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**From:** Bao Le  
**Sent:** Wednesday, January 16, 2008 10:46 AM  
**To:** 'Bill Towey'  
**Cc:** Mary Mayo; Shane Bickford; Jim Good (good@parametrix.com)  
**Subject:** upcoming Okanogan toxins assessment  
**Attachments:** toxins study plan.doc

Hi Bill, as you're already aware, we're getting ramped up to conduct some water quality monitoring studies in the Okanogan River this year. I wanted to touch base with you regarding the Okanogan Toxins Study where we will be sampling the levels of DDT and PCB in fish tissue and sediment at recreation sites within the Project boundary. Since this was initially an issue raised by you, I wanted to be sure that you had some input in the more detailed development of site selection or recreation sites to be sampled for sediment and fish species that are of concern to the Tribe. Currently, we plan to sample three resident species of fish; carp, mountain whitefish, and smallmouth bass as this is consistent with the Ecology assessment done in 2002 (Serdar). With recreation sites, swimming holes and boat launches up to RM 15.5 (within Project Boundary) will be examined. If you have any additional input, please feel free to give me a call so that we can discuss. I've attached the study plan for reference. Hope you're doing well. Cheers, Bao

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**ASSESSMENT OF DDT AND PCB IN FISH TISSUE AND  
SEDIMENT IN THE LOWER OKANOGAN RIVER  
(Okanogan Toxins Study)**

**WELLS HYDROELECTRIC PROJECT**

**FERC NO. 2149**

May 2007

Prepared by:  
Public Utility District No. 1 of Douglas County  
East Wenatchee, Washington

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## **ABSTRACT:**

The current Wells Hydroelectric Project (Wells Project) license will expire on May 31, 2012. The Public Utility District No. 1 of Douglas County (Douglas PUD) owns and operates the Wells Project and is using the Integrated Licensing Process (ILP) for relicensing as promulgated by Federal Energy Regulatory Commission (FERC) regulations issued July 23, 2003 (18 CFR Part 5). As part of the Wells Project relicensing process, Douglas PUD is required to obtain a water quality certificate pertinent to section 401 of the Clean Water Act. The Washington State Department of Ecology (WDOE) is responsible for the issuance of a 401 certificate as well as administering the state's Water Quality Standards. As part of the 401 certification process, Ecology must assess the effect of a hydroelectric project's operations on the transport and accumulation of toxins within the sediment as they apply to the numeric and narrative criteria of the state standard.

The Aquatic Resource Work Group (RWG), which is composed of stakeholders (including WDOE) and Douglas PUD staff, was formed for the purposes of identifying issues that may require study during the Wells Project relicensing, identified the need to collect more information with regards to DDT and PCB in the lower Okanogan River within the Wells Project boundary and its potential human health effects related to recreational activities. In order to satisfy this request, the Aquatic RWG proposes a study to collect and analyze for the presence of toxins in fish tissue and at specific recreation sites located on the lower Okanogan River. These samples will be collected in an effort to address the human health concerns brought forth by the RWG.

In 2001-2002, WDOE conducted a technical assessment in support of the development of a Total Maximum Daily Load (TMDL) for 1,1,1-trichloro-2,2-bis[*p*-chlorophenyl]ethane (DDT) and polychlorinated biphenyls (PCBs) in the Lower Okanogan River. For the purposes of the 2001-2002 assessment, the Lower Okanogan River was defined as the portion of the river from the U.S./Canadian border at Lake Osooyos (RM 80.2) downstream to the town of Monse (RM 5.0). During this assessment, various mediums (water, sediment, and fish tissue) at various locations in the Okanogan River were assessed for concentrations of DDT and PCB. This study will augment the previous information collected during the development of the TMDL and will be consistent with the recommendations of the Water Quality Implementation Plan (WDOE, 2006) submitted by WDOE which provides recommendations to assure that DDT and PCB concentrations in the waters and fish tissues from the Okanogan River and its tributaries continue to improve with the goal of meeting the regulatory standards for these persistent bioaccumulative toxins.

Sampling locations for fish during the study will include all accessible reaches of the lower Okanogan River within Project boundary (RM 15.5 to RM 0.0). Sampling sites for sediment will include recreational sites of concern (e.g. swimming areas and boat launches) from the Okanogan River mouth up to RM 15.5. Study implementation is planned for the 2-year ILP study period (2008-2009) with sampling occurring in May 2008. Sampling frequency, timing, and methodology as well as sample analysis will be consistent with the 2001-2002 WDOE TMDL Technical Assessment as outlined in Serdar (2003) and WDOE's "Water Quality Certification for Existing Hydropower Dams: Preliminary Guidance Manual (September 2004)."

A technical report of the study will be produced to assist the Aquatic RWG in determining the concentration of DDT and PCBs in recreational fish species and in swimming areas of the lower Okanogan River within Project boundary. The information may inform the development of an appropriate information and education program to address the human health risks towards recreational use by the public in the lower Okanogan River.

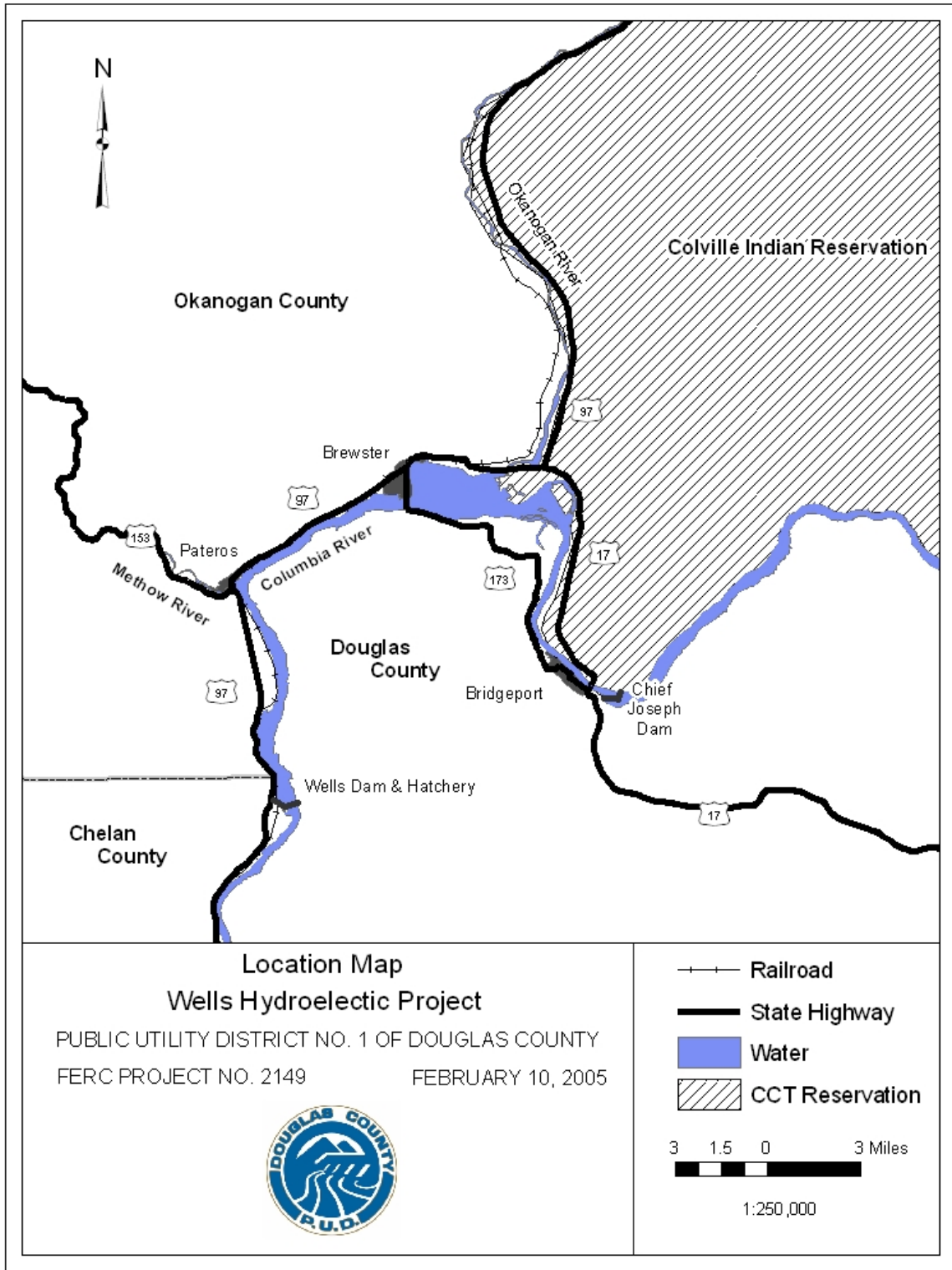
## **1.0 INTRODUCTION**

### **1.1 General Description of the Wells Hydroelectric Project**

The Wells Hydroelectric Project (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 Hydroelectric Project, owned and operated by the United States Army Corps of Engineers (COE), and 42 miles upstream from the Rocky Reach Hydroelectric Project, owned and operated by Public Utility District No. 1 of Chelan County (Chelan PUD). 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 Public Utility District No. 1 of Douglas County (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. Fish passage facilities reside on both sides of the hydrocombine, which is 1,130 feet long, 168 feet wide, with a crest elevation of 795 feet in height.

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. The normal maximum water surface elevation of the reservoir is 781 feet (Figure 1.1-1).



**Figure 1.1-1      Location Map of the Wells Project**

## 1.2 Relicensing Process

The current Wells Project license will expire on May 31, 2012. Douglas PUD is using the Integrated Licensing Process (ILP) as promulgated by FERC regulations issued July 23, 2003 (18 CFR Part 5). Various state and federal agencies, tribes, local governments, non-governmental organizations and the general public will participate in the Wells Project ILP. During the ILP, information needs related to the relicensing of the Wells Project will be identified. All study plans intended to meet these information needs will be prepared in a manner that addresses each of the required seven FERC criteria described in 18 CFR § 5.9(b).

18 CFR § 5.9(b) Content of study request. Any information or study request must:

- (1) Describe the goals and objectives of each study and the information to be obtained;
- (2) If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
- (3) If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study;
- (4) Describe existing information concerning the subject of the study proposal, and the need for additional information;
- (5) Explain any nexus between project operation and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
- (6) Explain how any proposed study methodology is consistent with generally accepted practices in the scientific community or, as appropriate, considers relevant tribal values and knowledge. This includes any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration;
- (7) Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

All study plans submitted to FERC will be reviewed by Douglas PUD and the applicable Resource Work Group(s) to determine if studies proposed will fill the information needs related to the Wells Project Relicensing. Any dispute over alternative study methods, that cannot be reconciled with stakeholders, will be decided by FERC.

## 2.0 GOALS AND OBJECTIVES

The objective of the study is to determine the concentration of the insecticide 1,1,1-trichloro-2,2-bis[*p*-chlorophenyl]ethane (DDT) and polychlorinated biphenyl (PCB) in recreational fish species and in swimming areas of the lower Okanogan River (up to RM 15.5) within the Wells Project boundary.

Tasks to be completed toward the achievement of the goal include:

- Collect and analyze sediment samples for DDT and PCBs from specific recreational sites (i.e., swim areas and boat launches) in the lower Okanogan River up to RM 15.5.



- Collect and analyze fish tissue for DDT and PCBs from recreational fish species of interest consumed by tribal and recreational anglers.

The information gathered from this monitoring effort will assist the Aquatic RWG in determining the concentration of DDT and PCBs in recreational fish species and in swimming areas of the lower Okanogan River within the Wells Project boundary. The information may inform the development of an appropriate information and education program to address the human health risks towards recreational use by the public in the lower Okanogan River.

### **3.0 STUDY AREA**

The study area consists of waters within the Okanogan River from its confluence with the Columbia River up to RM 15.5.

### **4.0 BACKGROUND AND EXISTING INFORMATION**

The Okanogan River originates in the Cascade Mountains north of the international border in British Columbia. The Okanogan River is characterized by a series of lakes north of international boundary and a free flowing river flowing out of Osoyoos Lake, which straddles the boundary; 78 miles to its confluence with the Columbia River (WDOE, 2004). The lower 15.5 miles of the Okanogan River before it joins with the Columbia River is considered within the Wells Project boundary.

Beginning in the early 1970s, Canadian investigators began documenting high levels of DDT in fish collected from British Columbia lakes along the mainstem Okanogan River (Northcote et al., 1972). In 1983, WDOE collected data which revealed DDT and PCB contamination in fish from the Okanogan River below the Canada border (Hopkins et al., 1985). Since then a number of WDOE surveys have verified DDT and PCB contamination in the basin (Johnson and Norton, 1990; Davis and Serdar, 1996; Johnson et al., 1997; Serdar et al., 1998, Serdar, 2003).

The WDOE Environmental Assessment Program prepared an assessment of total maximum daily loads (TMDLs) of DDT and PCBs in the lower Okanogan River basin, including Osoyoos Lake. For the purposes of the WDOE assessment, the Lower Okanogan River was defined as the portion of the river from the U.S./Canadian border at Lake Osoyoos (RM 80.2) downstream to the town of Monse (RM 5.0). Sampling conducted during 2001-2002 examined DDT and PCB concentrations in the water column of the mainstem Okanogan River, water in tributary streams, sewage treatment plant (STP) effluent and sludge, and cores of bottom sediments. Composite samples of three species of fish – carp (*Cyprinus carpio*), mountain whitefish (*Prosopium williamsoni*), and smallmouth bass (*Micropterus dolomieu*) also were analyzed for DDT and PCBs. Data from these samples were used in conjunction with historical data to develop the TMDLs (Serdar, 2003).

Results of the 2001-2002 sampling (Serdar, 2003) suggest that:

1. DDT concentrations in the mainstem water column typically decreased from upstream sites (Okanogan River at Zosel Dam) to downstream sites (Okanogan River at Malott). PCBs were not detected in the mainstem.
2. Only small loads of DDT and PCBs are delivered to Osoyoos Lake and the lower Okanogan River through tributary streams and STPs.
3. Generally, lipid-normalized t-DDT and t-PCB concentrations in fish tissue decreased from sites upstream to downstream (Oroville, Riverside-Omak, Monse) with the exception of large-sized smallmouth bass which had higher concentrations downstream at the Monse site.
4. t-DDT and t-PCB concentration trends decreased in the 1980s followed by steady concentrations in the last decade in the lower Okanogan system.
5. DDT concentrations in the Osoyoos Lake core sediments were an order of magnitude higher than core sediments of approximately equal age from the Okanogan River near the mouth (Monse).
6. PCB concentrations in core samples were low, with concentrations around 1 ng/g t-PCB. Concentrations from both sites (Osoyoos Lake and lower Okanogan River: Monse) were similar suggesting that low-level PCB sources such as STPs between the lake and the river mouth keep depositional areas enriched with low levels of PCBs. Little is known about sources of PCB contamination in the lower Okanogan River basin, except that no major sources appear evident. It is notable that while PCBs in edible fish tissues may be a human health concern at the levels reported, it is not uncommon to find similar levels in other Washington waters where no discernible sources of PCB exist (Davis and Johnson, 1994).
7. Re-suspended Osoyoos Lake sediments account for nearly all of the measured DDT loads in the lower Okanogan River which may explain the disparity between DDT load delivery and measured loads in the water column of the lower mainstem Okanogan River.
8. The Colville Tribes conducted a longitudinal transect of DDT in 40 lower Okanogan River sediments from Osoyoos Lake outlet to the mouth in 2001 (Hurst and Stone 2002). Aside from two locations, little DDT was found. 60% of sites had t-DDT less than the detection limit (0.5 ng/g) and another 35% had a concentration of 1-10 ng/g (mostly less than 2 ng/g). Two sites with significant concentrations were found just below the Osoyoos Lake outlet and just downstream of Elgin Creek (RM 28.4).
9. Acute toxicity is not considered to be a concern at concentrations in the lower Okanogan River basin.
10. According to the report, there are few realistic options for obtaining meaningful reductions in DDT and PCB loading to Osoyoos Lake and the lower Okanogan River. It appears that most loading to fish occurs internally through direct or indirect exposure to sediments. Natural attenuation will eventually reduce levels through dilution and capping, especially downstream of the Similkameen River confluence.

In conjunction with the TMDL technical assessment (2003) and TMDL (2004), WDOE submitted a Detailed Implementation Plan (WDOE, 2006) to EPA as required by the Clean Water Act in July 2006. This report provides direction to assure that DDT and PCB concentrations in the waters and fish tissues from the Okanogan River and its tributaries continue

to improve with the goal of meeting the regulatory standards. The report's main recommendations are the continued monitoring of fish tissues at 5 year intervals and preventative measures that would minimize the amount of contaminants entering the river from the surrounding watershed.

Currently, WDOE is planning a two-year monitoring program (2007-2008) for toxins in the lower Okanogan River as part of a larger statewide aquatic toxins assessment. WDOE's long-term monitoring station, located near Malott (RM 17) just upstream of the Wells Project boundary, also samples monthly for conventional parameters and metals; however, water samples, fish tissue and sediment cores are not collected for analysis of toxins.

## **4.1 Aquatic Resource Work Group**

As part of the preparation for the relicensing of the Wells Project, Douglas PUD established an Aquatic Resource Work Group (RWG) which began meeting informally in November, 2005. This voluntary effort was initiated to provide stakeholders with information about the Wells Project, to collaboratively identify potential resource issues related to Project operations and relevant to relicensing, and to develop preliminary study plans to be included in the Wells Pre-Application Document (PAD).

Through a series of meetings, the Aquatic RWG cooperatively developed a list of Issue Statements, Issue Determination Statements and Agreed Upon Study Plans. An Issue Statement is an agreed upon definition of a resource issue raised by a stakeholder. An Issue Determination Statement reflects the RWG's efforts to review the existing project information and to determine whether an issue matches with FERC's seven criteria and would be useful in making future relicensing decisions. Agreed Upon Study Plans are the finished products of the informal RWG process.

Based upon these meeting and discussions, the Aquatic RWG is proposing to conduct a study to determine the concentration of DDT and PCBs in recreational fish species and in swimming areas of the lower Okanogan River within the Wells Project boundary. This study will help to inform future relicensing decisions through the 401 water quality certification process and will fill data gaps that have been identified by the Aquatic RWG.

## **4.2 Issue Statement**

### **Issue Statement (PAD Section 6.2.1.4)**

Project operations may affect the input, movement, accumulation and retention of toxins (sediment dynamics and water column) originating from the Okanogan River subbasin and their potential effects on aquatic organisms and humans.

### **Issue Determination Statement (PAD Section 6.2.1.4)**

The Okanogan River likely contains toxins within the sediment and in the water column. These pollutants are discharged into the river from mining, industrial and agricultural activities

upstream of the Project boundary. There are numerous reports by the Washington State Department of Ecology and the Colville Tribes documenting the presence and levels of toxins within the Okanogan Basin. Of the five assessments conducted on toxins in the Okanogan River most have focused on the presence of toxins within the water column, sediment and within the fish found in the Okanogan River.

The lower Okanogan DDT PCB Detailed Implementation Plan (WDOE, 2006) submitted to and approved by the Environmental Protection Agency for the purpose of providing direction to assure that DDT and PCB concentrations are reduced to a level that meet regulatory standards recommends continued monitoring of fish tissues from the lower Okanogan River.

The resource work group agrees that a study is needed during the two-year ILP study period. The study would assess the concentration of DDT and PCBs found within fish tissues collected from the lower Okanogan River. This study would also collect sediment samples from specific recreation areas located between the mouth of the Okanogan River upstream to RM 15.5.

## **5.0 PROJECT NEXUS**

The WDOE is responsible for the protection and restoration of the state's waters. WDOE has adopted water quality standards that set limits on pollution in lakes, rivers, and marine waters in order to protect water quality. WDOE's water quality assessment of the state's waterbodies lists the status of water quality for a particular location in one of 5 categories (Category 1-5) recommended by the Environmental Protection Agency (EPA). This assessment represents the integrated report for Sections 303(d) and 305(b) of the Clean Water Act. Categories 1-4 represent the status of waters for the 305(b) report, while Category 5 represents those waters placed on the 303(d) list. Waters placed on Category 5 require the preparation of TMDLs, which are an integral tool in the work to clean up polluted waters.

The lower Okanogan River within the Project boundary was 303(d) listed for high levels of total PCB's, 4,4'-DDE and 4,4'-DDD in fish tissues in 1998. As a result of this listing, a TMDL (WDOE, 2004) was developed to address these impaired parameters in this location. Currently, the EPA-approved 303(d) list submitted in 2004 no longer includes these parameters for the lower Okanogan River as they have been re-assessed as Category 4a (impaired waters with a TMDL) waters in the Washington State Water Quality Assessment 305(b) report. The information resulting from an assessment of fish tissue and sediments in the lower Okanogan River will assist the Aquatic RWG in the development of licensing requirements through the 401 water quality certification process.

## **6.0 METHODOLOGY**

In order to collect information that will be informative of the health risks from recreational activities within the lower Okanogan River sampling stations for fish tissue will be located throughout the lower 15.5 miles of the river. Field sampling will consist of one sampling event in May of 2008 during the spring run-off to be consistent with the 2001-2002 WDOE assessment (sampling during high water).

All methods implemented will be consistent with the 2001-2002 WDOE TMDL Technical Assessment as outlined in Serdar (2003) if appropriate in addressing the objectives of this study. Additionally, any components of the study not clearly specified in Serdar (2003) will be consistent with WDOE's "Water Quality Certification for Existing Hydropower Dams: Preliminary Guidance Manual (September 2004)." Quality assurance plans will meet State and Federal guidelines.

Sediment samples will be collected using standard aquatic toxicology protocol. Fish for fish tissue analysis will be collected either via electrofishing or angling, when appropriate. Fish species of interest will be determined by the Aquatic RWG but should be fish normally consumed by either tribal or local recreational anglers and consistent with WDOE's Detailed Implementation Plan (2006). Biological data (species, length, weight and age) will be collected for all fish samples.

All sediments samples and fish tissue samples will be stored to meet quality specifications prior to transport and delivery to a qualified laboratory for analysis. Parameter analysis will also be consistent with Serdar (2003) and will consist of tests to determine the concentrations of all DDT analogs and PCBs per each sample.

## **7.0 STAFFING AND EQUIPMENT REQUIREMENTS**

Based upon discussions with the Aquatic RWG regarding specific study design and study needs, Douglas PUD will secure the assistance of a qualified consultant to conduct the field portion of the study in addition to a qualified water quality and toxicology laboratory to analyze samples.

The technical skills necessary to complete the study are knowledge of aquatic toxicology with an emphasis on transport and accumulation, water quality sampling equipment and protocol consistent with WDOE's preliminary guidance manual, motor boat operation and safety, data acquisition and management, and Washington State water quality standards.

A Washington State Collection Permit will be required for fish sampling. The consulting firm contracted to implement the field sampling portion of the study will be responsible for obtaining this permit prior to the start of the study.

## **8.0 BUDGET**

The total estimated hours for the Lower Okanogan River DDT/PCB assessment is approximately 185 person hours. The allocation of these hours is approximately 25 hours for study plan development; 36 hours for coordination and permitting; 76 hours for field activities; and 48 hours for data analysis and reporting. Labor costs are estimated to be \$25,000. Equipment costs and expenses related to field activities (sediment sampling equipment, boat use, travel, shipping, etc.) are estimated to be \$6,000. Laboratory costs for the analysis of fish tissue and sediments are estimated to be \$20,000. Total planning level costs for this effort are approximately \$51,000.

## 9.0 SCHEDULE

Planning for this study will begin in late 2007, shortly after the issuance of FERC's Study Plan Determination in October 2007. Activities to obtain a Washington State Scientific Collectors Permit will be implemented during late 2007. Field sampling will take place during the spring of 2008 with an Initial Study Report due to stakeholders by October 2008. A final report will be provided to FERC and the stakeholders by October 2009.

## 10.0 REFERENCES

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