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Public Utility District No. 1 of Douglas County

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Via Electronic Filing

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

February 25, 2020

Subject: 2019 Annual Report - Total Dissolved Gas Abatement Plan– Wells Hydroelectric Project – FERC License Article 401 (b)

Dear Secretary Bose:

Pursuant to Article 401(b) of the Federal Energy Regulatory Commission (FERC) license for the Wells Hydroelectric Project (Wells Project), the Public Utility District No. 1 of Douglas County (Douglas PUD) hereby submits the final Total Dissolved Gas Abatement Plan Annual Report (TDG Report) for calendar year 2019. Article 401(b) requires Douglas PUD to file an annual TDG Report with the FERC by February 28th during each year of the license.

The final 2019 TDG Report is attached as Appendix A to this letter. A draft version of this 2019 TDG report was distributed to the Washington State Department of Ecology (Ecology) and all of the other parties to the Aquatic Settlement Agreement (ASA) including the 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). No comments were received during the 30 day comment period. Following review, all parties present during the February 12, 2020 Aquatic Settlement Work Group (Aquatic SWG) meeting approved the 2019 TDG Report. In addition, Ecology signified their approval via email on February 14, 2020. The pre-filing consultation record supporting the review and approval of the 2019 TDG Report can be found in Appendix B.

The enclosed 2019 TDG Report is consistent with (1) the Water Quality Management Plan that is contained within the ASA, (2) Condition 6.7(2)(c)(iii) of Ecology's Clean Water Act section 401 Water Quality Certification (401 Certification), and (3) the National Marine Fisheries Service Endangered Species Act Incidental Take Statement (ITS) Reasonable and Prudent Measure No. 2 for the Wells Project.

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

Sincerely,

Shane Bickford
Natural Resources Supervisor

Enclosure:

1) Appendix A – 2019 Annual Report - Total Dissolved Gas Abatement Plan - Wells Hydroelectric Project

2) Appendix B – Pre-filing consultation record for the 2019 Annual Report – Total Dissolved Gas Abatement Plan - Wells Hydroelectric Project

Cc: Breean Zimmerman – Ecology, Union Gap
Scott Carlon – NMFS, Portland
Wells Aquatic Settlement Work Group
Tom Kahler – Douglas PUD
Andrew Gingerich – Douglas PUD

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APPENDIX A

2019 ANNUAL REPORT TOTAL DISSOLVED GAS ABATEMENT PLAN WELLS HYDROELECTRIC PROJECT

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2019 Annual Report
Total Dissolved Gas Abatement Plan

Wells Hydroelectric Project

Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802-4331

Prepared for:

Washington Department of Ecology
1250 Alder St, Union Gap, WA 98903

And

Aquatic Settlement Work Group

February 2020

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1 INTRODUCTION

The 2019 Wells Hydroelectric Project (Wells Project) Gas Abatement Plan (GAP) was approved by the Washington State Department of Ecology (Ecology) by email on February 20, 2019 and subsequently submitted to the Federal Energy Regulatory Commission (FERC) on February 28, 2019. The FERC approved the GAP on August 8, 2019. The GAP and its associated measures represent a long-term strategy to achieve compliance with the Washington State Water Quality Standard (WQS) criteria for total dissolved gas (TDG) downstream of the Wells Project while continuing to provide safe passage for downstream migrating juvenile salmonids. This annual report summarizes the results from the 2019 monitoring season and describes the background, operations, and results of GAP implementation at the Wells Project in 2019. In addition, this report contains TDG performance for the Wells Project during the 2019 fish passage season, and TDG performance outside of the fish passage season. Data summarized in this report includes monitoring from January 1, 2019 to December 31, 2019.

1.1 Project Description

The Wells Project is owned and operated by Public Utility District No. 1 of Douglas County (Douglas PUD) and is located at river mile (RM) 515.6 on the Columbia River in the State of Washington (Figure 1). Wells Dam is located approximately 30 river miles downstream from the Chief Joseph Hydroelectric Project, owned and operated by the United States Army Corps of Engineers (USACE), and 42 miles upstream from the Rocky Reach Hydroelectric Project, 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 of Wells Dam.

The Wells Project is the chief generating resource for Douglas PUD. It includes ten generating units with a nameplate rating of 774,300 kW and a peaking capacity of approximately 840,000 kW. 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. The hydrocombine is 1,130 feet long, 168 feet wide and has a top of dam elevation of 795 feet above mean sea level (msl). Upstream fish passage facilities are located on both sides of the hydrocombine.

The Methow and Okanogan rivers are tributaries of the Columbia River, which drain into the Wells Reservoir. The Wells Project boundary extends 1.5 miles up the Methow River and 15.5 miles up the Okanogan River. The 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 the normal maximum water surface elevation of 781 feet msl.

1.2 Fixed Monitoring Site Locations

Fixed monitoring stations (FMS) for TDG are located above and below Wells Dam. The forebay station (WEL) is located midway across the deck of Wells Dam (47° 56’ 50.28” N, 119° 51’ 54.78” W). The tailrace station (WELW) is located on the left bank of the Columbia River 2.6 miles downstream of Wells Dam (47° 54’ 46.86” N, 119° 53’ 45.66” W). In the spring of 2014, Douglas PUD installed a third FMS at

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Washburn Island (WSBW; 48° 5' 17.15" N, 119°40' 33.82" W), located approximately 7 miles downstream of Chief Joseph Dam. Hach® or Hydrotech HYDROLAB MiniSonde (MS5) instruments equipped with TDG and temperature probes are deployed approximately 15 feet below normal surface water elevation and are calibrated monthly. Data from the three stations are automatically transmitted by radio to Wells Dam, stored, forwarded to the USACE, and posted to the Douglas PUD public webpage (www.dcpud.org). Weather data are recorded by Global Water, Inc. instrumentation, including an electronic barometer located on the deck of Wells Dam at 810 feet elevation. All three FMS are geographically represented by yellow pins in Figure 1.

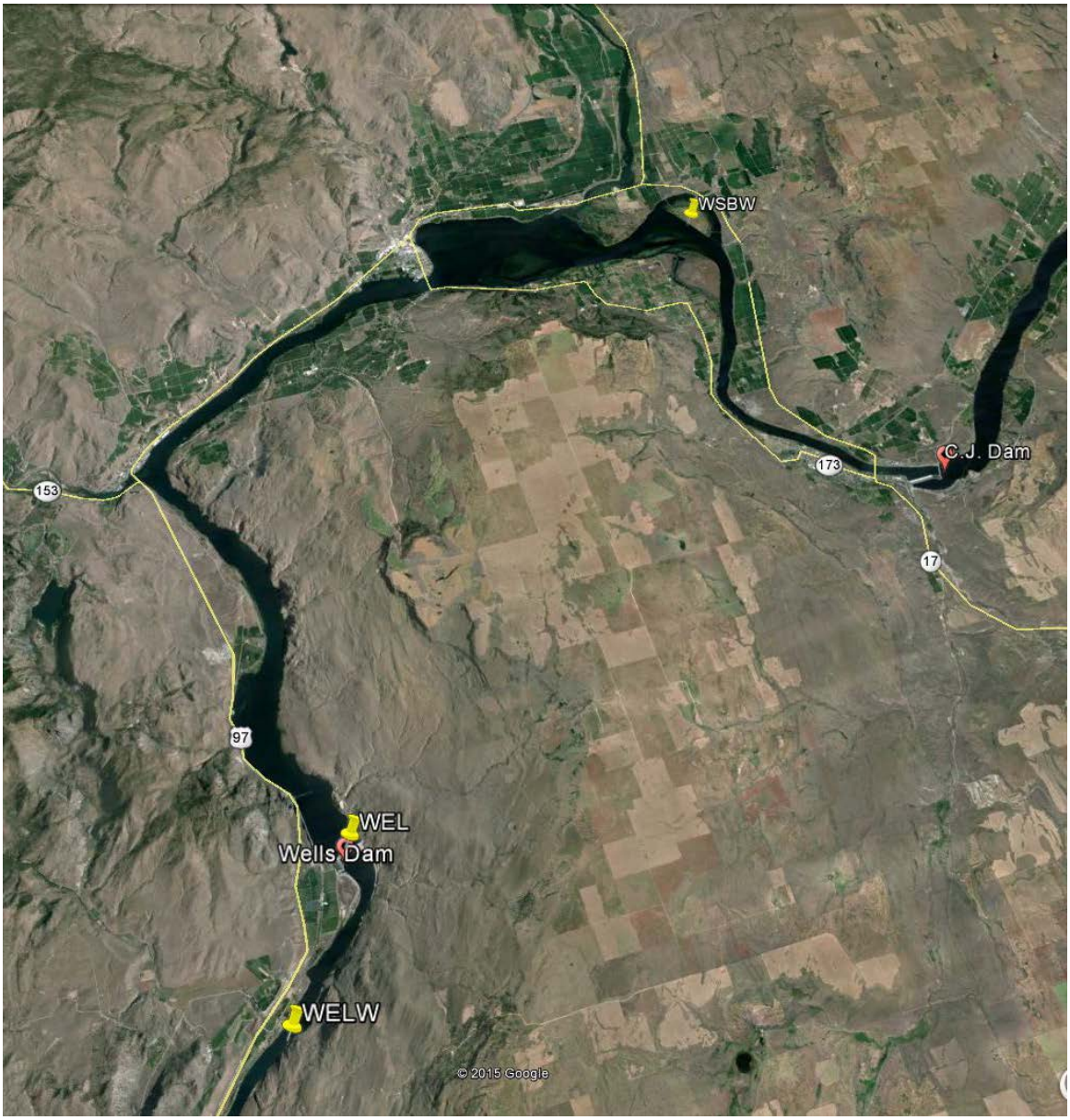

Figure 1. TDG fixed monitoring stations (yellow pins) above and below Wells Dam

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1.3 Regulatory Framework

Washington Administrative Code (WAC) Chapter 173-201A identifies the WQS for surface waters in Washington State. Per the WQS, TDG measurements shall not exceed 110% saturation at any point of measurement in any state water body. The WQS provide for two exceptions to this rule: (1) for spill over dams to increase survival of downstream migrating juvenile salmon; and (2) during natural flood flows.

Ecology may approve an adjustment to the 110% upper criterion for TDG saturation during the outmigration of juvenile salmon; provided that spill aids in the survival of migratory fish. The TDG adjustment is considered by Ecology on a per-application basis and must be accompanied by an approved Gas Abatement Plan and biological monitoring plan (WAC 173-201A-200(1) (f) (ii)). On the Columbia and Snake rivers, the TDG exception for fish passage has three standards during the fish passage season: (1) TDG shall not exceed 125% saturation in the tailrace of the project as measured in any one-hour period; (2) TDG shall not exceed 120% saturation in the tailrace of the project based on the average of the twelve highest consecutive hourly readings (12C-High); and, (3) TDG shall not exceed 115% saturation in the forebay of the next downstream project based on the average of the twelve highest consecutive hourly readings. Natural flood flows are identified by periods in which river flow volume exceeds the highest seven consecutive day average observed during a ten-year period, called the 7Q-10 flow. The 7Q-10 flow for the Wells Project is 246,000 cubic feet per second (cfs), based on the hydrologic records from 1930 to 1998 and the USGS Bulletin 17B, "Guidelines for Determining Flood Flow Frequency" (Pickett et al. 2004). When river flow volume exceeds 7Q-10 flows, the WQS established in the WAC do not apply.

1.4 Gas Abatement Plan Approach

1.4.1 Structural

No permanent structural modifications were proposed or conducted in the 2019 monitoring season. However, on April 16th, a contractor (Toshiba International) mistakenly opened a valve in the powerhouse flooding several turbine pits. This accident required an emergency response from plant personnel that superseded routine GAP/BOP operations. Some of those emergency actions, and miscommunication between the contractor, operations staff, and mechanical staff at the dam, resulted in approximately 77 hours spread over 11 days during which bypass operations did not fully conform to the BOP. This accident involved 4 of 10 turbine units (not all at the same time) and 2 of 5 bypass bays (only affected one bypass bay at a time). Despite these challenges the operational aspects of the GAP and Playbook were implemented according to plan and no TDG violations were incurred during this incident.

1.4.2 Consultation

Consistent with prior consultation requirements, Douglas PUD directs all correspondence related to TDG compliance to Ecology's Hydropower Projects Manager located in the Central Region Office (Union Gap, Washington 98903). In addition, Douglas PUD annually consults with the Aquatic Settlement Work

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Group (Aquatic SWG) and HCP Coordinating Committee (HCP CC) for specific TDG and WQS documents per Douglas PUD's 401 Certification and consults with the FERC all toward complying with the consultation and approval requirements contained within the FERC license for the Wells Project.

2 OPERATIONS

2.1 Description of Fish-Passage Season Flow

The Wells Anadromous Fish Agreement and Habitat Conservation Plan (HCP) required Douglas PUD to provide juvenile fish bypass passage opportunities for greater than 95% of the downstream migrating juvenile fish covered by the HCP (Plan Species). The HCP defined juvenile fish passage season starts April 1st and runs through August 31st of each year. Douglas PUD annually reviews fish passage statistics and uses that information to tune operation during subsequent years toward ensuring that greater than 95% of the juvenile outmigration is afforded a non-turbine passage route around Wells Dam. Based upon prior year information, the juvenile fish bypass was started on April 9 (0:00 hrs.) and ended at midnight on August 19th. As required, TDG performance was monitored during this period and transmitted to the USACE, Northwest Division on a real-time basis (www.nwd-wc.usace.army.mil) and made available on Douglas PUD's public webpage (http://dcpud.org/wells-project/total-dissolved-gas-and-temperature-monitoring). Historical data continues to be available for download at both of these websites.

Data from 1969 to 2019 show that average monthly flows at Wells Dam range from a September low of 74.2 kcfs to a June high of 162.9 kcfs (Table 1; Figure 2). The ten year average shows higher flows in May through July compared to the historical means recorded during the same months. Flows at the run-of-river Wells Project are determined by upstream storage releases at the Grand Coulee Hydroelectric Project and Canadian storage projects, with typically less than 10% of the total river flow provided by the two rivers that flow into the Columbia River within the Wells Project (Okanogan and Methow Rivers).

Table 1. Monthly average river discharge (kcfs) from the Wells Project, 1969-2019.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
2019	94.0	90.5	74.5	78.4	136.1	112.9	95.1	93.8	53.3	55.4	93.5	85.4	88.6
Average since 1969	108.8	108.3	107.1	118.9	153.2	162.9	131.7	105.3	74.2	74.7	88.1	100.9	111.2
Minimum since 1969	67.4	69.9	56.0	51.9	55.2	73.7	53.4	63.9	53.5	55.4	63.8	72.6	N/A
Maximum since 1969	159.2	180.7	193.9	203.8	266.3	348.7	253.8	181.3	123.0	108.9	110.0	149.0	N/A
10YR mean (2010-2019)	107.2	105.5	108.6	137.1	177.6	173.8	144.8	110.3	66.9	66.3	88.7	98.0	115.4

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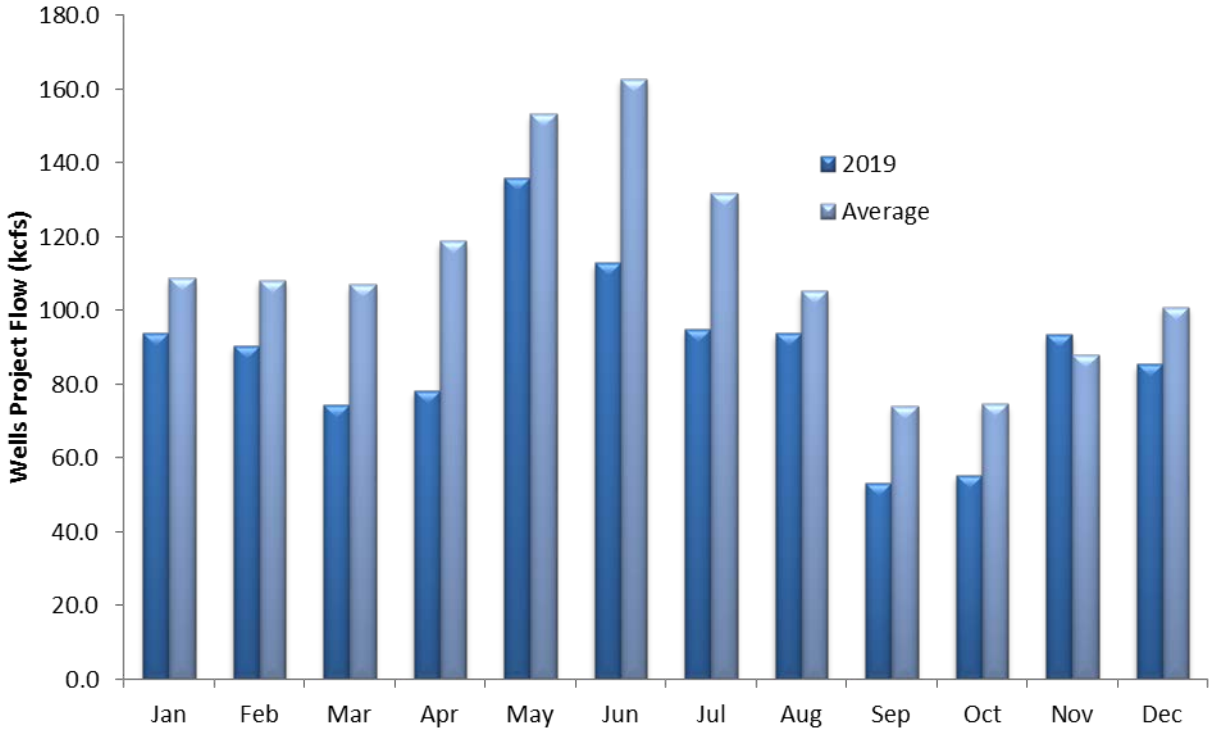
Observed flows at Wells Dam in 2019 were below average. Flows between April and August were 77% of average at Wells Dam. Further, flows in April and June were less than 70% of average (Figure 2). Within the tributaries the Okanogan and Methow river basins were given drought declarations by Governor Jay Inslee on April 4th, 2019. Notably tributary flows usually make up less than 1/10th of the total Wells Project flows seen at Wells Dam in a given year. Peak flows or freshet flows, occurred one month earlier than normal at Wells in 2019 and were muted compared to normal values (Table 1; Figure 2).



* December 2019 accounting check had not been completed at the time of this report development and therefore is considered preliminary and subject to revision.

Figure 2. 2019 monthly flows compared to monthly average.

2.2 Fish Bypass Program

Wells Dam is a hydrocombine, where the spillbays are located directly above the turbine intakes. Research at Wells Dam in the mid-1980s demonstrated that a modest amount of spill could effectively guide a high proportion of downstream migrating juvenile salmon away from turbines and into a surface oriented bypass system. A JBS was subsequently developed at Wells in the late 1980s. The Wells Dam JBS was engineered based on biological research and hydraulic modeling, and utilizes constricting flow barriers deployed in five of the eleven spillbays to effectively attract and safely guide fish through the project. The Wells Project JBS has since proven to be the most efficient system on the mainstem

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Columbia River, providing high levels of fish protection and survival that has met approval from various fisheries agencies and tribes (Skalski et al. 1996). The passage and survival performance measures contained within the FERC-approved HCP have been consistently exceeded, with a three-year project survival average of 96.2% for juvenile steelhead and Chinook salmon (Bickford et al. 2001). The results from a fourth year of survival study at Wells Dam in 2010 (Bickford et al. 2011) confirmed past study results by documenting survival through the entire Wells Project of 96.4% for juvenile spring migrating anadromous salmonids (see Section 3.1.2 below).

2.3 Fish Bypass Spill Quantities and Duration

The Wells Dam JBS uses up to 2,200 cfs of water for each of the five bypass/spillbays. Under normal conditions, the JBS will use roughly five to eight percent of the total river flow for fish guidance. The increased spill has a small influence on TDG production (~0-2%) while providing a safe and highly effective, non-turbine passage route for over 92% of the spring-migrating and 96% of the summer-migrating juvenile salmonids. The HCP defined juvenile fish migration period runs from April 1st to August 31st of each year. The HCP CC retains annual operating oversight that includes the potential to operate the JBS as early as April 1 and as late as August 31 to ensure that at least 95% of the spring and summer migration of juvenile salmonids are provided a safe, non-turbine passage route over Wells Dam. Any spill that occurs between April 1st and August 31st is deemed to have a beneficial effect on migrating juvenile salmonids.

From 2003 to 2011 the HCP CC directed the District to operate the JBS on a fixed schedule between April 12 and August 26 in an effort to provide a non-turbine passage route for at least 95% of the spring and summer migration of juvenile salmonids. In 2012, Douglas PUD evaluated past performance of the Wells Dam JBS operating dates relative to observed annual run timing (at the Rocky Reach Bypass) for both spring and summer migrants. With that data, a request was made to and granted by the HCP CC to revise the bypass operating dates in 2012 to start April 9 and end August 19. These new dates were therefore used in 2012-2019 to operate the fish bypass system for migrating juvenile salmonids. Juvenile anadromous salmonids that pass Wells Dam before and after the bypass system is shut down for the year benefit from spill at the Wells Project and therefore Douglas PUD annually develops a GAP and conducts biological and physical monitoring in order to obtain an Ecology approved TDG adjustment for the entire juvenile salmonid migration period (April 1st to August 31st).

3 IMPLEMENTATION RESULTS

3.1 Fisheries Management

3.1.1 Fish Passage Efficiencies

No new fish passage efficiency studies were conducted at the Wells Project in 2019. However, three years of bypass efficiency studies have shown the Wells Dam JBS to be the most efficient juvenile salmonid collection system in the Columbia River with fish passage efficiencies up to 92% for spring

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migrants and up to 96% for summer migrants (comprised of steelhead, spring Chinook, and sockeye salmon, and summer/fall Chinook salmon, respectively; Skalski et al. 1996).

3.1.2 Run-Timing Evaluation

Based on analysis conducted by Drs. John Skalski and Richard Townsend of Columbia Basin Research, in 2019 Douglas PUD surpassed the HCP requirement to provide bypass operations during at least 95 percent of the juvenile salmon and steelhead migration taking place at Wells Dam. Based upon the analysis conducted by the University of Washington's School of Aquatic and Fisheries Sciences (Skalski 2019), Douglas PUD provided bypass passage during 100 percent of the migrations for yearling and subyearling Chinook, steelhead, and sockeye, and 99.99 percent of the coho migration passing Wells Dam in 2019.

3.1.3 Survival Studies

No survival studies were conducted at the Wells Project in 2019. Douglas PUD is preparing for a 2020 survival verification study that will employee spring migrating yearling Chinook salmon. Releases of these fish will occur in April and May of 2020.

3.2 Biological Monitoring

The 2019 Wells Project GAP includes the National Marine Fisheries Service (NMFS) recommendation to sample for Gas Bubble Trauma (GBT) in juvenile salmon when hourly tailrace TDG levels exceed 125% saturation (NMFS 2000). Since no TDG values above 125% occurred during the 2019 compliance period no biological monitoring was required or implemented.

3.3 Water Quality Forums

Douglas PUD has actively participated in regional water quality forums with Ecology, Washington Department of Fish and Wildlife, NMFS, Tribal Agencies, the U.S. Fish and Wildlife Service, the USACE, and other Mid-Columbia PUDs (i.e., Grant and Chelan counties). Specific forums include the Trans-boundary Gas Group, Columbia Basin meetings with Ecology, and the Sovereign Technical Team Water Quality Work Group. These meetings allow for regional coordination for monitoring, measuring, and evaluating water quality in the Columbia Basin and support ongoing Upper Columbia Treaty review analyses that will provide a foundation for Treaty negotiations between Canada and the U.S. Douglas PUD will continue its involvement in water quality meetings for further coordination with other regional water quality managers towards meeting TDG standards.

3.4 Physical Monitoring

3.4.1 Overview

TDG monitoring at the Wells Project has occurred since 1984 when forebay stations were first established. TDG monitoring in the tailrace of Wells Dam began in 1997 by actively collecting data at four points across the width of the river. Based on these data, the location for a FMS was established in 1998. Subsequent analysis verified that both monitoring station locations are appropriate and

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representative of mixed river condition, particularly during high flows (EES et al. 2007; Politano et al. 2009). TDG monitoring at the Wells Project currently occurs year round as required by Douglas PUD's Wells Project 401 Water Quality Certification (401 Certification). As required by Douglas PUD's Quality Assurance Project Plan for TDG, FMS sensors are serviced and calibrated at least once per month or sooner if calibration issues are observed in the data.

In 2014, an additional reservoir monitoring station was installed at Washburn Island (RM 537.5) to collect TDG data representative of water quality entering the Wells Project from Chief Joseph Dam. The current Chief Joseph Dam tailwater station (CHQW) minisonde TDG sensor is deployed along the right bank of the Columbia River, 0.75 miles downstream from the dam. The river right location of the USACE TDG sensor precludes it from collecting bulk flow data, and instead the sensor monitors spillbay water disproportionally. Under some conditions, water coming from Chief Joseph Dam spillbays is of lower TDG concentration than the powerhouse. For example, when the Chief Joseph Dam forebay has high concentrations of TDG (e.g. greater than 120%) as a result of high spill volumes from Grand Coulee Dam and limited degassing through Rufus Woods Reservoir, water sent through the spillbays at Chief Joseph Dam may actually be stripped of gas via the spill deflectors. However, powerhouse TDG concentrations are essentially identical to those in the forebay and can be missed by the CHQW sensor since powerhouse flows orient to river left rather than river right where the TDG sensor resides. As a result of the CHQW location and the orientation of spill and powerhouse flows, bulk flows leaving the federal system and entering the Wells Project are not accurately monitored. The Washburn Island location installed and operated by Douglas PUD allows water quality managers and the Aquatic SWG Parties to:

1) Better understand TDG degassing in the Wells Project and expected TDG saturation in the Wells forebay.

2) Assure data quality at the Wells forebay TDG sensor since Washburn Island TDG values should correlate predictably with Wells forebay TDG values. Based on the comparison of the sensors at these two locations, technicians can ensure reliable data collection by scheduling sensor servicing when data appears to be erroneous.

3) More accurately assess TDG production from the federal power system upstream of Wells Dam, which may support improved management towards minimizing TDG production in the Columbia River.

3.4.2 Data Evaluation and Analyses

Hourly TDG monitoring data were retrieved from the USACE, Northwest Division for three monitoring locations: the forebay of Wells Dam (WEL), tailrace of Wells Dam (WELW), and forebay of Rocky Reach Dam (RRH) or from the DCPUD.org dataset. The data were partitioned to include only readings obtained during the fish passage season (April 1 to August 31). Data were stratified by monitoring site, ascending date, and ascending time. The Ecology-approved 12C-High method was used to obtain TDG measurements for comparison to numeric criteria and evaluation of compliance.

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3.5 TDG Compliance

Outside of the fish passage season, the TDG criterion in the Wells tailrace is 110% (January – March and September – December). Additionally, there were three compliance criteria for the 2019 fish passage adjustment that must be met in association with operation at the Wells Project as described in the 2019 GAP:

1) Average TDG in the tailrace cannot exceed 125% for one hour or

2) 120% for 12 continuous hours (12C-High), and

3) TDG in the downstream Rocky Reach Forebay cannot exceed 115% (12C-High).

These compliance criteria are waived when flows exceed the 7Q-10 value for the Wells Project (246 kcfs). For more information refer to WAC 173-201A-200.

3.5.1 Non-Fish Passage Season Compliance (Wells Tailrace 110%)

Per the Douglas PUD's FERC Operating License and 401 Certification, in August 2013 Douglas PUD started collecting TDG data during the non-fish passage season. Non-spill flows at Wells Dam (through the turbine units and fishways) generate little to no additional dissolved gas. Spill outside the fish passage adjustment period is uncommon. However, in March and September of 2019 there were several days when short burst of spill past unloaded turbine units caused temporary TDG exceedances above the 110% standard (March 22, September 6, and 23; Figure 3). These exceedances were related to Wells Project inflows increasing rapidly and approaching the FERC license maximum forebay elevation of 781 msl. Internal review of these two events indicated that better situational awareness, coordination and communication with federal project operators and better energy resource utilization could have avoided these two violations. As a result, ongoing training and enhancements to the Douglas Energy Accounting System are being implemented to further reduce the potential for spill past unloaded units to take place in the future .

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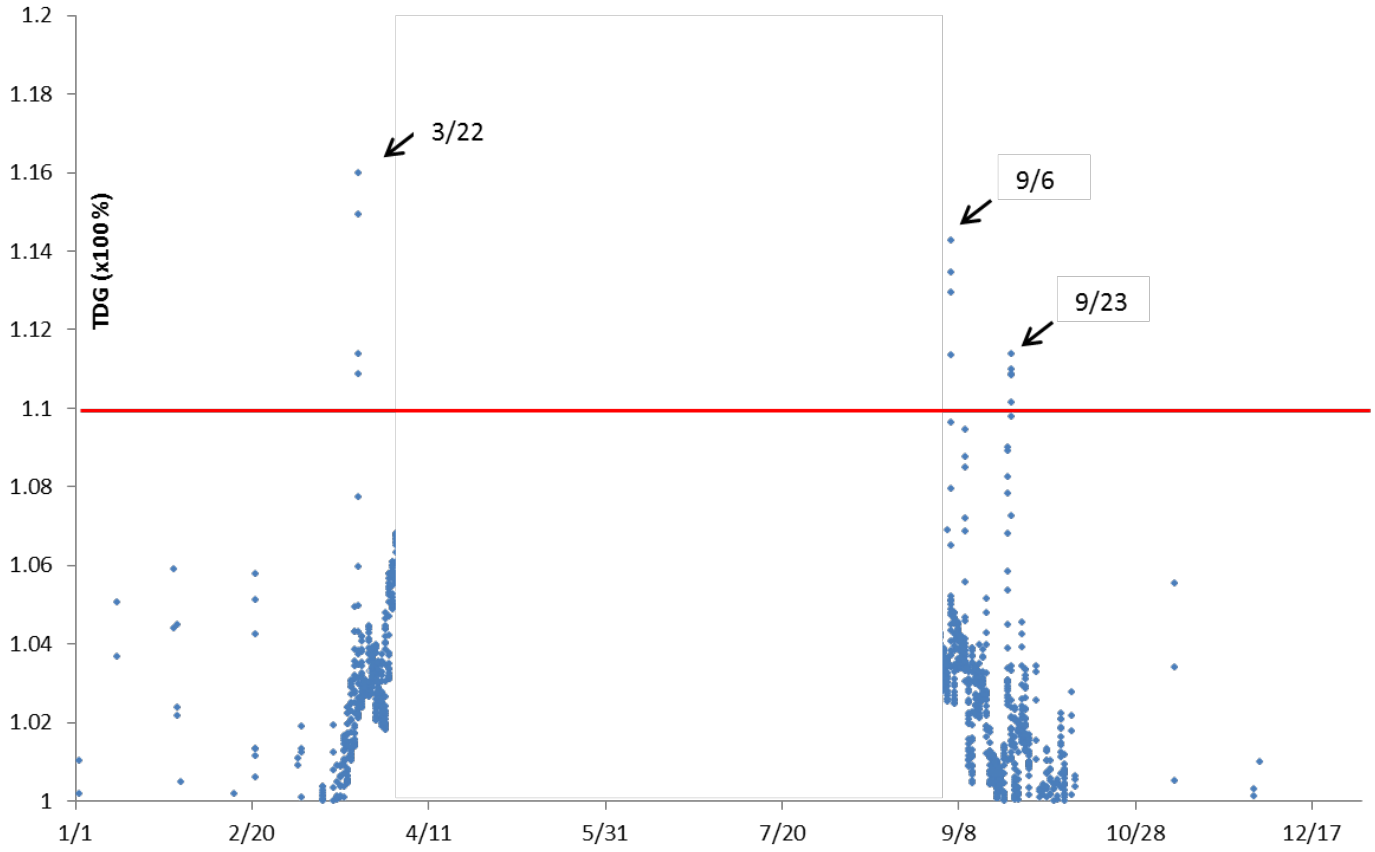

Figure 3. Hourly TDG data for the Wells tailrace during the non-fish bypass season in 2019. The red line denotes the 110% TDG concentration. Values above the red line represent exceedances of the standard.

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3.5.2 Fish Passage Season Compliance

Wells Tailrace 125% hourly standard

There were no exceedances of the 125% standard in the Wells tailrace in 2019 (Figure 4).

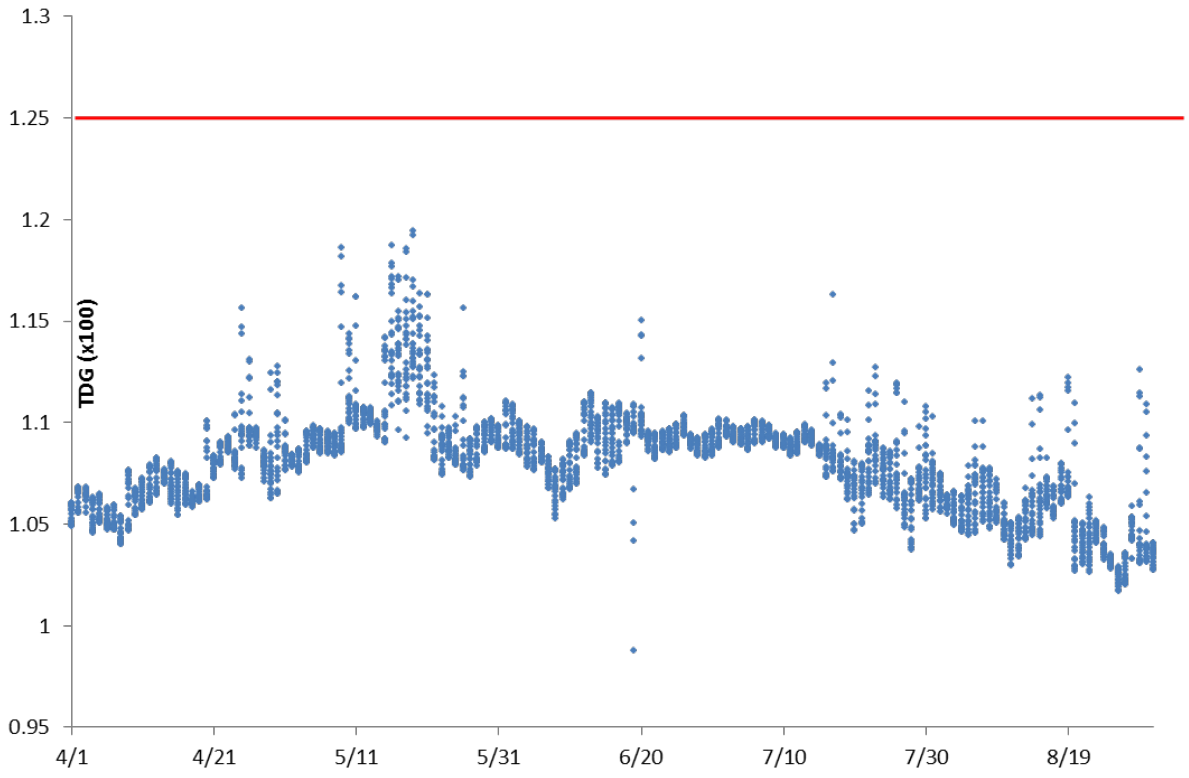

Figure 4. TDG compliance below Wells Dam using the 125% hourly average calculation. Data shown is exclusive to the fish bypass period of 2019. The Redline denotes the compliance threshold.

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Wells Tailrace 120% 12C-High standard

There were no exceedances of the 120% standard in the Wells Tailrace in 2019 (Figure 5).

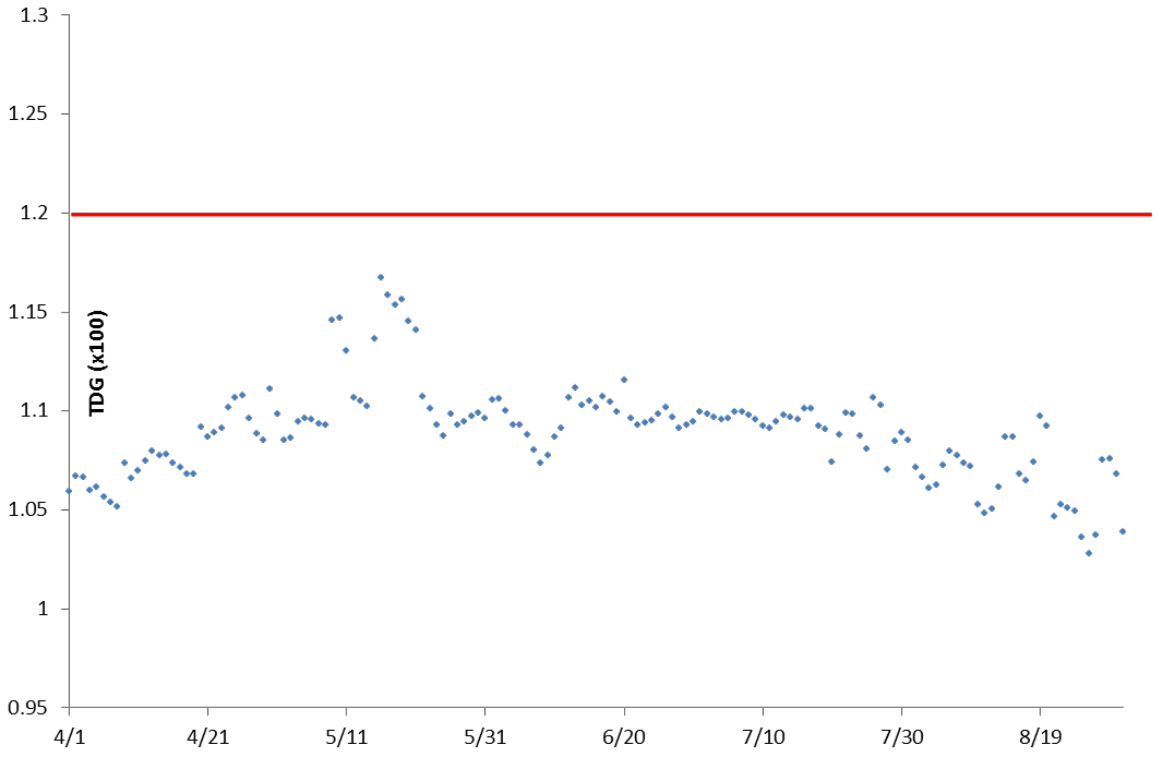

Figure 5. TDG compliance below Wells Dam using the 120% 12C-High calculation. Data shown is exclusive to the fish bypass period of 2019. The Redline denotes the compliance threshold.

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Rocky Reach Forebay 115% 12C-High standard

There appeared to be one day in 2019 when TDG values in the Rocky Reach Forebay, as calculated as the 12C- High, rose above 115% to 115.2%. This exceedance occurred on May 20, 2019 and was a result of annual peak flows at Wells Dam.

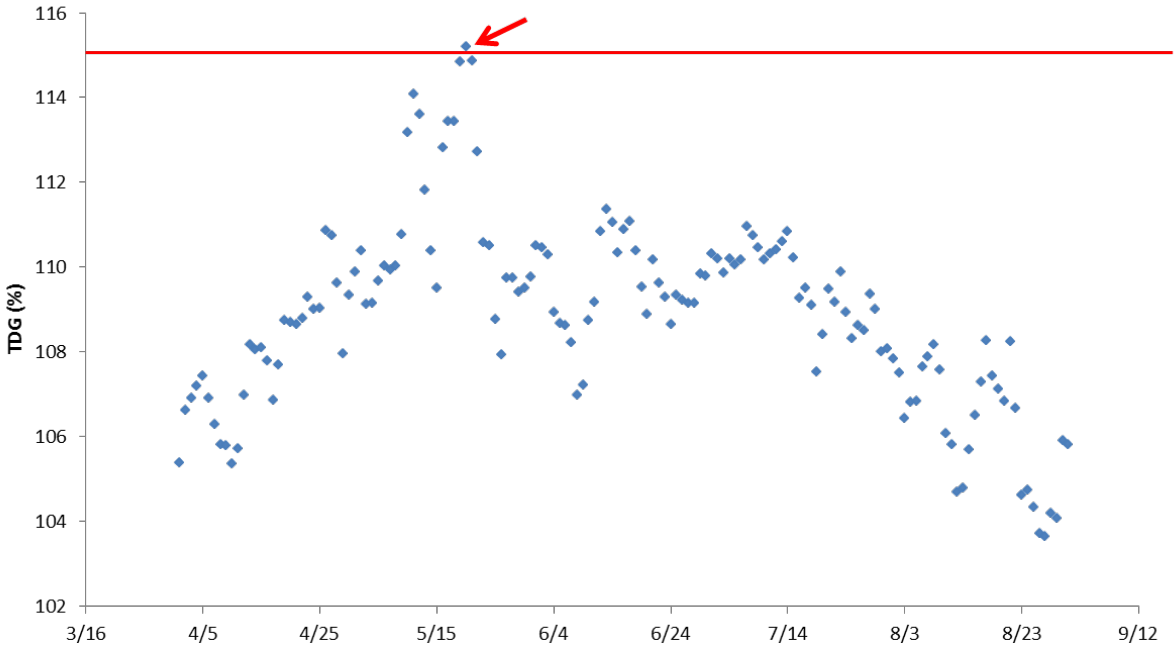

Figure 6. TDG compliance in the Rocky Reach Dam forebay using the 115% 12C-High calculation. May 20,2019 was the only day when Wells Dam operations failed to meet the 115% WQS in the Rocky Reach forebay reaching 115.2% (red arrow). All other days were compliant.

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3.5.3 Yearly TDG Compliance Summary

Table 2. TDG compliance at the Well Project for the entire 2019 season.

	Compliance
Wells Tailrace 125% hourly standard	
Days out of compliance	0
Fish passage season	153
DCPUD compliance	**100%**
Wells Tailrace 120% 12C-High standard	
Days out of compliance	0
Fish passage season	153
DCPUD compliance	**100%**
Rocky Reach Forebay 115% 12C-High standard	
Days out of compliance	1
Fish passage season	153
DCPUD compliance	**99.3%**
Wells Tailrace 110% (Non-fish passage season standard)	
Days out of compliance	3
Non-fish passage season	212
DCPUD compliance	**98.6%**

4 DISCUSSION OF GAS ABATEMENT MEASURES

4.1 Water Quality Attainment Plan Activities

As required by the Wells Project 401 Certification, Douglas PUD developed a Water Quality Attainment Plan (WQAP) that was approved by Ecology and the FERC in 2013. The WQAP provides a detailed strategy for achieving compliance with the TDG state WQS within a required ten-year timeframe (i.e., compliance schedule). The compliance schedule outlines a step-wise approach toward meeting compliance with the TDG WQS. In 2019 (Year 6), the WQAP called for continued adaptive management and implementation of the Spill Playbook, biological monitoring (i.e., GBT monitoring in biota, as needed), and the identification of key Project operating parameters that could be used towards developing a database that would house fine-scale operation data. Future year's data would be used to identify fine-scale operation changes that might improve TDG compliance. Finally, year 6 of the WQAP

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schedule discussed revisiting model assumptions that were used during relicensing studies that were associated with TDG compliance.

Although allowable by the WQAP no modifications were made to the Spill Playbook. Biological monitoring (i.e., GBT monitoring in biota, as needed) would have continued in 2019 but TDG values remained low and did not provide sampling opportunities.

In the spring of 2016 (year 3) Douglas PUD reviewed Wells Project operations data collection with Wells Dam Hydro Operations staff and the Information Systems Department. The objective of this analysis was to conduct a comprehensive evaluation of both operational and structural data collection that could ultimately improve compliance with the TDG WQS criteria. A fine-scale spill-data collection database was completed in 2017 (year 4). New data includes spillbay "openness" indication on nine of the eleven spillways (most frequently used). In addition, a new energy accounting system was developed in 2017. This new data collection process should allow for Douglas PUD to collect robust operations data over the balance of the WQAP. This new data can be used for subsequent modeling, if necessary, and towards improving compliance. As of 2017, data was being collected to meet the schedule of the WQAP Implementation Plan.

The IIHR TDG model suite (i.e., rigid lid and VOF models) developed during the Wells Project relicensing process in 2008 was operated under a set of assumptions (as required for all quantitative predictive models) for hydrodynamic characteristics such as gas volume fraction, bubble size, various free-surface features, and incoming TDG levels. However, Douglas PUD has no data that supports improving or modifying model assumptions. Rather, over the last five years, spill volume seems to be the most important variable in determining TDG addition at Wells Dam. Improved turbine unit reliability and improved powerhouse capacity is expected to occur once the rebuild of the 10 units at Wells Dam is complete. Having ten units available is expected to improve TDG performance over the next five years, potentially allowing the District to become fully complaint with the WQS when flows are below 7Q-10 volumes. Since 2013 Wells Dam has never had ten units available, since at least one unit has been out for extended unit rebuild each year.

4.2 Operational

Flows at Wells Dam werebelow normal in in 2019 (Table 1; Figures 2 & 7). There were no removals of bypass barriers at Wells Dam in 2019. With the bypass system and Spill Playbook operating normally, Douglas PUD was able to demonstrate exceptionally high TDG compliance with Washington State WQS in 2019. System Operator training and additional EAS enhancements are expected to further improve TDG performance outside of the bypass period when the WQS is 110%.

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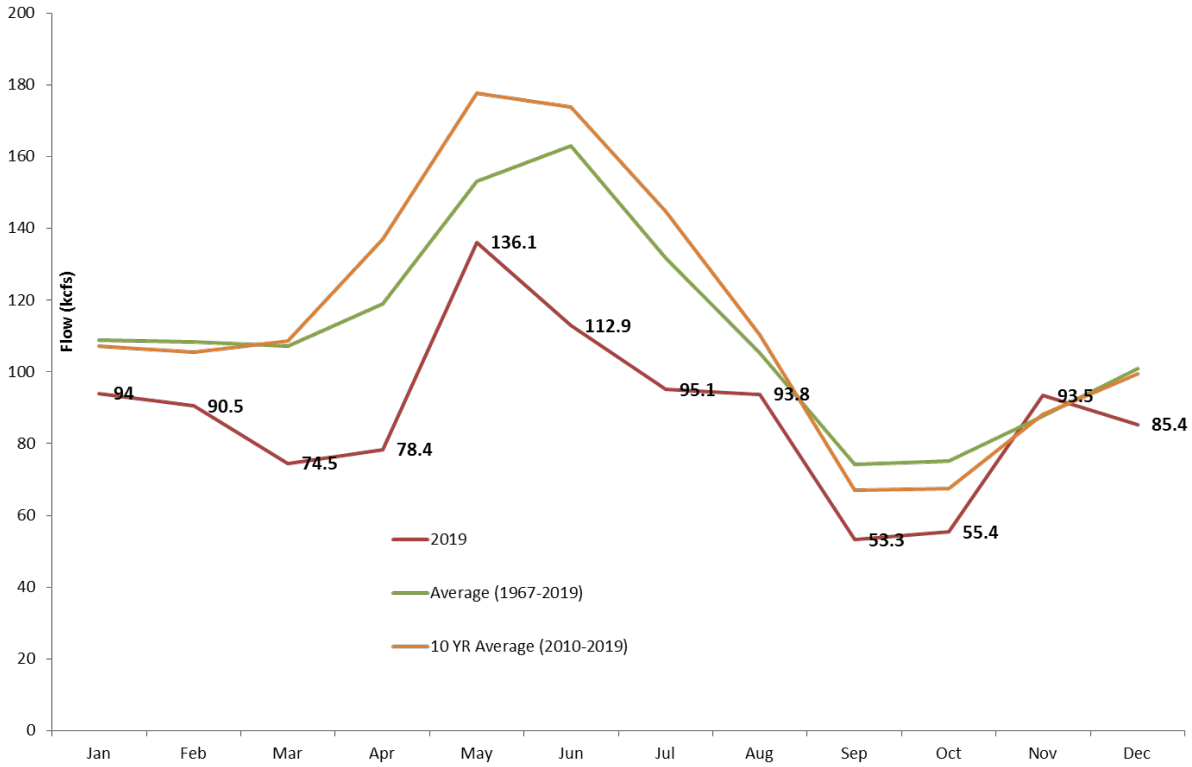

Figure 7. **Average daily flows at Wells Dam during 2019 relative to the ten year and operational average.**

4.3 Structural

No permanent structural modifications were proposed or completed during the 2019 monitoring season.

5 CONCLUSIONS

TDG performance at Wells Dam during the 2019 season was excellent. Results support the continued implementation of the Spill Playbook to manage TDG production through operational means, and suggest future operational performance should result in even higher rates of compliance with TDG standards. Exceedances of the 110% TDG standard occurring outside the bypass period were avoidable and these events are expected to decrease as Douglas PUD puts an emphasis on system operator training, EAS accounting and coordination with control room operators. Ideally, this training would also coincide with improved estimates and river discharge data that would be provided from the U.S. Army Corps of Engineers, Bureau of Reclamation and or the Bonneville Power Administration. Douglas PUD will put an emphasis on testing the Spill Playbook in years where ten units are available 95% of the time (normal reliability). The ongoing turbine rebuild project currently only provides 9 out of 10 units for operation during the peak hydrograph, thereby reducing the amount of water that can be passed

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through the powerhouse by approximately 15-20 kcfs and therefore makes compliance more challenging, since this water must be spilled. Despite this challenge Douglas PUD has maintained high TDG compliance with WQS. Douglas PUD will work closely with Ecology towards meeting year round TDG standards in subsequent years.

6 REFERENCES

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APPENDIX B

PRE-FILING CONSULTATION RECORD FOR THE 2019 ANNUAL REPORT TOTAL DISSOLVED GAS ABATEMENT PLAN WELLS HYDROELECTRIC PROJECT

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NOTICE TO AQUATIC SETTLEMENT WORK GROUP TO REVIEW THE TOTAL DISSOLVED GAS ABATEMENT PLAN 2019 ANNUAL REPORT

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From: Kristi Geris <kgeris@anchorqea.com>
Sent: Wednesday, January 08, 2020 4:47 PM
To: Amber Nealy; Andrew Gingerich; Brandon Rogers; 'Bret Nine'; 'Chad Jackson'; Chas Kyger; Chris Sheridan; Donella Miller (mild@yakamafish-nsn.gov); Fortier, Ryan T (DFW); Heironimus, Laura B (DFW); Jason McLellan; John Ferguson; Keith Hatch (Keith.Hatch@bia.gov); Keith Kirkendall (Keith.Kirkendall@noaa.gov); Kirk Truscott; Kristi Geris; Mark Peterschmidt (mape461@ecy.wa.gov); Patrick Verhey (Patrick.Verhey@dfw.wa.gov); Paul Ward (warp@yakamafish-nsn.gov); Ralph Lampman (lamr@yakamafish-nsn.gov); Sean Goudy (gous@yakamafish-nsn.gov); Shane Bickford; Steve Hemstrom (steven.hemstrom@chelanpud.org); 'Steve Lewis'; Zimmerman, Breean (ECY)
Cc: Tom Kahler; Jeff Johnson
Subject: FW: TDG GAP Annual Report for 2019 Draft
Attachments: 2020_01_08 Douglas - Draft 2019 TDG GAP Annual Report.doc

Hi Aquatic SWG: please see the email below from Andrew and the attached Draft 2019 TDG GAP Annual Report, which is available for a 30-day review with edits and comments due by **Monday, February 10, 2020**.

The attached draft report is also available for download from the Aquatic SWG Extranet Site, under: Documents > All by Mtg Date > 2/12/2019 (instructions below). Thanks! –Kristi ☺

Instructions:

To gain access to the Aquatic SWG Extranet Homepage, please use the following procedure:

* Visit: https://extranet.dcpud.net/sites/nr/aswg/
* Login using “Forms Authentication” (for non-Douglas PUD employees)

You should now be at the Aquatic SWG homepage.

If you encounter problems, or need a login username and password to access the site:
Please feel free to contact me, Andrew Gingerich, or Julene McGregor [jmcgregor@dcpud.org; (509) 881-2236] and we will gladly assist you with questions or issues.

Kristi Geris

ANCHOR QEA, LLC
kgeris@anchorqea.com
C 360.220.3988

From: Andrew Gingerich <andrewg@dcpud.org>
Sent: Wednesday, January 8, 2020 16:34
To: Kristi Geris <kgeris@anchorqea.com>
Cc: Chas Kyger <chask@dcpud.org>; Amber Nealy <amber.nealy@dcpud.org>; Shane Bickford <ShaneB@dcpud.org>; Tom Kahler <tomk@dcpud.org>; Jeff Johnson <jeffj@dcpud.org>
Subject: TDG GAP Annual Report for 2019 Draft

Hi Kristi, please distribute to the Aquatic SWG, BLM and BIA.

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As discussed during today's Aquatic SWG call, please find attached Douglas PUD's Draft Wells Hydroelectric Project Total Dissolved Gas Abatement Plan Annual Report for Calendar 2019. The report illustrates a very high level of compliance with State Water Quality Criteria. Douglas PUD is asking for a 1 month review period. Please provide any comments to Kristi or I NLT Monday the 10th of February. We will revise accordingly and seek formal approval from the Aquatic SWG during the February 12th, 2020 Aquatic SWG meeting. This report is due to the FERC by February 28, 2020.

I appreciate your review in advance. Please let me know if there are any questions.

Respectfully,
Andrew

Andrew Gingerich
Senior Aquatic Resource Biologist
Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802
Office: (509) 881-2323

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FINAL AQUATIC SETTLEMENT WORK GROUP ACTION ITEMS SHOWING APPROVAL OF TOTAL DISSOLVED GAS ABATEMENT PLAN 2019 ANNUAL REPORT

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FINAL

Conference Call Action Items

Aquatic Settlement Work Group

To: Aquatic SWG Parties

Date: February 14, 2020

From: John Ferguson, Chair (Anchor QEA, LLC)

Re: Final Action Items of the February 12, 2020 Aquatic SWG Conference Call

Below is a summary of Action Items from the Aquatic Settlement Work Group (SWG) meeting that was by conference call on Wednesday, February 12, 2020, from 10:00 a.m. to 11:30 a.m. Attendees are listed in Attachment A. These action items include the following:

I. Summary of Action Items

1. U.S. Fish and Wildlife Service (USFWS) will submit a vote via email on the *2020 Aquatic Settlement Agreement and Workgroup Action Plan* to Douglas PUD by Friday, February 21, 2020 (Item VI-4).
2. Douglas PUD will update the *2020 Aquatic Settlement Agreement and Workgroup Action Plan* to include continued discussion of adult Pacific Lamprey upstream passage study designs and juvenile Pacific Lamprey downstream passage study designs throughout 2020 (Item VI-4).
3. Douglas PUD will verify the fish rescue numbers reported in the Wells Dam west fish ladder fish salvage memorandum and redistribute a revised memorandum (Item VI-5).
4. Douglas PUD will inquire internally about a possible tour of the Wells Dam west fish ladder during the 2019/2020 winter maintenance outage (Item VI-5).
5. Douglas PUD and Anchor QEA, LLC (Anchor QEA) will distribute logistics information for the Aquatic SWG in-person meeting on March 11, 2020 (Item VI-7).
6. The Aquatic SWG meeting on March 11, 2020, will be held in-person at Wells Fish Hatchery in Azwell, Washington (Item VII-1).

II. Summary of Decisions

1. Aquatic SWG members present approved the *Wells Hydroelectric Project Total Dissolved Gas Abatement Plan 2019 Annual Report* (Item VI-2).
2. Aquatic SWG members present approved the *2020 Total Dissolved Gas Abatement Plan* (and appended *Wells Bypass Operating Plan*) (Item VI-3).

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FINAL

3. Aquatic SWG members present approved the *2020 Aquatic Settlement Agreement and Workgroup Action Plan* (Item VI-4). *(Note: USFWS abstained.)*

III. Agreements

1. Aquatic SWG members present agreed to release Wells Fish Hatchery brood year (BY) 2019 White Sturgeon in May/June 2020 that weigh less than 200 grams as part of the stocking program, so long as: 1) the majority of BY2019 White Sturgeon released weigh more than 200 grams; and 2) any BY2019 White Sturgeon weighing less than 200 grams are large enough to receive a passive integrated transponder (PIT) tag (Item VI-7).

IV. Review Items

1. The draft *Wells Hydroelectric Project Total Dissolved Gas Abatement Plan 2019 Annual Report* was distributed to the Aquatic SWG by Kristi Geris on January 8, 2020, and is available for a 30-day review with edits and comments due to Andrew Gingerich by Monday, February 10, 2020. Douglas PUD will request approval of the report during the Aquatic SWG meeting on February 12, 2020 (Item VI-4).
2. The draft *2020 Aquatic Settlement Agreement and Workgroup Action Plan* was distributed to the Aquatic SWG by Kristi Geris on January 16, 2020, and is available for review. Douglas PUD will request approval of the plan during the Aquatic SWG meeting on February 12, 2020.
3. The draft *2020 Total Dissolved Gas Abatement Plan* (and appended *Wells Bypass Operating Plan*) was distributed to the Aquatic SWG by Kristi Geris on January 20, 2020, and is available for review. Douglas PUD will request approval of the plan during the Aquatic SWG meeting on February 12, 2020 (Item VI-6).

V. Documents Finalized

1. There are no documents that have been recently finalized.

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FINAL

Attachment A – List of Attendees

Name	Role	Organization
John Ferguson	Aquatic SWG Chairman	Anchor QEA, LLC
Kristi Geris	Administration/Technical Support	Anchor QEA, LLC
Andrew Gingerich	Aquatic SWG Technical Representative	Douglas PUD
Chas Kyger	Technical Support	Douglas PUD
Steve Lewis	Aquatic SWG Technical Representative	U.S. Fish and Wildlife Service
Breean Zimmerman	Aquatic SWG Technical Representative	Washington State Department of Ecology
Laura Heironimus	Aquatic SWG Alternate Representative	Washington Department of Fish and Wildlife
Jason McLellan	Aquatic SWG Technical Representative	Colville Confederated Tribes
Ralph Lampman	Aquatic SWG Technical Representative	Yakama Nation

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WASHINGTON DEPARTMENT OF ECOLOGY EMAIL APPROVAL OF THE TOTAL DISSOLVED GAS ABATEMENT PLAN 2019 ANNUAL REPORT

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From: Zimmerman, Breean (ECY) <bzim461@ECY.WA.GOV>
Sent: Friday, February 14, 2020 11:45 AM
To: Andrew Gingerich
Subject: 2019 Annual Report Total Dissolved Gas Abatement Plan

Follow Up Flag: Follow up
Flag Status: Completed

Thank you for submitting for review and approval the Wells Hydroelectric Project Total Dissolved Gas Abatement Plan 2019 Draft Annual Report via email on January 8, 2020. The Washington State Department of Ecology (Ecology) has reviewed and **approves** this 2019 Annual Report. This plan was submitted in accordance with Clean Water Act (CWA) 401 certification Section 6.7(2)(c).

Thank you,
Breean Zimmerman, Hydropower Projects Manager
Department of Ecology, Central Region Office, Water Quality Program
Direct line: (509) 575-2808, Cell: (509) 406-5130
breean.zimmerman@ecy.wa.gov

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Document Content(s)

2019 TDG GAP Annual Report.PDF.....1-36