miles upstream of Chief Joseph Dam).

1.2.1 Fish Spill and Non-Fish Spill Season

Although not defined in state regulations, the fish spill season at Wells Dam is determined by the Wells Anadromous Fish Agreement and Habitat Conservation Plan (HCP) Coordinating Committee and is intended to aid downstream juvenile salmonid fish passage via Wells Dam spill as an alternative to passage through the turbines. The fish spill season is generally early April to late August, but may vary from year to year. Each year during the fish spill season, Douglas PUD operates the Wells Project in accordance with an Ecology-approved GAP. During the fish spill season, Douglas PUD will make every effort not to exceed 125 percent in any one-hour period or a 12C-High of 120 percent as measured in the Wells Project tailrace and a 12C-High of 115 percent as measured in the forebay of the next downstream dam (Rocky Reach). Nothing in these special conditions allows an impact to existing and characteristic uses.

During non-fish spill (i.e., approximately September through March), the Wells Project is subject to the 110 percent TDG WQS. Douglas PUD will make every effort to remain in compliance with the 110 percent standard.

Douglas PUD will report Wells Project TDG monitoring data for both the spill and non-fish spill season from the previous year by February 28th of every year in an annual TDG report (previously called a GAP report). This report will be reviewed and approved by Ecology and the Aquatic Settlement Work Group (Aquatic SWG). The final report will be filed annually with the FERC by the February 28th deadline. The report will also be filed with the NMFS as required in the terms and conditions contained within their 2012 Wells Project Biological Opinion (BO).

1.3 Water Temperature Regulatory Framework

Under the WQS Chapter 173-201A-602 of the WAC, Ecology designates the section of the Columbia River within the Wells Project as a “salmonid spawning, rearing, and migration” water body and therefore, requires that water temperature must remain below 17.5°C, as measured by the 7-day average of the daily maximum temperatures (7-DADMax). When a water body's temperature is warmer than the criteria (or within 0.3°C of the criteria) 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. In addition, the standard for the lower Okanogan and Methow rivers (both have lower reaches of the river within the Wells Project) is identical to the Columbia River temperature criteria, except that in the Methow River, the criterion is 13°C from October 1 to June 15 to support spawning and incubation protection for native char, salmon and trout (Ecology 2006). Portions of the Columbia River within the Wells Project boundary are currently classified as impaired for temperature under Section 303(d) of the Clean Water Act. A Total Maximum Daily Load (TMDL) for temperature is expected to be developed by EPA in the future that will establish a load allocation for all of the Columbia River dams including the Wells Project.

Douglas PUD will report Wells Project water temperature monitoring data by April 30th of every year (for prior year's monitoring activities). This report will be reviewed and approved by Ecology and the Aquatic SWG. The final report will be filed annually with the FERC by the April 30th deadline.

2.0 PROJECT DESCRIPTION

2.1 Purpose and Objectives

The purpose of this QAPP is to outline the methods of collecting water temperature and TDG data within the Wells Project. This QAPP is designed to attain data of the type and quality necessary to inform future decisions; in this case, the data will be used to evaluate temperature and TDG compliance of the Wells Project with the state WQS and whether additional measures may be necessary to achieve compliance.

Specific objectives of this QAPP include:

1. Documenting year-round physical values for TDG and seasonal values of temperature in the Wells Project in a systematic, reliable, and robust manner.
2. Making the data publically available via a license implementation webpage.
3. Managing a complete and expanding dataset.
4. Using monitoring data to support the development of plans and reports (e.g., GAP, TDG Report, Water Temperature Report, Aquatic SWG Report, the Wells Project Water Quality Attainment Plan [WQAP], etc.).
5. Using adaptive management, as defined in the Aquatic Settlement Agreement (ASA), to strengthen the quality and reliability of the data collected and to support the goals and objectives of the water quality monitoring program.

2.2 Wells Hydroelectric Project

The Wells Project is located at river mile (RM) 515.8 on the Columbia River in the State of Washington. Wells Dam is located approximately 30 river miles downstream from the Chief Joseph Dam, owned and operated by the USACE, and 42 miles upstream from the Rocky Reach Dam, owned and operated by Public Utility District No. 1 of Chelan County. The nearest town is Pateros, Washington, which is located approximately 8 miles upstream from the Wells Dam.

The Wells Project is the chief generating resource for Douglas PUD. It includes ten generating units with a nameplate rating of 774.3 MW and a peaking capacity of approximately 840 MW. The design of the Wells Project is unique in that the generating units, spillways, switchyard, and fish passage facilities were combined into a single structure referred to as the hydrocombine. Fish passage facilities reside on both sides the hydrocombine, which is 1,130 feet long, 168 feet wide, with a crest elevation of 795 feet in height. The juvenile fish bypass (JBS) system was developed by Douglas PUD and uses a barrier system to modify the intake velocities on all even numbered spillways (2, 4, 6, 8 and 10).

The Wells Reservoir is approximately 30 miles long. The Methow and Okanogan rivers are tributaries of the Columbia River within the Wells Reservoir. The Wells Project boundary extends approximately 1.5 miles up the Methow River and approximately 15.5 miles up the Okanogan River. The normal maximum surface area of the reservoir is 9,740 acres with a gross storage capacity of 331,200 acre-feet and usable storage of 97,985 acre-feet at elevation of 781 feet above mean sea level (msl). The normal maximum water surface elevation of the reservoir is 781 feet (Figure 1).

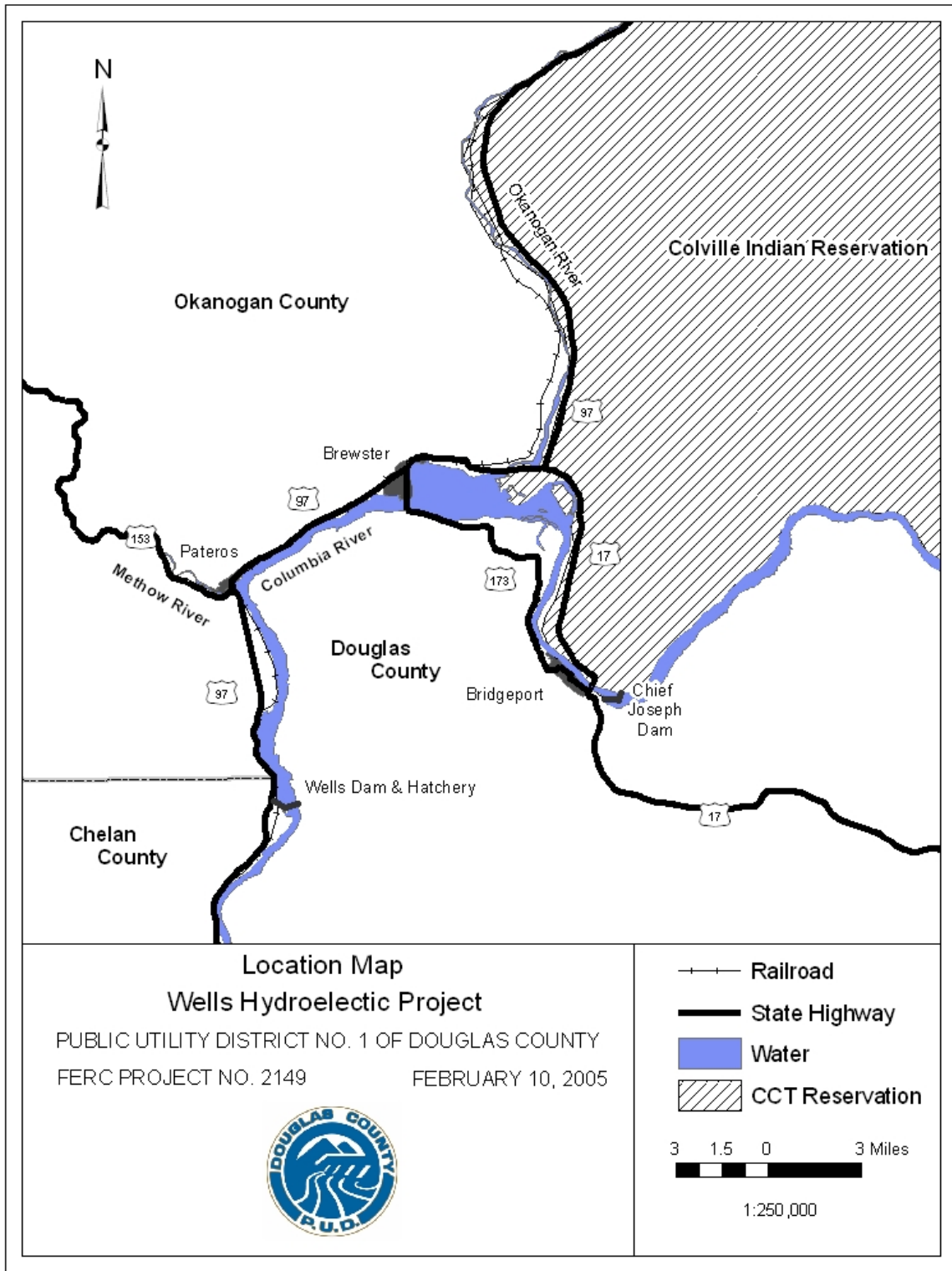


Figure 1. Location Map of the Wells Project.

2.3 TDG and Water Temperature Evaluations at Wells Dam

2.3.1 TDG

TDG levels associated with the operation of the Wells Project have occasionally been measured above the numeric criteria and are more likely to occur during April through August as a result of high flows, high TDG levels entering the Project from the operations of upstream projects, unit outages, or a combination of the above. Similar to other Columbia River hydroelectric facilities, probabilities for TDG exceedances are highest during late spring periods of high flow and low electrical demand, coupled with the Project's run-of-the-river nature and relatively limited storage capacity.

During the relicensing of the Wells Project, three studies were performed to evaluate the ability of the Project to meet the TDG numeric criteria. The first two were field studies where physical TDG data was collected above and below Wells Dam under different operational scenarios (Columbia Basin Environmental 2006, EES Consulting Inc. et al. 2007) and the third study was the development of an unsteady-state three-dimensional two-phase numerical model (Politano et al. 2009). The model was developed to observe the predicted movement of water through the Project and how gas bubbles interacted with Project flows to produce TDG under various operating scenarios. Model results allowed Douglas PUD to identify specific Project operations that produce less TDG in both the near and far field under different flow conditions. According to the model output, concentrated spill operations of sufficient flows coupled with the appropriate configuration of unit generation (i.e., below operating spillways) across the Project reduced TDG production and increased the degasification of Project outflows at the free surface (i.e., reduced plunging spillway flows and air entrainment). Notably, reduced load, especially when flows are at or near 246 thousand cubic feet per second (kcfs), reduces TDG performance at Wells since spill over generation at Wells Dam enhances the surface jet of spilled water thereby maximizing air water interaction and increasing degasification. The model was tested using an available 9 out of 10 units and each unit passing 20 kcfs. Under these conditions Wells Dam was able to meet WAC WQS standard for TDG when incoming water from upstream was in compliance.

Based upon the modeling results, Douglas PUD developed a "Playbook" identifying a specific Project operational work flow process using a combination of spill gate and generating unit settings that would minimize TDG production and thereby meet TDG numeric criteria. Each year, the Playbook is updated, as needed, based upon the Project's TDG performance in the preceding year. An updated Playbook is included as part of the annual GAP filing in support of the Ecology-approved fish-passage adjustments for TDG at the Wells Project.

In 2011 and 2012, Columbia River flows at Wells Dam were the fourth- and third-highest, respectively, on record during the months of April through August. During the month of July 2012, Wells Dam received almost twice as much water than the monthly average since the Project was commissioned in the late 1960's. In addition, the total rebuild of unit 7 reduced the plant capacity at Wells Dam for both of these years by more than 20 kcfs. Despite these unusual factors, Wells Dam showed high compliance with all three TDG adjustment criteria when flows were below the 7Q-10 value (246 kcfs).

2.3.2 Water Temperature

2.3.2.1 Reservoir and tributaries

The 7-DADMax temperature data recorded since 2001 indicate that the portion of the Columbia River upstream of and within the Project generally warms to above 17.5°C (see WQS numeric criteria) in mid-July and drops below the numeric criterion by early October. Temperatures in the Methow River upstream of the Project warm to above 17.5°C in mid-July and drop below the numeric criteria by September, while trends in the Okanogan River upstream of the Project indicate warming above 17.5°C from early June with cooling by late September.

To assess compliance with the state WQS for temperature (during the Wells Project FERC relicensing process), two 2-dimensional laterally-averaged temperature models (using CE-QUAL-W2) were developed that represented existing (or “with Project”) conditions and “without Project” conditions of the Wells Project, including the Columbia River from the Chief Joseph Dam tailrace to Wells Dam, the lowest 15.5 miles of the Okanogan River, and the lowest 1.5 miles of the Methow River. The results were processed to develop daily values of the 7-DADMax, and then compared for the two conditions.

The model analyses demonstrated that “with Project” temperatures in the Columbia, Okanogan and Methow rivers do not increase more than 0.3°C compared to ambient (“without Project”) conditions anywhere in the reservoir, and that the Project complies with the state WQS for temperature (West Consultants Inc. 2008). However, a full evaluation of potential temperature impacts of hydroelectric power generation on the Columbia River will most likely require analysis of hydraulic and temperature conditions on a system-wide basis. Hydraulic and temperature influences from upstream dams complicate the evaluation of Project-related impacts. The only way to properly understand these impacts is to examine the river water temperatures more comprehensively through a system-wide TMDL study such as that which is under consideration for development by EPA. Currently, Douglas PUD is participating in the Sovereign Technical Team Water Quality Workgroup which is developing a temperature model that will inform Columbia River Treaty negotiations with the Canadian Government.

2.3.2.2 Fish Ladders

According to the HCP BO issued by NMFS, all entities that use the fish trapping facilities at Wells Dam are required to monitor the ladders every two hours May 1 to November 15 and discontinue trapping operations when fish ladder water temperatures exceed 68.0° F (20.6°C). In 2001 and 2003, Douglas PUD added supplemental temperature recording equipment at Pool 39 near the broodstock collection facilities in the east fishway at Wells Dam to ensure compliance with requirements in the NMFS HCP BO. In 2001, hourly data indicated that water temperatures at this location in the east fish ladder did not exceed 68.0°F (20.6°C) at any time during the monitoring period, which ran from late July to early December. In 2003, data were recorded every two hours and exceedances of greater than 68.0°F (20.6°C) were observed on only three hourly occasions.

3.0 ORGANIZATION AND SCHEDULE

3.1.1 Personnel

This water quality monitoring project is to be conducted primarily by Douglas PUD personnel and experienced contractors hired by Douglas PUD. All personnel conducting work have experience working with or collecting water quality data in addition to having a background in aquatic ecology. Douglas PUD will provide implementation and contractor oversight of equipment installation, data collection and report writing. Regulatory oversight and approval of the QAPP will be provided by Ecology. The Aquatic SWG members will provide peer review on the study design and any reports. Key personnel include:

Andrew Gingerich, Douglas PUD. Oversees the implementation of all water quality measures found within the 401 Certification, Wells Project License Order and Water Quality Management Plan (WQMP) contained within the ASA.

Chas Kyger, Douglas PUD. Serves as an alternate technical lead for water quality resources. Also provides contractor oversight, report development and technical editing support.

Shane Bickford, Douglas PUD. Natural Resources Supervisor responsible for the implementation of all aquatic and terrestrial resource measures.

Beau Patterson, Douglas PUD. Provides land use oversight and serves as Douglas PUD's land owner liaison.

Mary Mayo, Douglas PUD. Provides support for administrative activities including contract invoice accounting and technical editing and review.

Dan Stolp, Douglas PUD. Serves as the communications lead for the wireless transmission of data.

Rich Klein, Douglas PUD. Serves as the database lead for all water quality data received by Douglas PUD.

Bao Le, HDR Engineering, Inc. Supports water quality resources including technical editing and report development. Also provides technical and regulatory assistance on all water quality program objectives.

John Lemons, Columbia Basin Environmental. Serves as the TDG lead technician which includes station maintenance, calibration, and quality assurance/quality control (QA/QC) activities of TDG monitoring equipment.

Greg Perry, United States Geological Survey (USGS). Spokane District Field Manager for the stream monitoring field program.

Patrick Miller, USGS. Spokane District lead technician for the stream monitoring field program. Serves as the temperature monitoring station technician responsible for calibration, station maintenance and QA/QC activities.

Charlie McKinney, Ecology. Water Quality Section Manager, Central Regional Office (CRO). Oversees Ecology participation regarding the Wells Project 401 Certification and Settlement Agreement.

Patricia Irle, Ecology. Hydropower Projects Manager, CRO. Ecology's lead responsible for tracking compliance with terms of the Wells Project 401 Certification and Aquatic Settlement Agreement.

3.1.2 Schedule

The schedules below will be managed to meet the implementation and reporting requirements of the Wells Project 401 Certification and FERC License Order. An estimated schedule for setup and annual reporting is provided below:

3.1.2.1 QAPP Development and Monitoring Schedule

February 15 2013	Send Draft QAPP to Ecology
March 15 2013	QAPP comments received from Ecology
March 20 2013	Secure professional services agreement with USGS
March 20 2013	Install TDG stations
March 30 2013	Distribute revised QAPP (per Ecology comments) to Aquatic SWG
April 1 2013	Forebay and tailrace TDG stations operational
April 30 2013	QAPP comments received from Aquatic SWG
June 30 2013	Install temperature stations
July 30 2013	Temperature stations operational
June 30 2013	File Final QAPP with the FERC

3.1.2.2 Annual Reporting Schedule

30-Jan	Draft TDG Report to Ecology and Aquatic SWG
15-Feb	Receive comments from Ecology and Aquatic SWG
28-Feb	File Final TDG Report with Ecology and the FERC
30-Jan	Draft GAP to Ecology, HCP and Aquatic SWG
15-Feb	Receive comments from Ecology, HCP and Aquatic SWG
28-Feb	File Final GAP with Ecology and the FERC
30-Jan	Draft Temperature Report to Ecology
28-Feb	Temperature Report comments from Ecology
30-Mar	Draft Temperature Report to Aquatic SWG
30-Apr	File Final Temperature Report with the FERC and Ecology
30-Mar	Incorporate water quality reporting in annual Aquatic SWG report
30-Apr	Receive comments from Aquatic SWG on annual water quality parameters
30-May	File Aquatic SWG Annual Report with the FERC

3.1.2.4 Schedule Limitation

Douglas PUD will work towards meeting the QAPP Development and Monitoring Schedule described above, however some factors exist that may limit the ability for implementation in accordance with the schedule. These factors include the permitting and regulatory review required for the installation of water quality instrumentation to support the monitoring program (i.e., review and processing of a Joint Aquatic Resources Permit Application and the potential need for implementation of the State Environmental Policy Act process or USACE section 10 and county shoreline permits). In addition, high flows, which typically occur during the spring run-off period, may preclude safe installation of water temperature stations as scheduled.

It is important to note that per the Wells Project 401 Certification, the development of the QAPP and installation of water quality monitoring stations are not required to be completed until the end of October of 2013 (by the end of the first year of the FERC license). However, Douglas PUD's advanced schedule is proposed in consideration of the additional time required for the regulatory permitting and review process, as needed. In the event that environmental or permitting activities preclude Douglas PUD from meeting the above QAPP Development and Monitoring Schedule, and further, prevents Douglas PUD from meeting the within one year requirements for water quality monitoring, both Ecology and the FERC will be formally notified and Douglas PUD will submit a request for a modified schedule.

4.0 QUALITY OBJECTIVES

4.1 DECISION QUALITY OBJECTIVES (DQO) Process

The DQO Process is used when data are being used to select between two clear alternative conditions or to determine compliance with a standard. For this QAPP, a DQO Process will be implemented using the monitoring data (i.e., water temperature and TDG) for relevant parameters to determine compliance with the state WQS. Actions that could be taken if measurements indicate that state WQS numeric criteria are not met have already been defined in Douglas PUD's WQMP and 401 Certification. These potential actions include:

1. Continued sampling to determine the accuracy and repeatability of a violation.
2. Employing adaptive management, as defined by the ASA to address non-compliance in water quality measures, if and when they occur. Examples include:
 - a. Identifying reasonable and feasible actions that could be used to meet TDG and water temperature WQS numeric criteria.
 - b. Exploring other alternative approaches available in the water quality standards provided in WAC 173-201A-510(5)(g).

4.1.2 Representativeness

Obtaining representative measurements or samples requires the use of properly operated and calibrated equipment and requires a good sampling design as well as good execution of that design. A result is representative of a population when it reflects accurately the desired characteristics of that population. A set of representative samples is said to be valid if it provides a true representation of the temporal and spatial variations of the population characteristic (Lombard and Kirchmer 2004). For the water temperature and TDG monitoring program, Douglas PUD proposes a spatial distribution of instrumentation and a temporal collection regime for water quality data that is representative of the quality of water entering and exiting the Wells Project and that is sufficient to evaluate Wells Project compliance with the state WQS numeric criteria for relevant parameters.

TDG sensors will be placed in the forebay (near unit six) and in the tailrace of Wells Dam. The placement of the sensors has been confirmed as representative of bulk flow prior to passing Wells Dam and leaving the tailrace (Columbia Basin Environmental 2006, EES Consulting Inc. et al. 2007). The forebay and tailrace sensors will provide a representative value of TDG production through Wells Dam and allow for the determination of Wells Dam's ability to meet WAC standards.

During the summer of 2011, Wells Dam forebay values for TDG were often measured as higher than those determined in the Chief Joseph Dam tailrace. The USACE has determined that the placement of the TDG sensor maintained below Chief Joseph Dam causes inaccurate Chief Joseph Dam tailrace TDG values. The Chief Joseph Dam tailrace sensor is located below the spillway on river right and does not capture turbine outflow during certain operations. TDG in turbine outflow can be higher than spill flows when the spillway at Chief Joseph Dam is degassing supersaturated water in the forebay. Whereas, supersaturated water passing through the powerhouse is not stripped of gas (Pers. Comm. Mike Schneider, USACE). Given the unique hydrodynamics below Chief Joseph Dam and the lack of bulk flow representation, Douglas PUD is proposing to install an additional TDG station at Washburn Island (Washburn Island is downstream of Chief Joseph Dam, upstream from the Okanogan River and is being located at a site that contains mixed flow). The Washburn Island location will help Douglas PUD understand TDG degassing in the Wells Project and expected TDG saturation in the Wells Forebay. In addition it will help proof the Wells forebay TDG sensor since Washburn Island TDG values should predict Wells Forebay TDG values. Based on the comparison of the sensors at these two locations, technicians can service the sensors when data appears to be erroneous to ensure reliable data is being obtained. Finally, the Washburn Island location will more accurately assess TDG loading from the federal power system above Wells Dam, which may support improved management towards minimizing TDG production in the Columbia River.

The frequency of TDG data collection (15 minute intervals or more frequently year-round) is designed to provide a sufficient number of data points, which will represent real time TDG conditions in the Wells Project and allow Douglas PUD to evaluate TDG compliance in consideration of incoming water quality conditions in addition to TDG management activities occurring at Wells Dam throughout the year.

The proposed boundary locations for temperature sensors will provide a representation of water temperatures entering into and leaving the Wells Project. Boundary locations include the Chief Joseph Dam tailrace, the Okanogan River at RM 10.5 and the Methow River at RM 1.5. In addition, the temperature monitoring station in the Wells Dam forebay will collect a depth profile to allow Douglas PUD to continue to verify the lack of thermal stratification in the Wells Reservoir. Fishway thermistors will provide representative data to assist Douglas PUD in determining if trapping salmonids is allowable under NMFS BO temperature criteria for ESA listed fishes.

Together, proposed locations and depth of TDG and temperature sensors will provide the necessary information for a precise and accurate evaluation of the Wells Project's ability to continue to meet WAC compliance criteria for TDG and water temperature. Finally, samples will be taken in a consistent manner for all measurement locations.

4.1.3 Comparability

In order to compare data collected under this QAPP with historic Wells Project water quality data, TDG and water temperature data will be collected using instrumentation and standardized procedures similar to the historic water quality program. Instrumentation will consist of Hydrolab® Minsonde sensors as has been utilized in the past for TDG and water temperature sensors used by the USGS at their existing stream gauge stations. Methodology for data collection and processing will be similar to or comparable to previous water quality monitoring activities in the Wells Project. The data resolution in this study is not only intended to be comparable to data collected at the Project in the past, but to support future TMDL development and any modeling that may be required to support Columbia River Treaty negotiations. In addition, the majority of TDG and water temperature data collected on the Columbia River is collected using identical equipment and nearly identical data collection protocols, as proposed in this QAPP.

4.1.4 Completeness

The sampling design is intended to provide, at a minimum, hourly data or 168 single location samples per week at each station. For TDG monitoring, data collection will occur year-round and thus provide over 8,736 data points per station each year. Redundant sampling in the design should reduce the probability of data gaps even when unforeseen events occur such as instrument failure or damage due to weather or environmental factors. In addition, the real-time recording and dissemination of the data allows for the prompt identification of a failed sensor and immediate equipment service or replacement; thereby minimizing data loss and improving data completeness.

4.2 MEASUREMENT QUALITY OBJECTIVES (MQO)

All water quality monitoring instrumentation will be calibrated per factory recommended specifications prior to deployment and serviced in the field on a monthly or more frequent schedule, as needed. If an instrument does not meet specifications it will not be deployed. In addition, if a sensor appears to be sending erroneous data, the site will be visited toward

recalibrating the instrumentation and an evaluation will be conducted to determine the quality and validity of the data associated with the event.

The repeatability and sensitivity of the equipment needs to be within the allowable deviations from water quality criteria in order to avoid reaching a false conclusion regarding whether or not criteria have been met. The MQOs for these parameters, based on water quality criteria allowances for human effects (smallest reference level for decision making) and instrument capabilities are presented in Table 1.

Table 1. Measurement quality objectives

	<i>Parameter</i>	<i>Smallest Reference Level for Decision Making</i>	<i>Range of Instrument</i>	<i>Accuracy</i>	<i>Sensitivity/Resolution</i>
TDG Station (MiniSonde/ Hydrolab)	Temperature	0.3°C	-5 to 50°C	± 0.1°C	0.01°C
	TDG	1 % Saturation	400 to 1400 mmHg	± 1.5 mmHg	1.0 mmHg (0.1% saturation)
Temperature Station (Waterlog H-377 sensor)	Temperature	0.3°C	-40 to 105°C	± 0.1°C	N/A

5.0 SAMPLING PROCESS DESIGN

Douglas PUD maintains two TDG stations during the spill season (April- August) but will be installing two additional TDG stations in 2013 and expanding its TDG program to year-round monitoring beginning in March of 2013. Similar to the past TDG program, all TDG instrumentation will also collect temperature data. In addition, Douglas PUD maintains redundant (2 per location) temperature Tidbit loggers at six locations upstream of the dam. In 2013, Douglas PUD plans on replacing the existing Tidbit temperature loggers with real time monitoring stations and making data available on a public website. In previous years, temperature data was shared with the public and agencies by request. Additional information on the proposed monitoring and sampling design is provided below.

5.1 TDG

Douglas PUD maintains two real time water quality monitors at the Wells Dam. These instruments record barometric pressure (BP), water temperature, and TDG every fifteen minutes. The forebay sensor is located on the upstream face of the dam near turbine unit six and the tailwater monitor is located approximately two miles downstream of the dam on the river left bank. Hourly data from these sites are transmitted to the Columbia River Operational Hydromet System (CROHmS) operated by the USACE– Northwest Division. An additional reservoir monitoring station at Washburn Island (RM 537.5) and a redundant tailwater probe will be added in 2013. The subsequent Wells Project TDG monitoring system will consist of the following stations:

1. Forebay station located on the upstream face of Wells Dam near unit 6, (WEL).
2. Tailwater station located approximately 2.5 miles downstream on the eastern shore, (WELW)
3. Redundant probe located at the tailwater site, (WEL2) and
4. Washburn Island station (WELWASH).

The location of TDG monitoring stations are illustrated in figures 2, 3, and 5.

5.2 Water Temperature

Douglas PUD will maintain water temperature sensors at six locations in the Wells Project. Loggers used in previous years were Tidbit thermistors (Onset), which are programmed to collect hourly data year-round and will be used until new remote stations can be installed. Previously, Douglas PUD downloaded the loggers two to four times a year based on river conditions and access. In 2013, upon approval of this QAPP, Douglas PUD plans on installing remote temperature monitoring stations at the following locations to meet 401 Certification requirements and monitor compliance with the state WQS temperature numeric criteria. Locations and duration of monitoring include:

April 1st to October 31st

1. Methow River, RM 1.5 - Project Boundary
2. Columbia River, RM 544.5 - Chief Joseph Dam Tailrace
3. Okanogan River, RM 10.5 - Project Boundary

May 1st to November 15th

4. Wells Dam Forebay (three depths)
5. Wells Dam Fishways
6. Wells Dam Auxiliary Water Supply

Temperature monitoring locations are illustrated in figures 2 through 6.



Figure 2. Proposed locations of TDG/temperature, temperature stations only and Washburn Island TDG station within the Wells Project boundary.



Figure 3. Proposed locations of forebay and tailrace TDG/temperature stations and temperature stations only. Sensors pictured include two redundant tailrace TDG stations and one forebay station above turbine unit six, one fishway temperature and auxiliary water supply station and one forebay water temperature profile sensor (surface, mid and deep depths) affixed to the debris boom.



Figure 4. Proposed Methow River boundary temperature sensor.



Figure 5. Proposed Okanogan River boundary temperature sensor and additional TDG station location off of Washburn Island.



Figure 6. Proposed Chief Joseph tailrace (Columbia RM 544.5) temperature sensor.

6.0 MEASUREMENT PROCEDURES

6.1 TDG equipment

Hydrolab® miniSonde multi-probes (sensors) will be used to monitor TDG in the Wells Project. Hydrolab® probes are used throughout the Columbia River Basin by other Columbia River dam operators (e.g. Chelan PUD 2007, and Corps 2008). Probes are deployed via PVC conduit with a perforated end cap. A sensor communication cable is connected to a communications box on the shoreline. The communication box is connected to a wireless modem that sends data via radio or cellular frequencies back to a server at Wells Dam. A 20 watt solar panel and a voltage regulator keep a 12 volt battery charged, which provides power to the communications box.

6.2 Water Temperature monitoring equipment

With the exception of a change in instrumentation and components, the same system (i.e., sensor connected to communications box with wireless modem to send data to Wells Dam and powered by solar panel) used to collect TDG data will be used for water temperature data collection. Changes in equipment include a Design Analysis H-377 temperature sensor, Sutron GOES radio/logger, GOES satellite antenna and cable, 20 watt solar panel, and voltage regulator. Onshore housing includes a National Electrical Manufacturers Association (NEMA) enclosure, 12 volt sealed lead-acid battery, galvanized pipe, flex conduit, fittings, and other hardware.

7.0 QUALITY CONTROL

Listed below are the general calibration and maintenance procedures to be conducted for TDG and temperature quality assurance methods. Calibration and Quality Assurance Protocols have been adopted and modified, as appropriate, from those used in the USGS stream monitoring protocols as is required by the Wells Project 401 Certification.

7.1 Calibration and Maintenance Protocol for TDG

Calibration and maintenance follows a modified standard procedure used by the USGS's *Guideline and Standard Procedures for Continuous Water-Quality Monitors: Station Operations, Record Computation, and Data Reporting* (Wagner et al. 2006). Key elements of this procedure are provided below for both laboratory and field components:

7.1.1 Laboratory

1. Calibrate secondary standard field barometer to National Institute of Standards and Technology (NIST) traceable source.
2. Calibrate secondary standard multiprobe using known standards.
3. Perform integrity check of replacement membranes.

7.1.2 Field

1. Inspect fixed monitoring sites and document any problems monthly or as required.
2. Document pre-calibration water temperature and TDG measurements.
3. Remove sensor from housing, inspect for damage and document findings.
4. Remove TDG membrane, being careful to prevent moisture from entering TDG sensor. Visually inspect membrane and document findings.
5. Perform four-point calibration as follows:
 - A. Attach pressure gauge to TDG sensor and release pressure.
 - B. Check the zero by comparing TDG pressure from sensor to barometric pressure reported by secondary standard. Document readings and adjust TDG sensor, if necessary.
 - C. Using the digital pressure gauge, gradually add sufficient pressure to the TDG sensor to “bracket” the expected in situ pressures (~300 mmHg). The TDG sensor should report pressures equivalent to the ambient BP (zero) plus the additional pressure, e.g. at BP=760 mmHg with 300 mmHg added pressure, the sensor should report 1060 mmHg.
 - D. Recheck the zero.
 - E. Repeat if adjustments were required.
6. Install fresh TDG membrane. Monitor the TDG pressure as the membrane is attached. Pressure should increase as the seal is formed and then gradually return to ambient BP.
7. Replace sensor guard, if so equipped.
8. Perform final membrane check by immersing entire sensor in carbonated water, i.e. seltzer water. TDG pressure should increase rapidly and exceed ~1000 mmHg. Remove sensor from seltzer water and ensure that the pressure gradually returns to atmospheric levels. If pressures do not rise rapidly or if they instantly return to atmospheric levels, the membrane may have been damaged. Repeat steps 6-8 with a new membrane (Note: It is important that the sensor guard be replaced BEFORE performing the membrane integrity check as it is possible to damage the membrane during this action).

After each eight week interval, the data are reviewed and analyzed. Data will be compared to expected values using incoming TDG values, spill volumes and Rocky Reach forebay values. Erroneous data will be noted and described in annual reporting. At the completion of the water year, the final TDG data will be reviewed by the Douglas PUD’s water quality technical lead.

7.2 Calibration and Maintenance Protocol for Temperature

Like TDG, temperature calibration and maintenance follows a modified standard procedure used by the USGS's *Guideline and Standard Procedures for Continuous Water-Quality Monitors: Station Operations, Record Computation, and Data Reporting* (Wagner et al. 2006). Key elements of this procedure are provided below:

1. Water temperature sensors are verified in the lab before deployment.
2. At site visits, the sensor is checked against a digital thermistor which has been verified to be within USGS data-quality requirements with a NIST certified thermometer, as described by Wilde (2006).
3. A 5-point calibration is performed annually at the USGS Field Services Unit (FSU) in Tacoma, Washington, with additional 2-point calibrations performed twice annually.
4. Field sensors are verified and checked within +/-0.2°C accuracy, otherwise returned to vendor or discarded.
5. Temperature data will be collected in a cross-section adjacent to the sensor location, at different flow and temperature regimes, to check and possibly adjust for the collected data being representative of the river at the sampling point.

After each eight week interval, the data will be reviewed and analyzed, corrections will be applied if needed, and the database will be updated. At the completion of the water year, the final tables will be checked and reviewed by senior hydrographers.

8.0 DATA MANAGEMENT PROCEDURES

8.1.1 Data Access for TDG and water temperature

Data will be collected in a format that will include the location of collection, the time of day that each sample is taken, and the sample date. Data will be transferred to a Microsoft (MS) Access database since large volumes of data are anticipated, precluding the use of MS Excel. Data will be transmitted to Ecology or any other public agency by request. However, all final data will be published electronically at Douglas PUD's Wells Project license implementation website.

TDG and temperature data will be stored internally but also made available in real-time via the Columbia River DART (Data Access in Real Time) website and Douglas PUD's external website. TDG data will also be transmitted to the USACE's Columbia Basin Water Management Division Webpage which serves as the information clearing house for all real-time hydroelectric project water quality data on the Snake and Columbia rivers. Wells Project water quality data will be publically available at:

1. <http://www.cbr.washington.edu/dart/dart.html> and
2. <http://www.nwd-wc.usace.army.mil/tmt/wcd/tdg/months.html>

A link to these pages will also be provided on Douglas PUD's Wells Project license implementation website.

9.0 REPORTING

Monthly and bimonthly calibration reports for TDG and temperature monitoring locations, respectively, will be developed, reviewed and approved. All reports, including charts, diagrams, and data prepared by field personnel will be appended to annual reports. Key reports include:

1. Annual GAP
2. Annual TDG Report (GAP Annual Report)
3. Annual Water Temperature Report
4. Annual Water Quality Management Plan Report or Memo
5. Revised version of the QAPP (if available)
6. Revised version of the WQAP(if available)

10.0 REFERENCES

- Columbia Basin Environmental. 2006. Wells Dam Spillway Total Dissolved Gas Evaluation.
- Chelan PUD (Public Utility District No. 1 of Chelan County). 2007. Quality assurance Project plan for Lake Chelan water quality monitoring and reporting. Lake Chelan Hydroelectric Project, FERC Project No. 637. Wenatchee, Washington.
- Corps (U.S. Army Corps of Engineers). 2008. U.S. Army Corps of Engineers plan of action for dissolved gas monitoring in 2009.
- Ecology. 2011. Water quality standards for surface waters of the State of Washington. Chapter 173-201A Washington Administrative Code. Updated May 9, 2011
- Ecology. 2006. Waters Requiring Supplemental Spawning and Incubation Protection For Salmonid Species. Revised November 2006. Publication Number 06-10-038.
- EES Consulting Inc., J. Carroll, ENSR, Parametrix. 2007. Total Dissolved Gas Production Dynamics Study Wells Hydroelectric Project FERC No. 2149.
- Lombard, S.M. and C. J. Kirchmer. 2004. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Washington Department of Ecology. Report No. 01-03-003
- NMFS (National Marine Fisheries Service). 2000b. Risk Assessment for Spill Program described in 2000 Biological Opinion. Appendix E in Endangered Species Act Section 7 consultation biological opinion. Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin. National Marine Fisheries Service, Northwest Region.
- Wagner, R.J., Boulger, R.W., Jr., Oblinger, C.J., and Smith, B.A., 2006, Guidelines and standard procedures for continuous water-quality monitors—Station operation, record computation, and data reporting: U.S. Geological Survey Techniques and Methods 1–D3, 51 p. + 8 attachments.
- WEST Consultants Inc. 2008. Development of a Water Temperature Model Relating Project Operations to Compliance with the Washington State and EPA Water Quality Standards (Water Temperature Study). Prepared for Public Utility District No. 1 of Douglas County. East Wenatchee, WA
- Wilde, F. 2006. Chapter 6.1 Temperature version 2.3 *in* National Field Manual for the Collection of Water-Quality Data. United States Geological Survey. Available at <https://water.usgs.gov/owq/FieldManual/index.html>.

Politano, M., A. Arenas Amado, and L. Weber. 2009. An Investigation Into the Total Dissolved Gas Dynamics of the Wells Project (Total Dissolved Gas Investigation) Wells Hydroelectric Project FERC No. 2149.

APPENDIX B

**PRE-FILING CONSULTATION RECORD FOR THE QUALITY ASSURANCE
PROJECT PLAN FOR WATER TEMPERATURE AND TOTAL DISSOLVED GAS**

**LETTER SUBMITTING DRAFT QUALITY ASSURANCE PROJECT PLAN TO
WASHINGTON DEPARTMENT OF ECOLOGY**

Commissioners:
T. JAMES DAVIS
LYNN M. HEMINGER
RONALD E. SKAGEN

General Manager:
WILLIAM C. DOBBINS



Public Utility District No. 1 of Douglas County

1161 Valley Mall Parkway • East Wenatchee, Washington 98802-4497 • 509/884-7191 • FAX 509/884-0553 • www.douglaspud.org

Pat Irle
Department of Ecology
15 W. Yakima Avenue, Suite 200
Yakima, WA 98902

March 4st, 2013

Subject: 2013 Quality Assurance Project Plan for monitoring select water quality measures within the Wells Project

Dear Ms. Irle:

Please find enclosed Public Utility District No. 1 of Douglas County's (Douglas PUD) Quality Assurance Project Plan (QAPP) for monitoring water temperature and total dissolved gas in the Wells Hydroelectric Project (Wells Project) Area. Consistent with requirements in the Wells Project 401 Water Quality Certification and Federal Energy Regulatory Commission (FERC) License Order, this QAPP describes the systematic process that will be implemented to collect useful environmental (water quality) data.

Article 401(a) of the Wells Project License Order requires that the final QAPP and the comments received on draft versions be prepared and submitted to the FERC for final approval.

If you have any questions or require further information regarding the enclosed plan, please feel free to contact Andrew Gingerich at (509) 881-2323 or andrewg@dcpud.org.

Sincerely,

Shane Bickford
Natural Resources Supervisor

**EMAIL SUBMITTING DRAFT QUALITY ASSURANCE PROJECT PLAN TO
ECOLOGY**

From: Irle, Pat (ECY) <PIRL461@ECY.WA.GOV>
Sent: Monday, March 04, 2013 10:06 AM
To: Andrew Gingerich
Subject: RE: Draft QAPP

Thanks!

From: Andrew Gingerich [<mailto:andrewg@dcpud.org>]
Sent: Monday, March 04, 2013 9:57 AM
To: Irle, Pat (ECY)
Cc: Shane Bickford; Le, Bao; Chas Kyger
Subject: Draft QAPP

Pat, please find attached Douglas PUD's Quality Assurance Project Plan for TDG and water temperature monitoring. Although this document isn't due to FERC until October, I think both Ecology and Douglas agree that it makes sense to finalize this document prior to April's spill season (if we can). Once Ecology provides comments I will send it to the ASWG for review as well. Also, I am in the midst of working out the permitting details for water temperature recording stations. Having a final product will be helpful for the permitting processes.

I've elected to submit this as a word document to facilitate any editing or comments Ecology might have internally. As always, Please let me know if you have any questions.

Thanks for the ongoing support.

Andrew

Andrew Gingerich
Senior Aquatic Resource Biologist
Douglas County Public Utility District
andrewg@dcpud.org
509-881-2323 (work)
509-884-0553 (fax)
1151 Valley Mall Parkway
East Wenatchee, Washington 98802

COMMENTS BY ECOLOGY ON THE QAPP

From: Irle, Pat (ECY) <PIRL461@ECY.WA.GOV>
Sent: Monday, April 08, 2013 2:56 PM
To: Andrew Gingerich
Cc: Shane Bickford
Subject: FW: Draft QAPP for Wells

Comments:

Overall it is written well.

Section 4.1.2 – paragraph 3 states that the Corps determined that the location of the TDG sensor below Chief Joe causes inaccurate TDG values. It would be helpful if you cite the source of information (as you have other statements in the document). Does this information come from projects performed by Mike Schneider and Kent Easthouse?

Section 4.1.2 – You plan to add another TDG station at Washburn Island – it would be helpful to know how this data will be used in terms of compliance or improvement of TDG monitoring. Will these data be utilized in adjusting your playbook. Some further information would be helpful.

DOUGLAS PUD'S SUGGESTED CHANGES TO THE QAPP

From: Andrew Gingerich
Sent: Tuesday, April 16, 2013 9:27 AM
To: 'Irle, Pat (ECY)'
Cc: Shane Bickford; Chas Kyger
Subject: RE: Draft QAPP for Wells

Pat, thanks again for the comments on Douglas' QAPP for water temperature and TDG. Here are my suggested changes to the QAPP based on the comments that you provided. Please see the bold text. I am going to share this document with the ASWG at this point. Through that process we can make additional revisions if we so choose. Thanks again for the support. Andrew.

“During the summer of 2011, Wells Dam forebay values for TDG were often measured as higher than those determined in the Chief Joseph Dam tailrace. The USACE has determined that the placement of the TDG sensor maintained below Chief Joseph Dam causes inaccurate Chief Joseph Dam tailrace TDG values. The Chief Joseph Dam tailrace sensor is located below the spillway on river right and does not capture turbine outflow during certain operations. TDG in turbine outflow can be higher than spill flows when the spillway at Chief Joseph Dam is de-gassing supersaturated water in the forebay. Whereas, supersaturated water passing through the powerhouse is not stripped of gas (**Pers. Comm. Mike Schneider, USACE**). Given the unique hydrodynamics below Chief Joseph Dam and the lack of bulk flow representation, Douglas PUD is proposing to install an additional TDG station at Washburn Island (Washburn Island is downstream of Chief Joseph Dam, upstream from the Okanogan River and is being located at a site that contains mixed flow). **The Washburn Island location will help Douglas PUD understand TDG degassing in the Wells Project and expected TDG saturation in the Wells Forebay. In addition it will help proof the Wells forebay TDG sensor since Washburn Island TDG values should predict Wells Forebay TDG values. Based on the comparison of the sensors at these two locations, technicians can service the sensors when data appears to be erroneous to ensure reliable data is being obtained. Finally, the Washburn Island location will more accurately assess TDG loading from the federal power system above Wells Dam, which may support improved management towards minimizing TDG production in the Columbia River.**”

From: Irle, Pat (ECY) [<mailto:PIRL461@ECY.WA.GOV>]
Sent: Monday, April 08, 2013 2:56 PM
To: Andrew Gingerich
Cc: Shane Bickford
Subject: FW: Draft QAPP for Wells

Comments:

Overall it is written well.

Section 4.1.2 – paragraph 3 states that the Corps determined that the location of the TDG sensor below Chief Joe causes inaccurate TDG values. It would be helpful if you cite the source of information (as you have other statements in the document). Does this information come from projects performed by Mike Schneider and Kent Easthouse?

Section 4.1.2 – You plan to add another TDG station at Washburn Island – it would be helpful to know how this data will be used in terms of compliance or improvement of TDG monitoring. Will these data be utilized in adjusting your playbook. Some further information would be helpful.

EMAIL FROM ECOLOGY APPROVING THE QAPP

From: Irle, Pat (ECY) <PIRL461@ECY.WA.GOV>
Sent: Tuesday, May 21, 2013 2:48 PM
To: Andrew Gingerich
Subject: RE: Formal approval of various documents

Follow Up Flag: Follow up
Flag Status: Flagged

Hi, Andrew – This is an e-mail to formally approve the items listed in your e-mail below.

Thanks for all the good work!

Pat Irle

WA Dept of Ecology

Hydropower Projects Manager

From: Andrew Gingerich [<mailto:andrewg@dcpud.org>]
Sent: Thursday, May 09, 2013 3:25 PM
To: Irle, Pat (ECY)
Subject: Formal approval of various documents

Pat Anchor sent me your approval of the various documents discussed at the ASWG meeting yesterday. I think it would be helpful to have a direct email from you for the FERC filings for each of the documents we discussed and reviewed over the last few weeks.

Could you respond to me via a reply of this message to note that you formally approve these three items:

1. Aquatic Settlement Agreement Annual Report (distributed by Anchor QEA)
2. All six management plans annual reports
3. The QAPP for water temperature and TDG monitoring

Thanks!

Andrew Gingerich
Senior Aquatic Resource Biologist
Douglas County Public Utility District
andrewg@dcpud.org
509-881-2323 (work)
509-884-0553 (fax)
1151 Valley Mall Parkway
East Wenatchee, Washington 98802

**EMAIL TO AQUATIC SETTLEMENT WORK GROUP FOR A REVIEW OF THE
QAPP**

From: Kristi Geris <kgeris@anchorqea.com>
Sent: Tuesday, April 16, 2013 10:38 AM
To: Andrew Gingerich; Bao Le; Beau Patterson; Bill Towey (bill.towey@colvilletribes.com); Bob Jateff (jatefrjj@dfw.wa.gov); Bob Rose; 'Brad James'; 'Bret Nine'; 'Chad Jackson'; Charlie McKinney (cmck461@ecy.wa.gov); Chas Kyger; Chris Sheridan; 'Donella Miller'; Jason McLellan; Jeff Korth (korthjwk@dfw.wa.gov); 'Jessi Gonzales'; Joe Peone (joe.peone@colvilletribes.com); Keith Kirkendall (Keith.Kirkendall@noaa.gov); kirk.truscott@colvilletribes.com; Kristi Geris; Mary Mayo; Mike Schiewe; Molly Hallock (hallowh@dfw.wa.gov); Pat Irle (pir461@ecy.wa.gov); 'Patrick Luke'; Patrick Verhey (Patrick.Verhey@dfw.wa.gov); Paul Ward (ward@yakama.com); Shane Bickford; 'Steve Lewis'; 'Steve Parker (parker@yakama.com)'; Steve Rainey
Cc: Emily Pizzichemi
Subject: FW: DCPUD QAPP water temperature and total dissolved gas
Attachments: 2013_04_16 Douglas - DCPUD QAPP water temperature and total dissolved gas.pdf

Hi Aquatic SWG: please see the email below from Andrew and the attached draft Douglas PUD Quality Assurance Project Plan. This draft report is out for review with comments due to Andrew prior to the Aquatic SWG May 8, 2013 conference call. Douglas PUD will be asking for approval of this draft report at the May conference call.

Thanks!
Kristi ☺

Kristi Geris

ANCHOR QEA, LLC

kgeris@anchorqea.com

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From: Andrew Gingerich [<mailto:andrewg@dcpud.org>]
Sent: Tuesday, April 16, 2013 10:31 AM
To: Kristi Geris
Cc: Shane Bickford; Chas Kyger; Le, Bao
Subject: DCPUD QAPP water temperature and total dissolved gas

Kristi please send to the ASWG

Please find attached Douglas PUD's Quality Assurance Project Plan (QAPP) for monitoring water temperature and total dissolved gas in the Wells Hydroelectric Project. Consistent with requirements in the Wells Project 401 Water Quality Certification and the FERC License Order, the QAPP describes the systematic process that will be implemented to collect useful water quality data. Article 401(a) of the Wells Project License Order requires that the final QAPP and the comments received on draft versions be prepared and submitted to the FERC for final approval. Douglas has worked closely with the Washington Department of Ecology to revise this document in order to meet this obligation. At this stage we would like to work towards review and approval from the Aquatic SWG.

Douglas is asking for a shortened review period towards approving this document at the May 8th conference call. Of course, if folks feel they need the full 30 day review we will provide that. However, folks will likely agree that approvals during conference calls work best compared to email votes and approval. We can assess peoples comfort with approving this plan during the May 8th call.

Please note that the attached QAPP describes how Douglas PUD will collect reliable water quality data towards meeting WA State water quality standards.

As always, let me know if you have questions.

Thanks!

Andrew

Andrew Gingerich

Senior Aquatic Resource Biologist
Douglas County Public Utility District

andrewg@dcpud.org

509-881-2323 (work)

509-884-0553 (fax)

1151 Valley Mall Parkway

East Wenatchee, Washington 98802

**FINAL MEETING MINUTES FOR THE AQUATIC SETTLEMENT WORK GROUP
APPROVING THE QAPP**

Final Conference Call Action Items



Aquatic Settlement Work Group

To: Aquatic SWG Parties **Date:** May 9, 2013
From: Michael Schiewe, Chair (Anchor QEA)
Re: Final Action Items of the **May 8, 2013, Aquatic SWG Conference Call**

Below is a summary of Action Items from the Aquatic SWG meeting held by conference call from 10:00 am to 11:30 am on Wednesday, May 8, 2013. These action items include the following:

I. Summary of Action Items

1. Pat Irle (Washington State Department of Ecology) will provide additional comments or approval of Aquatic Settlement Work Group 2012 Annual Report to Mike Schiewe via email (*Approval was confirmed via email dated May 9, 2013*) (Item II).
2. Irle will provide additional comments or approval of the Water Quality Management Plan 2013 Annual Report to Schiewe via email (*Approval was confirmed via email dated May 9, 2013*) (Item III).
3. Andrew Gingerich will talk with Scott Kreiter (Douglas PUD Lands Department) about method of application of aquatic herbicide in public swimming areas, and report back to Aquatic SWG representatives at the June 12, 2013 meeting (Item IIX).
4. Steve Lewis will send the Twisp Weir Bull Trout Study deferral request letter to Emily Pizzichemi for distribution to the Aquatic SWG. Aquatic SWG representatives will submit comments and/or their formal approval to Gingerich no later than June 5, 2013 (Item IX).
5. Chas Kyger will provide additional details on the Lamprey Passage and Enumeration Study, including release locations, during the June 5, 2013 meeting (Item X).

II. Summary of Decisions

1. There were no Statements of Agreement (SOAs) approved at today's meeting.

III. Agreements

1. Aquatic SWG representatives present approved Douglas PUD's Aquatic Settlement Work Group 2012 Annual Report (*Bob Rose and Pat Irle provided email confirmation of approval on May 9, 2013*) (Item II).
2. Aquatic SWG representatives present approved Douglas PUD's Aquatic Settlement Agreement Management Plan Annual Reports (six total) (*Bob Rose and Pat Irle provided email confirmation of approval on May 9, 2013*) (Item III). Approval required the inclusion of a reference to the Wells Aquatic Settlement Agreement White Sturgeon Collection Plan SOA (approved March 20, 2013) in the prioritization list on page 11, section 4.4.1 of the White Sturgeon Management Plan Report.
3. Aquatic SWG representatives present approved the 2013 Draft Quality Assurance Project Plan for Water Temperature and Total Dissolved Gas Monitoring (*Bob Rose provided email confirmation of approval on May 9, 2013*) (Item IX).

IV. Reports Finalized

1. No reports have been finalized since the last Aquatic SWG meeting.

EMAIL FROM YAKAMA NATION APPROVING THE QAPP

From: Bob Rose <rosb@yakamafish-nsn.gov>
Sent: Thursday, May 09, 2013 7:26 AM
To: Mike Schiewe
Cc: Andrew Gingerich
Subject: Re: Wells ASWG

Hi Andrew, Mike.

I've reviewed each of the documents listed below and I do approve that the ASWG accept these as Final.

Thanks for the reminder.

My apologies for not being able to attend yesterday.

Best Regards,

B Rose

1. Approval of the 2012 Annual Report
2. Approval of the Settlement Agreement Management Plan Annual Reports
3. Approval of QAPP for Water Temperature and TDG Monitoring.

On Wed, May 8, 2013 at 8:15 AM, Mike Schiewe <mschiewe@anchorage.com> wrote:

Bob – There are three decision items on the agenda

1. Approval of the 2012 Annual Report
2. Approval of the Settlement Agreement Management Plan Annual Reports
3. Approval of QAPP for Water Temperature and TDG Monitoring.

Do you have any comments, questions? Are you ready to approve?

Thanks, Mike

From: Bob Rose [mailto:rosb@yakamafish-nsn.gov]
Sent: Monday, May 06, 2013 8:27 AM
To: Andrew Gingerich; Mike Schiewe
Subject: Wells ASWG

Hi Andrew - Mike, I hope you are refreshed and roaring to go for another week!

So, just looking at my schedule - I will need to be in Tacoma Wednesday with the Tacoma Power folks going over the Annual Review for that proceeding. So will not be in on the call.

However Mike - I'm going to go through the two decision documents asap and will get back to you with a vote for these two items. So hopefully I'll not hang up progress on those items.

I don't think I have much to add to the discussion, as I've visited recently with Andrew about a couple of these things. I am around via phone if I can help out with anything.

Best to both,

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Bob Rose
Yakama Nation
Fisheries Resource Management Program
[509-945-0141](tel:509-945-0141)

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Bob Rose
Yakama Nation
Fisheries Resource Management Program
509-945-0141

EMAIL FROM NATIONAL MARINE FISHERIES SERVICE APPROVING THE QAPP

From: Bryan Nordlund - NOAA Federal <bryan.nordlund@noaa.gov>
Sent: Wednesday, May 08, 2013 10:29 AM
To: Andrew Gingerich
Cc: Chas Kyger; Tom Kahler; Shane Bickford
Subject: Re: Left one more out

Follow Up Flag: Follow up
Flag Status: Flagged

Andrew - This morning, I read (actually, I think I re-read) the **Water Temperature and TDG QAPP plan for Wells Dam**. It wasn't checked off of my "tasks" list - possibly an error, since the text sounded familiar.

In any event, **the 2013 QAPP for Wells Dam looks good to me. No comments and consider this NMFS approval** (or added approval, if I had sent this approval previously).

Thanks,
Bryan

On Wed, Apr 17, 2013 at 2:56 PM, Andrew Gingerich <andrewg@dcpud.org> wrote:

Bryan, I left one out!

Here is item number seven that we need to show NMFS consultation. This is a plan on how we plan to collect TDG and water temperature data in the Wells Project in a robust manner that will help us determine Wells' ability to meet the WA state water quality standards. This review actually falls under article 41 and page 48 of the new Wells License.

Let me know if you have time and we can chat briefly on the phone about all these plans and reports.

Thanks again.

Andrew

Andrew Gingerich
Senior Aquatic Resource Biologist

Douglas County Public Utility District

Document Content(s)

Final Wells Temp and TDG QAPP.PDF.....1-57