

APPENDIX B

RI/FS WORK PLAN
COMMENTS ADDRESSED IN
THE QUALITY ASSURANCE
PROJECT PLAN FOR THE
BEACH SEDIMENT STUDY

Appendix B: RI/FS Work Plan Comments Addressed in the Quality Assurance Project Plan for the Beach Sediment Study

Comment Source	TCAI Ref#	EPA Ref #	Work Plan Comment Text	Work Plan Comment Response	Beach Sediment QAPP Response
USEPA 2007a	13	NA	Another example of unique differences between Site sections relates to natural processes. Separate factors are at play at different hydraulic and geographic locations along the study area. For instance, bluff and bank erosion rates and redistribution, or deposition rates are key components that need to be defined as work tasks to appropriately evaluate the system.	We agree that natural processes are important and should be considered in site assessment and remedy development. Bluff and bank erosion will be considered in the design of the sediment sampling program. The CSMs have been revised to reflect the outcome of the April 2007 Workshops. We disagree that specific tasks to develop information on erosion rates and redistribution or deposition rates should be identified at this time. As new information regarding site conditions is known, the CSMs will be accordingly updated and refined.	Originally, the beach sediment sampling design included data collection to support hydrodynamic and sediment transport evaluations. However, this component has been removed from the current study design as the focus of the study has shifted to a human health exposure assessment only. However, additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007a	18	NA	It may be appropriate to map the pre-reservoir thalweg and floodplain, the flooded Quaternary terraces that remain submerged at virtual all times, and the shoreline shallows exposed during draw downs.	It is anticipated that regardless of historical hydrologic conditions, programs such as sediment sampling (i.e., direct investigation) will provide a more definitive means of quantifying nature and extent, and assist in the assessment of site risks.	Maps of the shoreline shallow environs exposed during drawdowns was included in the beach sediment quality assurance project plan (QAPP). The beach sediment sampling program will collect data for quantifying nature and extent, and assist in the assessment of site risks.
USEPA 2007b	2.4	1	- Develop Sampling and Analyses Plans (with associated standard operating procedures for collection and analyses of samples)	Sampling and analysis plans will be prepared separate from the RI/FS work plan. Study designs will be closely coordinated with EPA, technical experts, and participating parties.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties.
USEPA 2007b	6	1	Permits - The Archaeological Resources Protection Act (16 U.S. C 700) requires a permit be obtained for any activity with potential to impact or disturb an archaeological site. These permits must be obtained from the appropriate tribe or land management agency. Also, consultation with the U.S. Fish and Wildlife Service (FWS) under section 7 of Endangered Species Act (ESA) is required for onsite actions associated with CERCLA activities. As per section 7(a)(1) of the ESA, all federal agencies have an obligation to use their authorities to recover or provide for the conservation of endangered and threatened species in addition to the requirements to "not jeopardize the continued existence of" the species. These requirements are consistent with EPA Region X activities previously conducted at the Upper Columbia River site and other sites throughout the northwest. In addition, a scientific collection and research permit will be required from the National Park Service (NPS) for any sampling events conducted within the boundaries of the National Recreation Area.	TCAI will obtain all required permits prior to any sampling.	TCAI will obtain all required permits prior to any sampling as indicated in Section 2.2 of Appendix A of the Beach Sediment QAPP. The Cultural Resources Coordination Plan (Appendix D of the Beach Sediment QAPP) will be followed during sample collection activities.
USEPA 2007b	9.1	188	Based on Figure 7.2, numerous SAPs and investigations are potentially proposed for 2007. The sequential rationale and connectivity to the CSM of these investigations needs to be described in greater detail. Studies planned for 2007 should be supported by previous work, should support the CSM, and must be a priority for immediate attention. Prior to initiation of sampling there is a need for consensus on components to the RI portion of the Work Plan. This includes:	Problem formulation elements throughout the RI/FS work plan, more specifically the CSMs in Section 6, have been revised. Data gaps, study rationale, and study sequencing are discussed in Sections 7 and 8. We plan to limit the amount of detail on study design in the RI/FS work plan to allow for early input from EPA, technical experts, and participating parties prior to SAP development.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties.
USEPA 2007b	9.3	188	- Assessment endpoints and data quality objectives (DQOs)	Assessment endpoints will be addressed in the BERA work plan and DQOs will be included in the SAPs. Early discussion of proposed study rationale, DQOs, study design, and target analytes will be discussed with EPA prior to submitting draft SAPs.	The DQOs presented in Section A7 and in Table A-1 of the QAPP.
USEPA 2007b	10.1	188	Cultural resource issues -For any testing activity to occur on an archaeological site, the land manager must review the plan, consult with the Tribes about any potential affect of the proposed activity, and issue a permit prior to the initiation of the project. This requirement is relevant to some invasive investigation activities and remediation activities that may be proposed as part of the RI/FS. The land management agencies and the tribal governments must issue permits under the Archaeological Resources Protection Act (16 U.S. C 700) for any activity that may disturb an archaeological site.	TCAI will make sure that appropriate communication has occurred and permits are obtained prior to any sampling effort. TCAI is currently coordinating with DOI to ensure effective communication and coordination for future sampling.	TCAI will obtain all required permits prior to any sampling as indicated in Section 2.2 of Appendix A of the beach sediment QAPP. The cultural resources coordination plan (Appendix 1 of the beach sediment QAPP) will be followed during sample collection activities.
USEPA 2007b	10.2	188	EPA will coordinate the preparation of this plan with the NPS, the Bureau of Reclamation (BOR), the Confederated Tribes of the Colville Reservation (CTCR) and the Spokane Tribe of Indians (STI). For those areas under State jurisdiction, EPA must follow requirements of the Washington State Laws Chapter 27.53 RCW Chapter 25-48 WAC; "Archaeological Sites and Resources" and Chapter 27.44 RCW Indian Graves and Records. The Cultural Resource Coordination Plan will be completed prior to initiation of field activities in 2007. The requirements of the plan will likely require coordination with the Sect. 106 consulting parties, the award of contracts or interagency agreements, and field staff availability. Consulting parties will need additional lead time to do these actions, thus field sampling for sediments or other ground disturbing activity will not likely be possible before late summer 2007 at the earliest.	A draft Cultural Resources Coordination Plan has been submitted to EPA and participating parties for review and comment. TCAI is fully aware that prior to conducting any intrusive sampling programs (e.g., sediment sampling), it will be necessary to obtain the appropriate permits and clearance on the proposed sampling activities. TCAI understands that under the Five-Party Agreement, a long-standing system (i.e., review and approval process) has been established and as such, is exploring potential efficiencies with DOI and EPA on this matter.	TCAI will obtain all required permits prior to any sampling as indicated in Section 2.2 of Appendix A of the beach sediment QAPP. The cultural resources coordination plan (Appendix D of the beach sediment QAPP) will be followed during sample collection activities.
USEPA 2007b	16	272	Natural attenuation - One aspect of a CSM is natural processes. Separate factors are at play at different hydraulic and geographic locations along the study area. One example: bluff and bank erosion rates and redistribution, or deposition rates are key components that need to be defined as work tasks to appropriately evaluate the system. The Work Plan should define a package of tasks/objectives to accomplish this, with a schedule. This would include such aspects as coring and dating work at several stations in several representative environments.	We agree that natural processes are important and should be considered in site assessment and remedy development. Bluff and bank erosion will be considered in the design of the sediment sampling program. The CSMs have been revised to reflect the outcome of the April 2007 Workshops. We disagree that specific tasks to develop information on erosion rates and redistribution or deposition rates should be identified at this time. As new information regarding site conditions is known, the CSMs will be accordingly updated and refined.	Originally, the beach sediment sampling design included data collection to support hydrodynamic and sediment transport evaluations. However, this component has been removed from the current study design as the focus of the study has shifted to a human health exposure assessment only. However, additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	18	272	Importance of Bathymetric Landform, Hydraulics and Submergence History on Contaminant Distribution – The CSMs fall short of necessary recognition of the potential importance of these interrelated factors on fate and transport and, in turn, eco risk and study design. The CSMs do not adequately detail out the most probable modes of deposition and remobilization influencing bioassay and chemistry results. Position, both laterally and vertically, along the reservoir is a key component of contaminant distribution and resulting magnitudes of toxicity. The pre-reservoir thalweg and floodplain must be mapped and targeted for coring, bioassays, mass calculations, metals analysis, etc. The flooded Quaternary terraces that remain submerged at virtually all times must also be mapped and targeted for similar sampling at several locations along the reservoir. The shoreline shallows exposed during draw downs also need to be GIS mapped and to be targeted for sampling. These objectives will serve to complete the CSMs and inform FS and ROD decision making, while more fully informing the ERA.	A consensus transport and fate CSM resulting from the collaborative process of the April 2007 Workshop is designed to address these sorts of issues. A description of this CSM has been incorporated into the revised document. We fully recognize and acknowledge that transport patterns and sediment accumulation in Lake Roosevelt differ from those of the original river. Should unacceptable levels of risks be identified and sediment transport and related issues become increasingly important to evaluate and understand (e.g., modeling), such issues will be addressed in a technical memorandum rather than in the draft RI/FS work plan as outlined within the June 2, 2006 Settlement Agreement.	Maps of the shoreline shallow environs exposed during drawdowns was included in the beach sediment QAPP. The beach sediment sampling program will collect data for quantifying nature and extent, and assist in the assessment of site risks.

Appendix B: RI/FS Work Plan Comments Addressed in the Quality Assurance Project Plan for the Beach Sediment Study

Comment Source	TCAI Ref#	EPA Ref #	Work Plan Comment Text	Work Plan Comment Response	Beach Sediment QAPP Response
USEPA 2007b	19	272	Hydraulic Modeling - The hydraulic modeling elaborated on in the Work Plan may be over-emphasized. Resources may be far better served by focusing work first on direct investigation, testing, measuring, and sampling in combination with professional experience and judgment. This modeling can be proposed in later phases as necessary.	Use of models for planning and data interpretation purposes employed to date, has in our opinion, enhanced our present understanding of the system and does not preclude or conflict with direct investigations of the site. We agree that other tools and/or resources (e.g., direct investigation, testing, measuring, and sampling) can and will be used to directly assist in the RI/FS. If required, hydraulic modeling can be employed within later stages (e.g., FS) of the process.	The beach sediment sampling design proposed in this QAPP is a direct investigation involving sampling and analytical testing to aid in determining whether unacceptable risks exists at the Site.
USEPA 2007b	20	272	Mercury - The fate and transport of Hg needs greater emphasis. This is especially true of the lower reservoir. A sub-CSM needs to be emphasized, with tasks clearly laid out to understand conditions and mechanisms of transport and potential biomagnifications. Further, sediment flux release from metals enriched sediments/weathered slag along the thalweg of the mid and lower reservoir is critical and should have an investigation plan defined.	Development of a mercury CSM is dependent on the outcome of some of the upcoming sampling programs (e.g., surface water), which will help to determine the environmental media (compartments) of greatest relevance to mercury cycling. Mercury is subject to fate and transport processes (e.g., methylation, biomagnifications) that do not affect some of the other metals or metalloids. RI/FS work plan language has been modified to better describe the studies that may be conducted related to mercury bioavailability and food web cycling.	The proposed beach sediment COIs include mercury (see Table A-7).
USEPA 2007b	21	272	Slag and Slag Transitioning to Highly Weathered Slag Byproducts - A very straight forward task in the Work Plan should be to map the extent and mass of slag remaining in the system. How that will be accomplished should then be described using a combination of sampling, coring, remote sensing, etc.	Issues related to granulated slag will focus on the determination of unacceptable risks and the feasibility of remediating areas posing unacceptable risk. The assessment of bioavailability of metals in granulated slag and sediment in general will be an important component of the UCR RI and ERA. The potential for erosion of granulated slag or sediment that could pose an unacceptable risk to downstream resources will be addressed in the context of the risk assessment and remedial strategy. It is anticipated that these items will be more fully developed and evaluated in the BERA work plan and subsequent sampling and analysis plans.	Originally, the beach sediment sampling design included data collection to support hydrodynamic and sediment transport evaluations. However, this component has been removed from the current study design as the focus of the study has shifted to a human health exposure assessment only. However, additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	22	272	Weathered Slag, Dissolved or Colloidal Deposition forming Metal Enriched Sediments in the Reservoir from Marcus to Gifford/Inchelium - This segment of the reservoir potentially has significant accumulations of toxics in the sediments that require further direct study (as evidence of the Phase 1 results of Focus Area #4). Linked to this risk evaluation is the importance of relating deposition to landform and bathymetry, as well as the thickness and total mass of the metals-rich deposit.	It is agreed that additional investigation and assessment of potential risks within this area of the reservoir appear to be warranted based on Phase I sampling results. As such, sampling within this area, as with other portions of the Site will be designed to assess nature and extent and assess potential risks.	Beach QAPP sampling program includes sampling locations within this area. Data from the sampling event will provide information on contamination and potential risks.
USEPA 2007b	30	272	Air Pathway and Human Health – Somewhat unclear is the exact proposed path forward to review existing records and advance future work to assess potential human health risks. A more coherent, connected plan of action is needed that will relate clearly to the pending EPA HHRA Work Plan.	The human health documents are being developed by EPA. Details of the approach to assessing human health risk will be included in the HHRA work plan. The TCAI team (focused on ecological risks) is closely coordinating refinements to the CSM and in the future will coordinate proposed sampling efforts with the HHRA team to ensure that future sampling efforts meet the needs of both human health and ecological risk assessment efforts.	Human health considerations were included in the design of the proposed beach sediment study (see Section A7).
USEPA 2007b	31	272	Bathymetric Surveying, Side-Scan Sonar, other Methods – Again, how this type work will be performed to support the CSM and fate & transport investigation should be clearly defined. To contain costs the greatest emphasis can be placed on: the slag deposition zone near Marcus and on potential lower energy zones in the flowing upper Columbia River; at strategic locations that are representative of the depositional/erosional characteristics of the site (e.g. see #5 above); at other significant deposition zones of metals enriched sediments (see # 8 as an example), and; at fixed stations that can be monitored again in the future for long-term observations.	The rationale and sequencing of studies have gone through extensive revision, and are described in revised Sections 7 and 8. Details on methods will be provided in future SAPs. We agree that Marcus Flats is of central interest. This comment will be considered in more detail when study designs are developed.	The beach sediment QAPP includes several beaches in EPA Focus Area #3 near Marcus Flats as part of its study area. However, side-scan sonar and bathymetry are not a part of the sampling design.
USEPA 2007b	36	1	Three key areas to de-emphasize in the Work Plan and use more strategically: 1-Minimize the use of top-down approaches. 2-Reduce the reliance on background/reference 3-Reduce the emphasis on multiple stressors in the risk assessment. These approaches should only be considered when necessary to explain data/results and must be dealt with during the Problem Formulation when selecting endpoints and determining how to interpret data.	These approaches have been deemphasized in the RI/FS work plan and considered, when necessary, to interpret data. Data interpretation in the RI/FS work plan has been scaled back (deferred to later documents) and the stressor section is now focused on chemical stressors only. Section 9, Ecological Risk Assessment Approach, is more strictly aligned to Superfund guidance.	Evaluation of background concentrations of COIs in beach sediment is part of the broader data evaluation and risk assessment framework. Consequently, background samples will not be collected in the current beach sediment study.
USEPA 2007b	42	1	Uranium or Thallium has been screened-out based on Ecological concerns as a COC related to fish. These COPCs must remain for human health concerns.	Based on discussions at the April 2007 Workshop, uranium or thallium have not been screened out. Human health documents for the UCR are being led by EPA and are not included in the RI/FS work plan. Sampling and analyses that supports both human health and ecological assessments will be coordinated with EPA to ensure that human health issues are addressed.	The proposed beach sediment COIs include uranium and thallium (see Table A-7).
USEPA 2007b	45	1	The Work Plan and then future sampling plans should evaluate the role of fine particles and whether 1) these fractions (such as the <63 um) account disproportionately for more toxicity and bioavailability, and 2) whether toxicity is underestimated using bulk sediment concentrations.	Future studies will address the potential adverse effects related to different particle sizes based on spatial variations on this variable in the UCR. Additional recommended studies to support the ERA were discussed and prioritized at the April 2007 Workshop.	The proposed beach sediment QAPP includes separate analyses of COI concentrations in different grain size fractions. At the laboratory, the composite surface sediment sample will be divided into two components: 1) the whole surface sediment that will be analyzed for grain size distribution; and 2) a sieved <2mm size fraction of the sample that will be analyzed for other conventional parameters (e.g., pH, TOC, percent moisture, and total sulfides, TAL metals/metalloids, and elemental uranium. For one composite sample at each beach, TAL metals/metalloids and elemental uranium will also be analyzed in each of the following sediment fractions: 2 mm to 250 µm, 250 µm to 125 µm, 125 µm to 63 µm, and < 63 µm. In addition, one of the surface composite samples from each beach will be analyzed for IVBA for arsenic, lead, and other metals on the following size fractions: < 250 µm, 250 µm to 125 µm, 125 µm to 63 µm, and < 63 µm.
USEPA 2007b	47	1	The Work Plan should discuss whether or not the RAGs required statistical power for evaluating fish tissue concentrations has been met for COCs. If this is determined to be a data gap, the Work Plan should discuss sampling to fill the data gap.	The human health documents for the UCR are being led by EPA and are not included in the work plan. Sampling and analyses that supports both human health and ecological assessments will be coordinated with EPA to ensure that human health issues are addressed.	DQOs supporting the human health risk assessment (HHRA) are included in the proposed beach sediment investigation (See Section A7). The sampling program is designed to provide beach sediment data needed for the HHRA.
USEPA 2007b	59	58	Anecdotal accounts from local Northport area residents indicate that the 1948 flood event had a significant impact on the currently observed distribution and configuration of major sediment depositional features, such as the large gravel bar (containing a considerable quantity of slag) located across from Deadmans Eddy, and possibly also Black Sand Beach.	Information documenting this event has been requested from EPA and USGS.	The proposed beach sediment study includes sample collection at Black Sand Beach.

Appendix B: RI/FS Work Plan Comments Addressed in the Quality Assurance Project Plan for the Beach Sediment Study

Comment Source	TCAI Ref#	EPA Ref #	Work Plan Comment Text	Work Plan Comment Response	Beach Sediment QAPP Response
USEPA 2007b	64	61	As with the previous comment, hypotheses regarding the degree to which current river/reservoir operations can or will displace and transport coarse grain sand and granulated slag from existing "positions of equilibrium" should be subject to further data collection and investigation. This is an important consideration that will affect future remedial action decision making.	Agreed. One possible use of various hydraulic, hydrodynamic, and sediment transport models is to permit such evaluations. Should unacceptable risks be identified at the site, such data collection efforts may be required.	Originally, the beach sediment sampling design included data collection to support hydrodynamic and sediment transport evaluations. However, this component has been removed from the current study design as the focus of the study has shifted to a human health exposure assessment only. However, additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	105.06	110	Section 5.2.6.6 – The distribution of trace-elements between sediment bound phase and water phase was measured at Northport (Bortleson et al. 2001) and was very different than reported in the cited reference (Depledge and Rainbow 1990) which was not directly related to the study area.	This section has been deferred to a later document. This comment will be addressed at that time.	The proposed beach sediment study includes analysis of trace element concentrations at many locations along the length of the study area.
USEPA 2007b	130	140	This implies that something is known about the rate of equilibration. Describe the basis for this assumption. Is it based on test data?	The text describes an equilibrium partitioning approach. For the purposes of RI/FS work plan development, it is appropriate to assume equilibrium partitioning is applicable. The appropriateness/validity of the equilibrium partition assumption would be tested during later stages of the project.	The beach sediment QAPP includes COI analyses that would help inform an equilibrium partitioning model, should that become necessary.
USEPA 2007b	134	131	The concentration of metals in slag has varied over time. Please describe the data upon which these point values are based, and how they are representative of historical slag composition. These values differ from sample results reported by others.	The discussion on page 5-33 is focused on processes that control the transport of chemicals in the particulate phase, not a more specific interpretation of temporal trends. Table 4-2 of the revised work plan presents a summary of bulk chemical analyses of granulated slag.	Additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	147	162	Section 3.1.1 of Permit No. PR-11898 (presented in Attachment E2) lists "total and dissolved aluminum (Al) as one of the constituents to be monitored in association with slag disposal area drainage water. Inclusion of aluminum in a permit issued by the BC Ministry of Environmental which requires monitoring of slag-impacted drainage water strongly suggests that some chemical data on aluminum in slag is readily available. Indicate whether such data are available, and if so, revise the text in Section 5.2.6.1 to indicate the percentage of aluminum in slag, and in the discussion on page 5-53.	Chemical data on granulated slag will be presented in Section 4.2.1.1 of the revised RI/FS work plan (Table 4-2).	Additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	151	162	Clarify that there is also significant slag deposition within Marcus Flats.	We agree that based on the 2005 sediment sampling program there appears to be a significant deposit of granulated slag within the Marcus Flats area. Granulated slag deposits in the Marcus Flats area are discussed in Sections 5.3.1.2, 5.3.2.1, and 5.3.2.2.	The beach sediment QAPP includes several beaches in EPA Focus Area #3 near Marcus Flats as part of its study area. Additional bulk samples will be collected at these beaches during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	209	272	It is acknowledged herein that all studies have not likely been identified and new data gaps may be recognized. However, this section as a whole needs to include further specificity before substantive comments can be provided on the proposed work. Generally we support the types of studies proposed, including bathymetry, hydrodynamic modeling, acoustic Doppler current profiling, porewater studies, and sediment, beach and sturgeon sampling. However, it is difficult to comment on the adequacy of the studies without further detail on which studies actually will be conducted.	Section 8 has been substantially rewritten to focus on studies and sequencing. The BERA work plan will contain the approach and rationale for most studies pertaining to the ERA. Individual SAPs will provide detailed evaluations of existing data; full DQOs; sampling approach, rationale and methods; and the QAPP. We plan to limit the amount of detail on study design in the RI/FS work plan to allow for early input from EPA, technical experts, and participating parties prior to SAP development.	This QAPP includes a detailed evaluation of existing data (Section A4.1), DQOs (Section A7 and Table A-1), the sampling approach, rationale, and methods (Sections B1, B2, and B3; and Appendix A).
USEPA 2007b	211	273	As with non-contaminant stressors, identification of other sources should be a low priority (at least initially). The primary concern should be to determine if risks exist, where, from what, and to what. Once this is determined, then the issues concerning sources should be investigated.	Comment acknowledged. Source identification will not be a primary driver for initial data gathering activities. However, sampling programs will be strategically designed to gather information in the UCR that may be associated with sources (e.g., near tributaries) to ensure that risks within the site are properly evaluated.	Evaluation of background concentrations of COIs in beach sediment is part of the broader data evaluation and risk assessment framework. Consequently, background samples will not be collected in the current beach sediment study.
USEPA 2007b	214	273	Will this effort to better understand "other sources of contamination to the UCR" also include an assessment of other possible sources of contamination to the Columbia River north of the U.S.-Canadian border? Please clarify.	Identification of contaminant sources in Canada that discharge to the Columbia River is not a goal of the RI/FS. However, measurement of water quality and sediment quality at the U.S.-Canadian border will be undertaken to understand the magnitude of contamination entering the U.S. The text will be revised accordingly.	Evaluation of background concentrations of COIs in beach sediment is part of the broader data evaluation and risk assessment framework. Consequently, background samples will not be collected in the current beach sediment study.
USEPA 2007b	218	279	Clarify if sediment sampling will include analysis of suspended particulates in addition to bottom, side bank and beach samples. If so, sampling should be conducted during different flow regimes to determine potential mobilization of particulates over the range of expected flows, which will help to better understand particulate transport in the UCR.	This comment will be addressed in upcoming sediment and surface water sampling and analysis plans.	Originally, the beach sediment sampling design included data collection to support hydrodynamic and sediment transport evaluations. However, this component has been removed from the current study design as the focus of the study has shifted to a human health exposure assessment only. However, additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007b	219.1	280	"During the 2005 Phase I study, chemical concentrations in sediments were determined for 15 beaches distributed along the UCR (USEPA 2005d). ... EPA's assessment compared maximum concentrations detected at each of the 15 beaches with a safe concentration calculated by EPA for each metal of concern (USEPA 2006d). Based on this screening approach, EPA concluded: "Twelve of the fifteen beaches are safely below health-based risk standards for all the contaminants EPA tested for, including arsenic, lead, pesticides, and PCBs. At three beaches EPA found levels of arsenic and/or lead that were slightly above EPA screening levels, but those beaches remain safe for seasonal recreation as well."	Provided as background to Comment TCAI Ref# 219.3.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties to aid in assessing risks to residents who frequent the beaches on a daily basis.
USEPA 2007b	219.2	280	EPA continues [from the executive summary of USEPA (2006g)] that: "Although this assessment was developed to prioritize beaches based on limited recreational use, the results suggest that sediments along the beaches would also present minimal risks for residents who frequent the beaches on a daily basis."	Provided as background to Comment TCAI Ref# 219.3.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties to aid in assessing risks to residents who frequent the beaches on a daily basis.
USEPA 2007b	219.3	280	These statements are not in USEPA (2006d) as cited but rather in USEPA (2006g). Further, and more importantly, the statements quoted above in the draft Work Plan are misleading because they were taken from a broader context in USEPA (2006g), quoted below, which indicates that risk to people of more frequent (e.g. daily) exposure to contaminated beaches is unknown and must be studied in much greater detail to assess the potential risk of year-round exposure to people. Specifically, USEPA (2006g) stated:	Comment acknowledged. The appropriate context will be provided in future discussions of beach data. The above text is no longer included in Section 8.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties to aid in assessing risks to residents who frequent the beaches on a daily basis.

Appendix B: RI/FS Work Plan Comments Addressed in the Quality Assurance Project Plan for the Beach Sediment Study

Comment Source	TCAI Ref#	EPA Ref #	Work Plan Comment Text	Work Plan Comment Response	Beach Sediment QAPP Response
USEPA 2007b	219.4	280	"EPA has completed a screening level risk assessment for sediment exposure from limited recreational use at fifteen popular beaches along Lake Roosevelt and the Upper Columbia River. Twelve of the fifteen beaches are safely below health-based risk standards for all the contaminants EPA tested for, including arsenic, lead, pesticides, and PCBs. At three beaches EPA found levels of arsenic and/or lead that were slightly above EPA screening levels, but those beaches remain safe for seasonal recreation as well. This screening was limited to recreational use only, such as a family that camps for up to two weeks per year, returning for 30 years. More intensive uses of the beaches, such as year-round food gathering or camping for extended periods of several months or more were not addressed by this assessment, but will be addressed in the Upper Columbia River RI/FS.	Provided as background to Comment TCAI Ref# 219.3.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties to aid in assessing risks to residents who frequent the beaches on a daily basis.
USEPA 2007b	219.5	280	The beach screening is a first step in evaluating potential risks from contamination. EPA will be using all of the sediment and fish tissue data EPA collected in 2005 and in TCAI 's RI to conduct an in-depth risk assessment for people living in the area and using the beaches year-round. That risk assessment may take several years to complete."	Provided as background to Comment TCAI Ref# 219.3.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties to aid in assessing risks to residents who frequent the beaches on a daily basis.
USEPA 2007b	220	279	Also need vertical sediment characterization, and identification of areas exceeding chemical-specific Tribal ARARs.	ARARs are developed as part of the RI/FS process. Tribal ARARs will be included when contamination is on tribal land. Approaches for characterizing chemical distribution patterns will be addressed in the revised beach SAP.	The beach sediment sampling design includes collection of subsurface sediment core samples (i.e., 0–30 in.; 0–75 cm or to refusal) at five randomly selected locations at each of the 34 beaches. Three vertical depth intervals from each core will be analyzed: 0–6 in. (0–15 cm), 6–18 in. (15–45 cm), and 18–30 in. (45–75 cm).
USEPA 2007b	233	285	In the highly dynamic conditions present in the various segments of the UCR, slag particles are likely to be abraded, broken, and possibly crushed as they travel downstream. Chemical releases are likely to be a function of particle size and degree of weathering it has experienced. Will the impact of these physical changes be evaluated as part of this task?	The relationship between slag weathering and risk may be undertaken if unacceptable risks are found to be associated with slag. A study design to address this issue would be described in a future SAP.	The proposed beach sediment QAPP includes separate analyses of COI concentrations different grain size fractions. At the laboratory, the composite surface sediment sample will be divided into two components: 1) the whole surface sediment that will be analyzed for grain size distribution ; and 2) a sieved <2mm size fraction of the sample that will be analyzed for other conventional parameters (e.g., pH, total organic carbon [TOC], percent moisture, and total sulfides), target analyte list (TAL) metals/metalloids, and elemental uranium. For one composite sample at each beach, TAL metals/metalloids and elemental uranium will also be analyzed in each of the following sediment fractions: 2 mm to 250 µm, 250 µm to 125 µm, 125 µm to 63 µm, and < 63 µm. In addition, one of the surface composite samples from each beach will be analyzed for IVBA for arsenic, lead, and other metals on the following size fractions: < 250 µm, 250 µm to 125 µm, 125 µm to 63 µm, and < 63 µm.
USEPA 2007b	275	300	This figure does not identify any DQOs. EPA and the participating parties will need to be part of the process be developed what data will be needed, how much and of what quality.	DQOs will be identified in the BERA work plan and various SAPs. All DQOs will be developed in conjunction with EPA and the participating parties.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties.
USEPA 2007b	302	309	The text does not provide an indication of how the effects of whole sediment exposure to organics will be addressed. The approach should consider the draft Washington State Freshwater Sediment Quality Values or an equivalent.	The referenced sediment quality values will be considered in the SLERA.	The sampling program is designed to provide beach sediment data needed for the HHRA. Therefore, ecological sediment quality values were not included in the beach sediment study.
USEPA 2007b	350	20	The list does not identify the list of potential ARARs. For instance, CAA requirements found at 40 C.F.R. Part 50; RCRA Maximum Concentration for Constituents for GW Protection (40 C.F.R. 264.90-264.96); WAC 173-204 Sediment Management Standards; WAC 173-200 Water Quality Standards for GW; WAC Water Quality Standards for Surface Waters of State of WA. No Tribal laws were cited as ARARs. NoTBCs were identified.	These potential ARARs be will included. However, we would appreciate clarification as to why CCA 40 CFR Part 50, RCRA Maximum Concentration for Constituents for GW Protection should be included. Tribal laws will included when contamination is on Tribal Land.	Tribal ARARs are provided in Table A-7
USEPA 2007c	3	A002	There is a concern that pollutants in a fast-moving river, as it was historically, would have been deposited much further downstream and also even beyond the current dam location. There are transport mechanisms created through drawdown. Pre-post dam considerations should be included in DQO development for each SAP, as needed, to allow decisional interpretation of the data, particularly with respect to any assumptions about exposure to contaminants.	Comment acknowledged. Future SAPs and associated DQOs will consider, as needed, transport processes (e.g., reservoir drawdown) in the interpretation of data and assessment of site risks as set forth within the June 2, 2006 Settlement Agreement.	Originally, the beach sediment sampling design included data collection to support hydrodynamic and sediment transport evaluations. However, this component has been removed from the current study design as the focus of the study has shifted to a human health exposure assessment only. However, additional bulk samples will be collected during the beach sediment study and archived for later analysis (e.g., particle density [including specific gravity] and percent granular slag composition), as needed to support evaluation of potential remedial alternatives.
USEPA 2007c	13	A011	Pg 1-8, section 1.3.2, 3rd par – A more comprehensive application of the DQO process is needed in section 8 to justify proposed investigations.	Media-specific DQOs will be developed during SAP preparation.	The DQOs presented in Section A7 and in Table A-1 of the QAPP.
USEPA 2007c	14	A012	Page 1-8, Last paragraph -Modify third sentence to state that cultural resource plan will be coordinated with all Section 106 consulting parties for Lake Roosevelt, including the two Tribes, State of Washington DAHP, Bureau of Reclamation, and the National Park Service.	Agreed. TCAI is currently discussing with DOI the most efficient way to coordinate with the entities. Revised text for this section includes the recommended information.	The protection of cultural resources is discussed in Section B2 and Appendix D of the QAPP.
USEPA 2007c	38	A035	Pg 3-1, 1st par -Consultation under section 106 Archaeological Resource Protection Act and section 7 of ESA are required for onsite actions associated with CERCLA activities. This is consistent with EPA Region 10 activities previously conducted at the Upper Columbia River site and other sites throughout the northwest. In addition, a scientific collection permit will be required from the National Park Service for any sampling events conducted on the National Recreation Area. DOI plans on developing a federal access agreement with Teck Cominco to support these permit and sampling needs for the RI/FS.	Agreed. Text has been revised accordingly.	TCAI will obtain all required permits prior to any sampling as indicated in Section 2.2 of Appendix A of the beach sediment QAPP.
USEPA 2007c	41	A038	"NHPA requires that the agency implementing the undertaking consult with the SHPO, the land-managing agency and the appropriate tribal governments about their proposed undertaking, its' potential effect on cultural resources, and any actions proposed to mitigate an adverse effect on the site."	Text has been revised accordingly. We agree that consultation needs to occur. TCAI is currently coordinating with EPA and DOI regarding the cultural resources plan to to ensure effective communication and coordination for future sampling.	The protection of cultural resources is discussed in Section B2 and Appendix D of the QAPP.
USEPA 2007c	108	A083	Studies that will address potential affects of COCs to wildlife need to be included in the RI/FS work plan and process. Evaluations of sediment, soil and food ingestion by various wildlife species should be included in the studies. There is a fair amount of interpretation based on previous investigations and publications. Section 8.1.1 Problem Description should include references to support conclusions and speculation on sediment dynamics.	The BERA work plan will address this comment.	The sampling program is designed to provide beach sediment data needed for the HHRA. Therefore, ecological studies were not included in the beach sediment study.

Appendix B: RI/FS Work Plan Comments Addressed in the Quality Assurance Project Plan for the Beach Sediment Study

Comment Source	TCAI Ref#	EPA Ref #	Work Plan Comment Text	Work Plan Comment Response	Beach Sediment QAPP Response
USEPA 2007c	109	A084	Section 8. Remedial Investigation Approach. Introduction. It is acknowledged herein that all studies have not likely been identified and new data gaps may be recognized. However, this section as a whole needs to include further specificity before substantive comments can be provided on the proposed work. In general we support the types of studies proposed, including bathymetry, hydrodynamic modeling, acoustic Doppler current profiling, porewater studies, and sediment, beach and sturgeon sampling. However, it is difficult to comment on the adequacy of the studies without further detail. In addition, some important studies additional studies may including but not limited to sediment profile imaging (SPI), TDS analysis of surface water, analysis of centrifuged sediments, transect surface water sampling, upland groundwater, air and soil studies and landslide and discharge data review. Finally, based on fish tissue results, PCB concentrations are a potential data gap.	The rationale and sequencing of studies is going through extensive revision, and will be described in Section 8. The additional detail requested in this comment is more likely to be provided in the SAPs, where a more detailed rationale for study elements will be provided. We plan to limit the amount of detail on study design in the RI/FS work plan to allow for early input from EPA, technical experts, and participating parties prior to SAP development.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties.
USEPA 2007c	110	A085	Page 8-3, Paragraph 8.1.3.1 Sediment Related Data Needs –Consider inclusion of an additional sediment data need to identify the extent, volume and character of beach deposits, particularly in the riverine reach upstream from Lake Roosevelt.	Collection of additional sediment data to identify the extent, volume, and character of beach deposits will be considered in development of the sediment and beach SAP.	The proposed beach sediment study includes several beaches in the upstream riverine reach.
USEPA 2007c	112	A087	Section 8.2.1.4, Page 8-9. RI/FS Tasks, Beaches. The statements cited in this section are not in USEPA (2006d) as cited in the draft Work Plan, but rather in USEPA (2006g). Further, and more importantly, the statements in the draft Work Plan could be misleading because they were taken from a broader context in USEPA (2006g), which indicates that risk to people of more frequent (e.g. daily) exposure to contaminated beaches is unknown and must be studied in much greater detail to assess the potential risk of year-round exposure to people.	Comment acknowledged. The appropriate context will be provided in future documents. The text cited is no longer included in Section 8.	The beach sediment sampling design proposed in this QAPP has been developed in close coordination with EPA and the Participating Parties to aid in assessing risks to residents who frequent the beaches on a daily basis.
USEPA 2007c	114	A088	Consideration should be given to supplementing the bathymetry with geologic mapping of the extent of beach areas in the UCR including both the upstream riverine reaches and Lake Roosevelt, as these deposits will extend above the elevation of the bathymetry at nearly all reservoir elevations except for full pool. Mapping could be performed on color air photos and ground checked in the field at low pool elevations when the majority of the beaches would be exposed to visual observation. Figure C30 in appendix C demonstrates the effectiveness of using air photos to delineate the extent of the beach deposits although a full color air photo base would be even more useful than the black and white photo used in this illustration.	Comment acknowledged. Geological mapping will be considered.	The sampling program is designed to provide beach sediment data needed for the HHRA. Therefore, geologic mapping was not included in the beach sediment study.
USEPA 2007c	121	A094	pg 8-7 section 8.2.1 Sediment -What is the spatial deposition (patterns) of contaminants in Lake Roosevelt and how will this change in the next 5, 10, 20 yrs. Comprehensive exposure scenarios for beach users throughout the reservoir, not just develop recreational areas (i.e. Onion Creek to Marcus).	The need for detailed sediment transport modeling will be evaluated once preliminary ecological and human health risks are determined.	The proposed beach sediment study includes analysis of trace element concentrations at many locations along the length of the study area.
USEPA 2007c	130	A102	pg 8-17 8.2.5 Air and Soils -In addition to the basic data needs for air and soil included on page 8-17, DOI needs to understand the core parameters of air, including (but not limited too): Comprehensive exposure scenarios for wind blown sediment during draw down events. Comprehensive analysis of the boundaries of potential upland or terrestrial contaminant And, the potential impacts to recreational users, adjacent landowners, NPS staff and tribal interest.	The exposure scenarios described in this comment are largely associated with human health exposure. For these types of issues, the TCAI team will coordinate with the EPA team, which is leading the human health documents.	The beach sediment study was designed to ensure that the nature and extent of contamination in exposed beach surface and subsurface sediments is sufficiently well characterized to allow a reliable evaluation of potential risks to humans (including recreational use by nearby residents, subsistence users and workers) who may be exposed via direct contact (ingestion and dermal). Wind-blown sediment is not a component of this study.
USEPA 2007c	135	A106	In addition to the basic data needs associated with recreational use and consumption on page 8-24, DOI needs to understand the below items to communicate the potential risks to employees, recreational users, tribal members, and adjacent landowners. What are the recreational use patterns for Lake Roosevelt? What are the fish and wildlife consumption patterns north of Kettle Falls? What are the possible exposure pathways for users and employees?	TCAI is coordinating with EPA and participating parties to plan surveys that will provide this information, which will be used by EPA in the human health documents.	Human health considerations were included in the design of the proposed beach sediment study (See Section A7).
USEPA 2007c	137	A108	pg 8-24 Air quality studies need to be focused on times of year, and areas, that contaminants are exposed on beaches above the draw down levels. Exposure pathways need to focus all traditional Native American cultural and subsistence uses of the areas, plants and animals. Additionally, additive, multiplicative, and /or synergistic effects of multiple contaminants, and multiple perturbations of exposed humans, plants and animals need to be addressed.	The exposure scenarios described in this comment are largely associated with human health exposure. The general CSM in the RI/FS work plan will be expanded in the human health documents to describe these pathways in a very general sense. For these types of issues, the TCAI team will coordinate with the EPA team, which is leading the human health documents.	Human health considerations were included in the design of the proposed beach sediment study (See Section A7), which includes the collection of sediment samples from areas exposed during low-water periods and reservoir drawdowns.
USEPA 2007c	155	A124	While it is anticipated that QAPPs will be developed for each study more emphasis needs to be placed on ensuring that consistent analytical methods and QA/QC procedures are applied across studies whenever possible. A program-level quality assurance plan should be developed to outline analytical QA parameters that are potentially applicable for many of the studies under consideration, while maintaining the flexibility necessary for more stringent or specific criteria when needed.	Good point; we agree. A programmatic QAPP could be developed as individual SAPs are prepared, and expanded to include new media and new analytical methods.	This QAPP will contribute to the programmatic QAPP.

Notes:
 USEPA. 2007a. Round 1 comments on Teck Cominco draft RI/FS work plan dated December 27, 2006, Upper Columbia River RI/FS. Comments dated February 16, 2007. U.S. Environmental Protection Agency, Washington, DC.
 USEPA. 2007b. Round 2 comments on Teck Cominco draft RI/FS work plan dated December 27, 2006, Upper Columbia River RI/FS. Comments dated April 11, 2007. U.S. Environmental Protection Agency, Washington, DC.
 USEPA. 2007c. Round 3 comments on Teck Cominco draft RI/FS work plan dated December 27, 2006, Upper Columbia River RI/FS. Comments dated June 14, 2007. U.S. Environmental Protection Agency, Washington, DC.