

# **APPENDIX A**

**MERCURY DISTRIBUTION AND  
BACKGROUND EVALUATION  
SUPPLEMENTAL SEDIMENT  
SAMPLING AND ANALYSIS PLAN  
NORTHWESTERN LAKE  
CONDIT DAM REMOVAL PROJECT  
FERC PROJECT No. 2342  
WHITE SALMON, WASHINGTON  
KLEINFELDER PROJECT NO. 53886 / 5**

**June 12, 2007**

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June 12, 2007  
Kleinfelder Project Number 53886 / 5

Mr. Tim Hemstreet, P.E.  
PacifiCorp Hydro Resources  
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Portland, Oregon 97232

**Subject: Supplemental Sediment Sampling and Analysis Plan  
Northwestern Lake – Condit Dam Removal Project  
FERC Project No. 2342  
White Salmon, Washington**

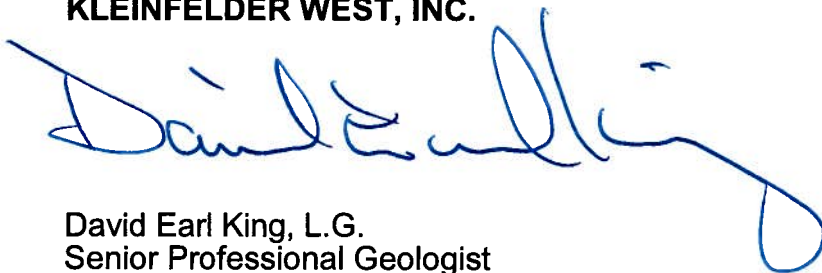
Dear Mr. Hemstreet:

We are pleased to present our Supplemental Sampling and Analysis Plan for the above referenced project. We trust the information contained in this Supplemental Sampling and Analysis Plan will meet your needs at this time.

We appreciate this opportunity to provide our services to you. Should you require additional information or have any questions regarding this report, please contact us at (503) 644-9447.

Sincerely,

**KLEINFELDER WEST, INC.**



David Earl King, L.G.  
Senior Professional Geologist

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## 1.0 INTRODUCTION

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In December 2006, Kleinfelder, under contract to PacifiCorp, collected sediment characterization samples from Northwestern Lake and reported the results in a *Sediment Sampling and Analysis Report* (March 2007). This investigation determined that the average concentration of mercury in the fine silts impounded behind Condit Dam is about 0.7 milligrams per kilogram (mg/Kg). During this work, the maximum detected concentration of mercury in the sediments was found to be 2.03 mg/Kg in the surface sediment at a location (boring B-1) near the dam. Laboratory bio-assays conducted on the sediment collected during this field work indicated that the sediment had no adverse effect on the life cycles of test species.

The applicable current regulatory screening levels for mercury in fresh water sediments are found in the *Northwest Regional Sediment Evaluation Framework* (NWRSEF) and are 0.28 mg/Kg (lower screening level, SL1) and 0.75 mg/Kg (upper screening level, SL2). The NWRSEF states, "The lower screening level (SL1) corresponds to a concentration below which adverse effects to benthic organisms would not be expected, and the upper screening level (SL2) corresponds to a concentration at which minor adverse effects may be observed in the more sensitive groups of benthic organisms.

Because mercury concentrations were found in excess of the upper screening level (SL2), the Regional Sediment Evaluation Team (RSET), composed of representatives of various state and Federal regulatory agencies, requested that PacifiCorp collect additional information to confirm sediment concentrations in Northwestern Lake, establish the bio-availability of mercury found in the sediments through fish tissue analysis, and ascertain background mercury sediment concentrations in the local area.

This document presents a Supplemental Sampling and Analysis Plan that will support these data needs.

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## 2.0 PROJECT DESCRIPTION

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The following sections describe the project location and description, the site ranking criteria, and proposed dredging and sampling parameters.

### 2.1 PROPOSED ACTION

Northwestern Lake sediments are proposed to be released in an “open-water” fashion during the decommissioning of the Condit Dam. Since the construction of the dam and formation of the lake, the natural transport of sediments by the White Salmon River has been disrupted and the sediments previously transported to the Columbia River are now deposited in the slack water of Northwestern Lake. The current estimate of impounded sediment volume is 2.3 million cubic yards.

The removal of Condit Dam would initiate the discharge of a portion of the impounded sediment into the lower White Salmon River, a tributary of the Columbia River. As the U.S. Army Corps of Engineers (USACOE), Portland District stated in a letter dated December 15, 2004, “Because the sediment will settle out within the river systems, the project would result in unconfined aquatic disposal of sediments into the Lower Columbia River system”. Unconfined aquatic disposal of sediments is regulated by the USACOE. The Regional Sediment Evaluation Team (RSET), composed of the USACOE’s Seattle District, Portland District, Walla Walla District, and Northwestern Division, in collaboration with the U.S. Environmental Protection Agency (EPA) Region 10, Washington Department of Ecology (WDOE), Washington Department of Natural Resources (WDNR), Oregon Department of Environmental Quality (ODEQ), Idaho Department of Environmental Quality (IDEQ), National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (US F&WS), has developed a framework for evaluating sediments and the suitability of disposing those sediments in the Pacific Northwest. This framework is presented in the *Northwest Regional Sediment Evaluation Framework (NWRSEF), Interim Final, September 2006*.

The sediments were physically and chemically characterized in 1994 and again in 2006. To assist with the continued evaluation of the accumulated sediment in Northwestern Lake, Kleinfelder has prepared this Supplemental Sampling and Analysis Plan (SSAP). The objective of this SSAP is to provide a systematic approach to collecting sediment characterization data that will supplement the existing data presented in the Condit Hydroelectric Project (FERC Project No. 2342) Northwestern Lake Sediment

Characterization Study, White Salmon, Washington, conducted in 1994 (the 1994 Condit Study).

## 2.2 PROJECT DESCRIPTION

The Condit Hydroelectric Project is located along the White Salmon River above Washington State Highway 14 on the border between Klickitat and Skamania Counties, approximately 3.3 miles upstream of the confluence of the White Salmon and Columbia Rivers (refer, Figure 1). The U.S. Geological Survey (USGS) topographic coordinates for the reservoir are Sections 2 and 3, Township 3 North, Range 10 East, Willamette Meridian (Sec. 2 and 3/T3N/R10E W.M.). The Condit Project includes a 125-foot high concrete dam across the White Salmon River that diverts water into a one-mile long woodstave flowline. The woodstave flowline conveys water to a headhouse, where the water is diverted into two pipes (penstocks) for delivery through two turbine generators in the powerhouse downstream of the dam.

The Condit Project is owned and operated by PacifiCorp. It has been in operation since its construction in 1913. The name of the reservoir behind the dam is Northwestern Lake. Northwestern Lake is approximately 10,380 feet long with a surface area of approximately 92 acres. The pool elevation listed on the USGS Northwestern Lake topographic map (1983 Edition) is 294 feet mean sea level (msl). At the time of its construction, the depth of water in the reservoir ranged from approximately 15 to 110 feet. Since the construction of the dam, the reservoir has been collecting sediments brought in by the White Salmon River. As of 1990, the depth of water in the reservoir reportedly ranged from approximately 3 to 85 feet.

Following the construction of the dam, a sawmill was established on a bay on the south shore of the reservoir, immediately upstream of the dam. This sawmill remained in operation for several decades. The exact start up and shut down dates of the sawmill operation are unknown, except that it closed sometime prior to 1960. As part of the development of the Work Plan for Sediment Characterization prepared in 1994, a site reconnaissance was conducted of the upland areas around Northwestern Lake and upstream along the White Salmon River. No industrial activity was observed. Land use consisted primarily of residential usage, with some orchards located on the eastern bank of the reservoir. A site reconnaissance of the upstream area of the White Salmon River was also conducted on March 2, 2005, to confirm that no new sources of possible environmental contaminants had been developed since 1994. This site reconnaissance

identified a new rock quarry located just east of Highway 141 (about 0.5 miles east of the northern end of the Lower Basin of Northwestern Lake). The rock quarry could be considered a new source for fine sediment, but not environmental contaminants. No new sources that would introduce contaminants not identified in the *1994 Condit Study* were discovered during the March 2, 2005 reconnaissance.

### 2.3 PREVIOUS INVESTIGATIONS

Bathymetric surveys of the reservoir have been conducted by PacifiCorp in 1990, 1997, and 2006. Based upon a comparison of preconstruction and bathymetric topography, a channel profile, showing the existing water depths and sediment thicknesses, has been developed by others. Based upon this document, the existing water depth within the reservoir appears to vary from approximately 3 to 85 feet, with an accumulated sediment thickness that varies from approximately 13 to 65 feet and an average thickness of approximately 31 feet. The current volume of these sediments has been estimated by others to be 2.3 million cubic yards.

The sediments in Northwestern Lake, located behind Condit Dam, were investigated by advancing ten borings for the collection of sediment and bedrock samples in 1994. The results of the 1994 investigation were presented in a report prepared by Squier Associates, entitled "*Condit Hydroelectric Project (FERC Project No. 2342), Northwestern Lake Sediment Characterization Study, White Salmon, Washington,*" and dated April 29, 1994. The 1994 investigation was developed in general accordance with the protocols of the Puget Sound Dredge Disposal Analysis (PSDDA) program.

The 1994 investigation consisted of exploratory borings, which were drilled with a JKS Winkie Drill equipped with a 2.97-inch diamond bit positioned on a barge that moved to 10 locations on Northwestern Lake. Eight of those locations were chosen using a random number selection process. The remaining two borings were located at the extreme upstream and downstream limits of barge access within the reservoir. As part of the *1994 Condit Study*, 45 geotechnical and 39 environmental samples were collected at various depths from the 10 boring locations.

The 1994 sediment characterization testing program consisted of both geotechnical and environmental testing. The geotechnical testing parameters included the following:

- soil classification,
- moisture content,

- grain-size analysis, and
- unit weight determination.

The environmental testing included a chemical analytical testing program for inorganic metals and organic compounds considered to be of concern by the Washington Department of Ecology at that time.

The geotechnical testing disclosed that the reservoir sediments consist mainly of fine-grained materials in the downstream deep pool area, and granular materials in the upstream area. Located in the middle of the reservoir is a transition area where the upstream granular sediments have overridden the deep pool fine-grained sediments.

The interpretation of the 1994 environmental testing results indicated that the metal concentrations were within expected background levels. However, remnant pesticides and herbicides were detected in the intermediate age sediments in the reservoir.

A second investigation of the sediments was conducted by Squier Associates in 1997. The results of that second investigation are presented in a report entitled, *“Additional Geotechnical Exploration and Laboratory Testing at the Condit Hydroelectric Project (Contract No. P018780)”* and dated November 20, 1997.

In 1998, the cooperative interagency/intergovernmental team consisting of the USACOE, EPA Region 10, WDOE, WDNR, and ODEQ produced the Dredged Material Evaluation Framework, Lower Columbia River Management Area (DMEF). The DMEF established a tiered system for ranking of proposed dredging sites. The *DMEF* Tier I used existing information to conclude whether or not there is “enough information to determine if project meets exclusion ranking”. Exclusionary Ranking was a Management Area Ranking that provided the least stringent characterization requirements. Projects from specific areas listed in the *DMEF* were awarded the Exclusionary Ranking. Northwestern Lake currently was not one of the listed zones for Exclusionary Ranking. The Exclusionary Criteria also included sediments that were to be used for beach enhancement and sediments whose final placement will be the same substrate as their origin. It is our understanding that the Northwestern Lake sediments did not meet either criterion.

Exclusionary Ranking was also awarded to locations whose sediments had at least 80% sand retained on a number (No.) 230 sieve (i.e., less than 20% fines) and a Total Volatile Solids (TVS) content of less than 5.0%. Mechanical sieve analysis of the

sediments collected from the upstream portion of Northwestern Lake demonstrated that those sediments met the criterion of having less than 20% fines.

However, in order to determine if the 1994 data was suitable, the data was first compared to the framework of Tiers II and IIB. Consequently, it was concluded that the sediments from Northwestern Lake (as one discrete unit) did not meet the criteria for Exclusionary Ranking. It was further concluded that the Low Management Area Ranking was appropriate. The Northwestern Lake sediment source location met the following criteria for Low Management Area Ranking:

- Low concentrations of chemicals of concern (COC),
- Some locations of higher percentages of fines, and
- Few sources of potential contamination

The DMEF allowed for the creation of Dredged Material Management Units (DMMUs), which are subdivisions of a sediment-generating project site that represent sediments similar in nature. Based on this understanding, the Northwestern Lake sediments were segregated into two DMMUs: the lower basin sediments and the upstream gravels. The segregation into two DMMUs provided for one Low Management Area Ranking of homogenous sediments (Lower Basin) and one area of Exclusionary Ranking (Upper Reservoir). The homogeneity of the sediments was supported by the 1994 mechanical sieve data. Based on the information presented in the *1994 Condit Study*, the lower basin included about 51% of the sediments (approximately 1,122,000 cubic yards).

The DMEF requirement for a homogeneous Low Management Area Ranking DMMU was 1 sample per 100,000 cubic yards. Accordingly, 12 samples were proposed for the 1,122,000 cubic yards of sediments.

In December 2006, Kleinfelder (formerly Squier | Kleinfelder) conducted additional sediment sampling in the lower basin of Northwestern Lake in order to obtain current data on the chemical characterization of the fine-grained sediments in the lower basin. A total of 15 probes were advanced into the fine-grained sediments for the collection of 12 project and 3 quality control samples. The analytical results were compared to the screening levels provided in the USACOE's *Dredged Material Evaluation Framework, Lower Columbia River Management Area*, November 1998 (DMEF). The Sampling and Analysis Plan (SAP) developed for the 2006 phase of sediment sampling was approved by the USACOE in August 2006.

The data that was collected by the implementation of the 2006 SAP was intended to satisfy the requirements of the USACOE in accordance with the applicable Tier IIB and Tier III testing guidelines as presented in the DMEF. However, RSET introduced the Interim Final of the NWRSEF in September 2006. The NWRSEF provides more stringent fresh water screening criteria, compared to marine screening criteria, and for those screening criterion to be divided into two discrete levels (SL1 and SL2). The mercury concentrations reported for 4 of the 12 project sediment samples and the three duplicate samples collected in December 2006 exceeded the SL2 criterion (0.75 mg/Kg). Therefore, the preparation of this SSAP to confirm sediment mercury concentrations, establish mercury background levels, and assess bioaccumulation was requested by members of the RSET.

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### 3.0 SAMPLING AND ANALYSIS TASKS

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The following section discusses the three primary tasks that will be performed during the Supplemental Sediment Sampling for Northwestern Lake.

#### 3.1 NORTHWESTERN LAKE SEDIMENT RESAMPLING

Seven surface sediment samples will be collected in the vicinity of the location previously identified as B-1 in the *Sediment Sampling and Analysis Report, Northwestern Lake Condit Hydroelectric Project, FERC Project No. 2342, White Salmon, Washington, Kleinfelder Project No. 53886/4, March 2007* (refer, Figure 2). In addition, one duplicate sample will also be collected at that time. The sediment samples will be collected using a bottom dredge capable of securely recovering an approximate 235 cubic inch sample.

Adequate sample volume will be collected from each location to provide for the proposed tests. In order to accomplish this, the sediment-filled bottom dredge will be emptied into either a 2-gallon, clean, stainless steel bowl or clean, dedicated, 5-gallon bucket immediately after retrieval. When an adequate volume of sediment has been obtained (approximately 360 cubic inches), the sediments will be transferred to the appropriate containers. The sampling containers will be clearly labeled with: the project name, sample identification, type of analysis to be performed, and date and time; and referenced by entry into the logbook.

##### 3.1.1 First Phase of Laboratory Analysis

All seven project samples and the one duplicate sample will be tested for the following:

- Mercury concentrations using EPA Method 7471A,
- Grain size determination using ASTM D422 and ASTM D2487,
- total solids using EPA Method 160.3M,
- total volatile solids (TVS) using EPA Method 160.4M,
- total organic carbon (TOC) using EPA Method ASTM D 4129-98M,
- ammonia using EPA Method 350.1M, and
- sulfides using Standard Method 9030M.

Grain size will be evaluated using the following sieve sizes: 5-inch; 2.5-inch; 1.25-inch; 0.63-inch; 0.31-inch; and numbers 5, 10, 18, 35, 60, 120, and 230. The fine-grained fraction (finer than No. 230 sieve) will be classified using hydrometer analysis.

Hydrogen peroxide will not be used in preparation for grain-size analysis. Sediment classification designation will be made in accordance with Unified Soil Classification System, ASTM D 2487. Water content will be evaluated in accordance with ASTM D 2216.

### 3.1.2 Second Phase of Laboratory Analysis

The sample with the highest mercury concentration will be further analyzed for the following tests:

- Elutriation testing preparation for analysis of mercury in the water column, and
- Bioassay Testing (*Hyalloella azteca* and *Chironomous tentans*) using ASTM 1706 and the accompanying replicate samples using the appropriate methodology.

## 3.2 BACKGROUND MERCURY DETERMINATION

### 3.2.1 Sample Locations

Samples will be collected from a variety of locations in the region of Northwestern Lake and submitted for mercury analysis. The State of Washington's Model Toxics Control Act (MTCA) provides the acceptable methods for defining the background concentrations of native elements. MTCA requires 10 samples for areas that have not been influenced by human activity. The ten sample locations include the following:

- The confluences of three minor tributaries (Little Buck Creek, Buck Creek, and Mill Creek) with Northwestern Lake (refer, Figure 2). This effort will be completed concurrently with Task 3.1 (refer, above).
- The confluences of Rattlesnake and Gilmer Creeks with the White Salmon River.
- The confluences of the White Salmon, Little White Salmon, and Wind Rivers with the Columbia River (refer, Figure 3).
- A marshy area associated with Trout Lake, on the White Salmon River (refer, Figure 3).
- Mud deposits associated with the Salt Creek lahar on the southwest side of Mount Adams (refer, Figure 3).

It is possible that one or more of these selected sample locations will not allow sample collection. If this occurs, alternate sites will be selected.

### 3.2.2 Sample Analyses

Since the mercury was detected in the fine-grained sediments impounded by Condit Dam, the evaluation will focus on evaluating the fine-grained fractions of the samples. In order to accomplish this, two grab samples will be collected from each location. The first grab sample will be submitted without pre-analysis preparation. The second grab sample (which will be of larger volume) will be mechanically sieved according to ASTM D422. Only the portion of the second grab sample passing the Number 230 sieve will be analyzed for mercury using EPA Method 7471A.

## 3.3 FISH TISSUE BIOACCUMULATION STUDY

### 3.3.1 Target Species

The bioaccumulation study will focus on three phyla: Chordata (fish), Mollusca (clams or mussels), and Arthropoda (crayfish). To accomplish this, the following field tasks will be performed:

- The mercury bioaccumulation study will require sacrificing fish since representative fish species will be collected and their tissues evaluated for mercury content. WDOE recommends collecting three composite samples containing five specimens of each available species. Most of the game fish that exist in Northwestern Lake are stocked annually and are not likely to exhibit mercury accumulation so hatchery stocked fish will be excluded. For the purposes of ease and efficiency, gill nets will be used for fish sampling. The gill net sampling will occur in approximately the same area where the lower reservoir sediment samples were collected in December 2006 and will be collected again as part of this scope of work. PacifiCorp Energy staff will place four 250-foot gill nets (3-inch stretch mesh) in the general vicinity of B-1. The nets will be set for 30-minute intervals, or until sufficient fish have been collected. Specimens will be kept in a cooler under ice and will be transported to a selected laboratory. PacifiCorp currently has a sampling permit issued by the State of Washington that covers the proposed fish collection effort.
- If an adequate molluscan community is present in the lake, the mercury bioaccumulation study will also include the evaluation of molluscan tissues for mercury content.

- In addition, the mercury bioaccumulation study will also evaluate the bioaccumulation of mercury in the tissues of crayfish, if they are present. Representatives from PacifiCorp will capture the crayfish using commercially available traps designed for the collection of crayfish.

### 3.3.2 Laboratory Analysis

The collected specimens will be transferred to a WDOE-recommended laboratory for analysis of mercury content in the soft tissues of the specimens. The processing of the specimens for analysis will be accomplished by the selected laboratory. The analysis for mercury will be conducted in accordance with EPA Method 1631 Appendix – Total Mercury in Tissue. The laboratory's report will include a detailed narrative, raw / instrument data, preparation sheets, and Quality Assurance (QA) review information.

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## 4.0 SAMPLING SCHEDULE AND OTHER PROCEDURES

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The following section describes the field activities and procedures during and after sediment sampling.

### 4.1 FIELD SAMPLING SCHEDULE

The sampling schedule is not currently set, but is anticipated to take place immediately after receiving approval from the RSET review panel. An updated sampling schedule will be set after approval of this SSAP. Sediment samples will be prepared in the field and delivered to the environmental testing laboratory.

### 4.2 FIELD NOTES

Field notes will be maintained during sampling operations. Included in the field notes will be the following information:

- Names of the sample equipment operator and person(s) collecting and logging the sediment samples
- Weather conditions
- Reservoir height (for samples collected in Northwestern Lake)
- Date and time of collection of each sample
- The sample station number
- Descriptions of sample
- Any deviation from the approved sampling plan

For each sample, the following data will be recorded on the field log:

- Depth interval of each sample point as measured from mudline
- Percent sample recovery
- Physical sediment description in accordance with the U.S. Soil Classification System, ASTM D 2487 (includes sediment type, density/consistency of sediment, color)
- Odor
- Visual stratifications and lenses
- Vegetation
- Debris
- Biological Activity (e.g., detritus, shells, tubes, bioturbation, live or dead organisms)
- Presence of oil sheen

- Any other distinguishing characteristics or features

#### **4.3 SAMPLE STATION POSITIONING**

The location of each sample point will be measured using a portable global positioning system (GPS). The locations of each sample point will be shown on the site plan. If the sample point is over water, water depths to the mudline at the sample locations will be measured directly by a weighted cloth or steel tape.

#### **4.4 DECONTAMINATION**

Following sample collection, sample collection devices will be thoroughly cleaned according to the following procedure:

- Wash with brush and trisodium phosphate or non-phosphate detergent
- Tap water rinse
- Rinse with distilled water

#### **4.5 SAMPLE TRANSPORT AND CHAIN-OF-CUSTODY PROCEDURES**

After sample containers have been filled, they will be packed on ice in coolers, as previously discussed. The coolers will be delivered to a qualified laboratory. Chain-of-custody procedures will commence in the field and will track delivery of the samples to the laboratory. Specific procedures are as follows:

- Individual sample containers will be packed to prevent breakage.
- The coolers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the cooler, and Kleinfelder's office name and address) to enable positive identification.
- A sealed envelope containing chain-of-custody forms will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- Signed and dated chain-of-custody seals will be placed on all coolers prior to removal from the site.
- Upon transfer of sample possession to the testing laboratory, the persons transferring custody of the coolers will sign the chain-of-custody form. Upon receipt of samples at the laboratory, the shipping container seal will be broken, and the receiver will record the condition of the samples.

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## 5.0 LABORATORY PHYSICAL AND CHEMICAL ANALYSIS

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The Northwestern Lake sediment samples will only be analyzed for the parameters listed in Section 3.

### 5.1 LABORATORY ANALYSIS PROTOCOLS

Laboratory testing procedures will be conducted in general accordance with the RSET's Recommended Analytical Methods (*Northwest Regional Sediment Evaluation Framework, Interim Final*, September 2006, Table 7-2).

#### 5.1.1 Chain-of-Custody

A chain-of-custody record for each set of samples will be maintained throughout all sampling activities and will accompany samples during shipment to the laboratory. Information tracked by the chain-of-custody records in the laboratory includes: sample identification number, date and time of sample receipt, analytical parameters required, and final disposition of the sample.

#### 5.1.2 Limits of Detection

*Northwest Regional Sediment Evaluation Framework, Interim Final*, September 2006, Table 7-2 includes the recommended Sample Quantification Limits (SQLs) for each analyte. For those tests where the laboratory's SQL's exceed the RSET-recommended SQLs, the laboratory Method Detection Limits (MDLs) will be used. For purposes of comparison with the chemical parameters shown in Table 7-2, laboratory SQLs / MDLs of all tested chemicals will be below the stated RSET Sediment Quality Guidelines. Failure to achieve this may result in a requirement to reanalyze. The testing laboratory will be specifically cautioned to comply with the detection limit requirements.

#### 5.1.3 Analysis Method Protocols

Sediment analysis protocols will follow the recommendations presented in RSET's Table 7-2.

## 5.2 LABORATORY WRITTEN REPORT

A written report will be prepared by the analytical laboratory documenting the activities associated with sample analyses. At a minimum, the following will be included in the report:

- Results of the laboratory analyses and Quality Control (QC) parameters
- Protocols used during analyses
- Chain-of-custody procedures, including explanation of any deviation from those identified herein
- Location and availability of the data
- As appropriate, this SSAP may be referenced in describing protocols

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## 6.0 REPORTING

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Reporting the results of the sediment sampling and analysis will be completed as described in the following sections.

### 6.1 QUALITY ASSURANCE (QA) REPORT

The project quality assurance representative will prepare a quality assurance report based upon activities involved with the field sampling and review of the laboratory analytical data. The QA/QC report will be incorporated into the Final Report.

### 6.2 FINAL REPORT

A written report will be prepared by Kleinfelder, documenting the activities associated with collection, transportation of samples, and chemical and physical analyses of the samples. The chemical and physical analysis laboratory reports will be included as appendices. The laboratory QC reports will be incorporated by reference. At a minimum, the following will be included in the final report:

- Type of sampling equipment used
- Protocols used during sampling and testing and an explanation of any deviations from the sampling plan protocols
- Descriptions of each sample
- Locations where the sediment samples were collected
- A plan view of the project showing the actual sampling locations
- Chain of-custody procedures used and explanation of any deviations from the sampling plan procedures
- Description of sampling procedures
- Final QA report
- Chemical and physical testing data and a comparison to the Sediment Quality Guidelines shown in Table 7-1 of the Northwest Regional Sediment Evaluation Framework, Interim Final, September 2006.
- Fish tissue sampling results

In addition, the 2006 data will be reformatted to conform to the RSET requirements and presented in the supplemental report. Included in the reformatted table will be the RSET SQLs, the laboratories MDLs, and Method Reporting Limits (MRLs).

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## 7.0 REFERENCES

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Kleinfelder, 2007. *Sediment Sampling and Analysis Report, Northwestern Lake, Condit Hydroelectric Project. FERC Project 2342, White Salmon, Washington.*

Squier Associates, 1994. *Condit Hydroelectric Project (FERC Project No. 2342) Northwestern Lake Sediment Characterization Study, White Salmon, Washington.*

Squier | Kleinfelder, 2005. *Suitability Evaluation of Northwestern Lake Sediment Characterization Study, Squier Associates, April 1994.*

United States Army Corps of Engineers (USACOE) et al., 1998. *Dredged Material Evaluation Framework, Lower Columbia River Management Area, November 1998.*

USACOE et al., 2006. *Interim Final Sediment Evaluation Framework For The Pacific Northwest, September 2006.*

USACOE, 2006. *April 12, 2006, Draft Letter to PacifiCorp Hydro Licensing / Hydro Resources.*

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## 8.0 LIMITATIONS

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We have prepared this plan for use by PacifiCorp, their authorized agents, and regulatory agencies for specific application to this site. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, Kleinfelder should be notified for review of the recommendations of this plan, and revision of such, if necessary.

This plan may be used only by PacifiCorp, their authorized agents, and regulatory agencies and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors may change over time and could materially affect our recommended sampling scheme. Therefore, this plan should not be relied upon after 24 months from its date of issue. Kleinfelder should be notified if use of the plan is delayed by more than 24 months from the date of this plan so that a review of site conditions can be made, and recommendations revised, if appropriate.

Any party other than PacifiCorp, their authorized agents, and regulatory agencies who wishes to use this plan shall notify Kleinfelder of such intended use. Based on the intended use of the plan, Kleinfelder may require that additional work be performed and that an updated plan be issued. Non-compliance with any of these requirements by the clients or anyone else will release Kleinfelder from any liability resulting from the use of this plan by any unauthorized party.

No warranty, expressed or implied, is made.



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- |                           |                    |                   |
|---------------------------|--------------------|-------------------|
| Local Road                | Utility/Pipe       | Private Airport   |
| Major Connector           | Railroad           | Cemetery          |
| State Route               | Point of Interest  | County Boundary   |
| Trail                     | County Seat        | State Boundary    |
| Interstate/Limited Access | Small Town         | Population Center |
| Toll Highway              | Summit             | Land              |
| US Highway                | Geographic Feature | Water             |
| Exit                      | Locale             | National Park     |

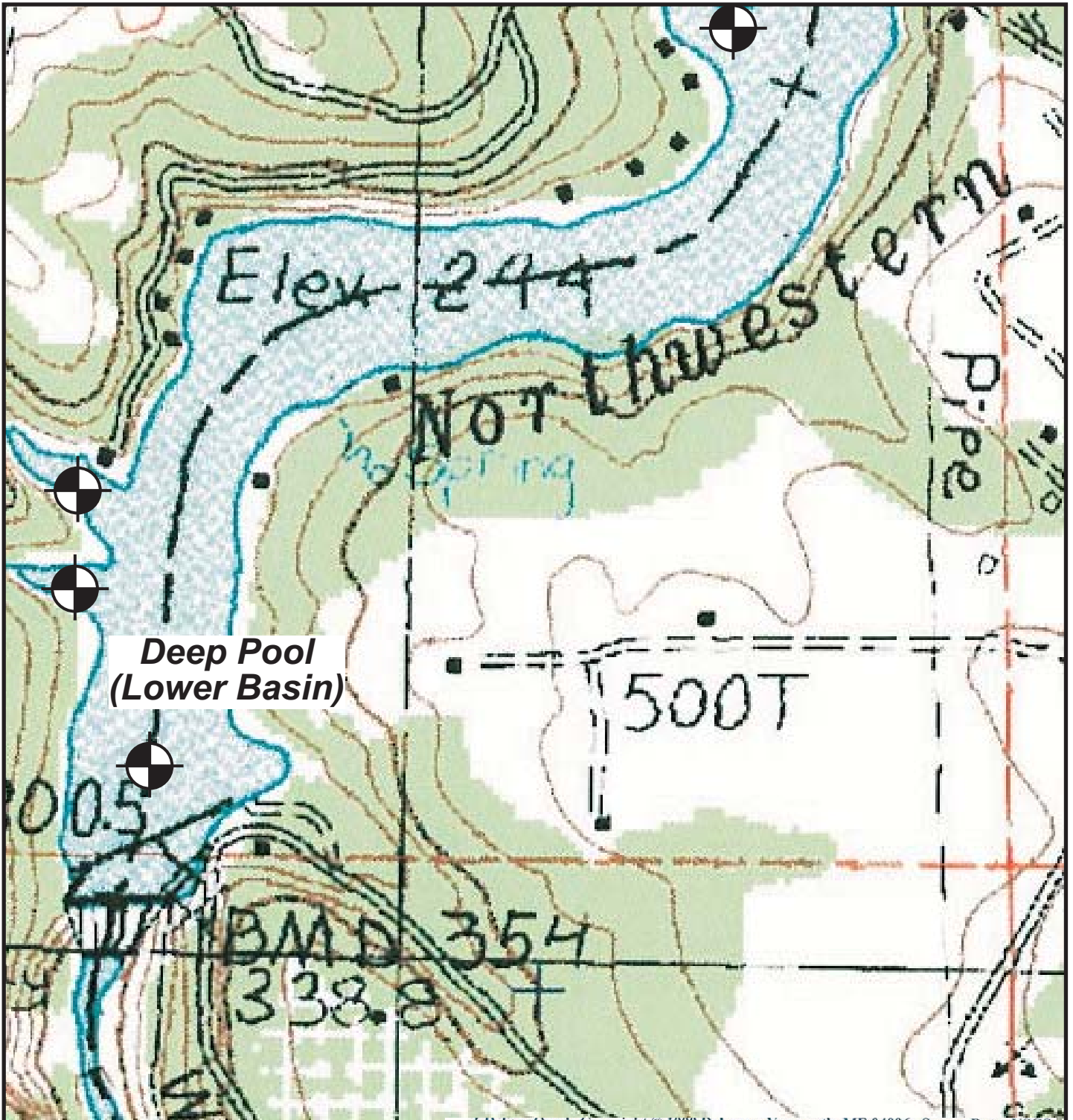


**SITE LOCATION MAP**  
**NORTHWESTERN LAKE**  
 CONDIT DAM SAMPLING AND ANALYSIS  
 WHITE SALMON, WASHINGTON

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PROJECT # 53886

FIGURE 1



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS



Scale  
650 ft.

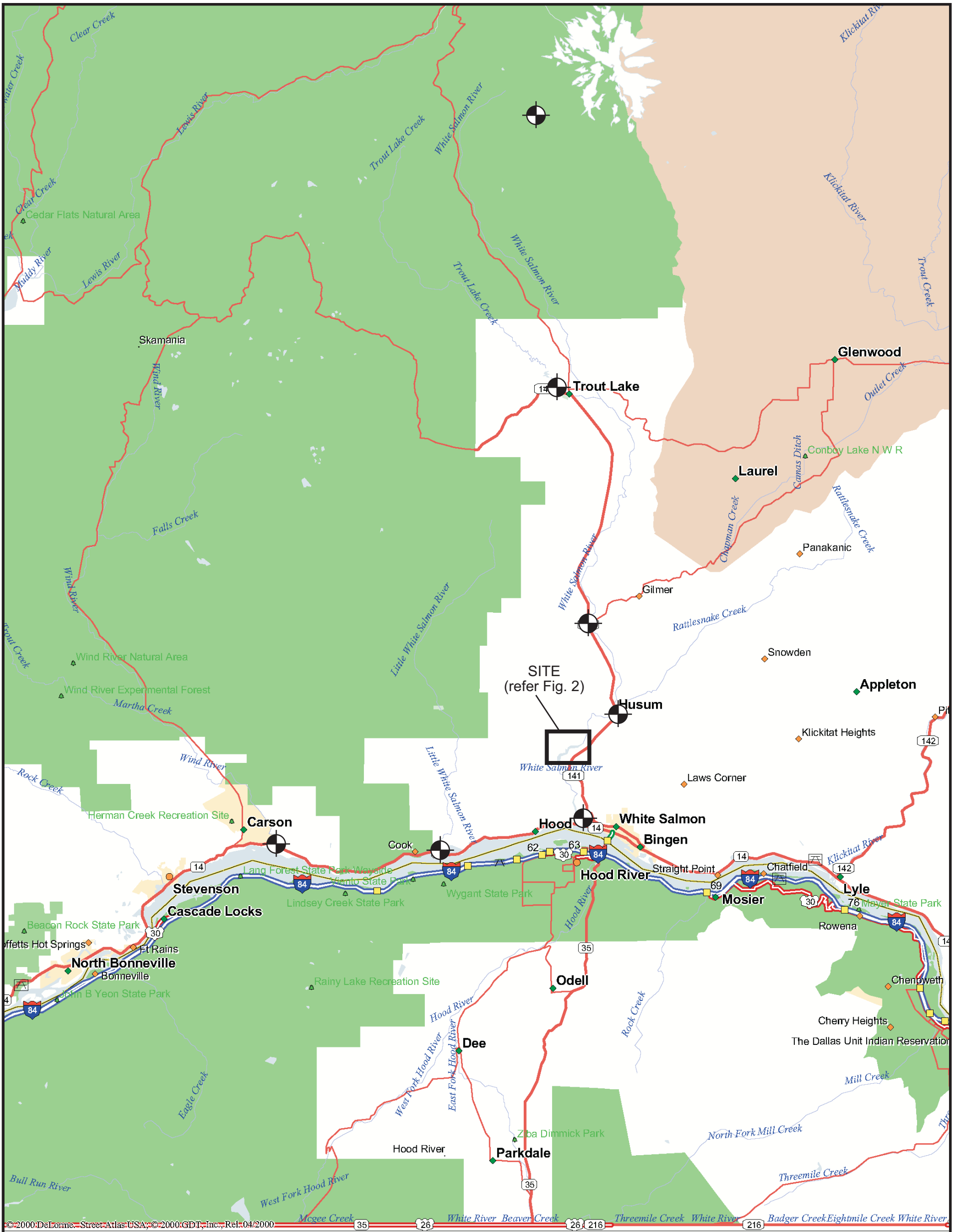
**LEGEND**



Proposed sampling location



**SAMPLING LOCATION MAP**  
**NORTHWESTERN LAKE**  
 CONDIT DAM SAMPLING AND ANALYSIS  
 WHITE SALMON, WASHINGTON



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Mag 11.00  
 Thu Jun 07 11:19 2007  
 Scale 1:250,000 (at center)  
 5 Miles  
 5 KM  
 Sample location

- |                           |                    |                             |                   |
|---------------------------|--------------------|-----------------------------|-------------------|
| Toll Highway              | Water              | Local Road                  | Small Town        |
| US Highway                | Indian Reservation | Major Connector             | Park/Reservation  |
| Rest Area with facilities | National Park      | State Route                 | Locale            |
| Exit                      | State Park/Forest  | Rest Area                   | City              |
| Point of Interest         | River/Canal        | Glacier                     | State Boundary    |
| County Seat               | Intermittent River | Interstate/Limited Access   | Population Center |
|                           |                    | Interstate/Unlimited Access | Land              |



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**SAMPLING LOCATION MAP**  
**WHITE SALMON RIVER**  
 CONDIT DAM SAMPLING AND ANALYSIS  
 WHITE SALMON, WASHINGTON

PROJECT # 53886

FIGURE 3



July 2, 2007  
Project No. 53866 / 5

Washington Department of Ecology  
P.O. Box 47600  
Olympia, Washington 98504-7600

Attn: Laura Inouye, Environmental Specialist (Sediment)

**Subject: Supplemental Bioaccumulation Testing  
Supplemental Sampling and Analysis Plan  
Northwestern Lake - Condit Dam Removal Project**

Dear Ms. Inouye:

On June 8, 2007, Kleinfelder submitted a *Supplemental Sediment Sampling and Analysis Plan (SSAP)* to further evaluate mercury distribution in the sediments and aquatic fauna of Northwestern Lake. One of the three tasks specified in the SSAP was a Bioaccumulation Study that was to focus on fish tissue, molluscan tissue, and crayfish tissue. During the field work conducted for this task, the biologists were only able to recover representative fish. Traps set in Northwestern Lake did not recover any crayfish and mollusks were not observed by biologists while snorkeling and wading. Based on this field result, we wish to amend our SSAP to provide for bioaccumulation testing of collected Northwestern Lake and background sediments through exposure of *Lumbriculus* and *Corbicula*. Specifically, the SSAP shall include the following:

1. An adequate volume of sediment will be collected from the vicinity of probe location B1 (the sample location that produced the highest mercury concentration as per the Kleinfelder report: *Sediment Sampling and Analysis Report, Northwestern Lake Condit Hydroelectric Project, FERC Project No. 2342, White Salmon, Washington, Kleinfelder Project No. 53886/4, March 2007*) to allow for the exposure portion of the bioaccumulation testing.
2. Adequate sample volume for bioaccumulation testing will also be collected at each of the 10 background sample locations. The background sample that has the most similar grain size characteristics as the Northwestern Lake B1 vicinity sediment will be submitted for bioaccumulation testing.
3. Northwestern Aquatic Sciences of Newport, Oregon will conduct the exposure portion of the probe B1 vicinity sediments and selected background sampling location sediments. The exposure portion of bioaccumulation will be conducted on an imported population of the worm

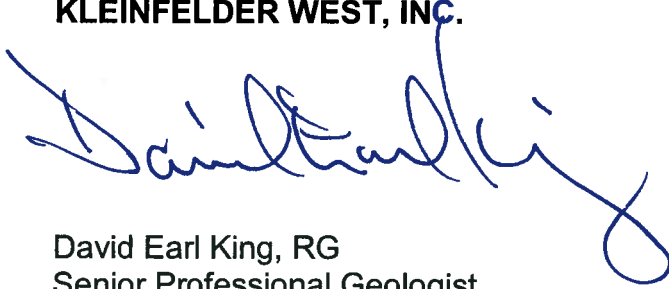
*Lumbriculus* and an imported population of the clam *Corbicula*. Five sets of each target species will provide the appropriate controls and replicates. The exposure portion of the bioaccumulation test will last for 28 days. The exposures will be conducted according to EPA Method 100.3 and the protocols described in U.S. Environmental Protection Agency (EPA) document EPA 600/R-99-064.

4. A total of ten sets of *Corbicula* tissues and ten sets of *Lumbriculus* tissue will be submitted under proper shipment guidelines and other protocols to an analytical laboratory for analysis of mercury content.

Should you have questions concerning this request, please do not hesitate to contact us.

Sincerely,

**KLEINFELDER WEST, INC.**



David Earl King, RG  
Senior Professional Geologist

cc: Tim Hemstreet, P.E., PacifiCorp  
Mark Siipola, U.S.A.C.O.E.  
Stephanie Stirling, U.S.A.C.O.E.