Comments Draft Phase I Fish Tissue Sampling Data Evaluation Summary Report dated October 25, 2006				
Upper Columbia River RI/FS				
Teck Cominco Comment No.	**Comment No.**	**Comment**	**Response**	**Comment for Teck Cominco**
		Department of Ecology Comments **December 1, 2006**		
TF1	G1	It appears that overall focus has been put on largescale suckers and this is seen within the written sections and also in the figures and tables. Although this provides useful information it limits the ability to form a comprehensive Conceptual Site Model. The project will benefit in the revisions by providing additional information within the document for the other target species. This is particularly true for Figures 3-66 through 78. Similar comparisons would be useful for the other target species.	USEPA conducted the largescale sucker gut analysis in response to unforeseen field observations. We realized that the potential for copious deposits of slag in the gut of large-scale suckers would add to the uncertainties of the tissue measurements and the future use of those data. The large-scale sucker gut analysis was completed to estimate the relative impact of slag (which was visually apparently as a significant mass in some fish collected from the northern reach of the site) and to help understand how it might best be addressed in future data collection and analysis. The approach was presented in a Supplemental QAPP (CH2M HILL, 2006c). This timely and unplanned effort attempted to optimize the use of the samples in hand. Although this analysis is not ideal or comprehensive, we believe it was a reasonable response to the potentially significant and unanticipated field observations. Additional and/or alternative analyses are at this time considered data gaps, which USEPA expects to be filled as part of the UCR ecological risk assessment. The presentation of this data in the report was intended to illustrate the phenomenon observed and not intended to suggest that this was the most important data.	USEPA conducted a largescale sucker gut analysis in response to unforeseen field observations. We realized that the potential for copious deposits of slag in the gut of large-scale suckers would add to the uncertainties of the tissue measurements and the future use of those data. The large-scale sucker gut analysis was completed to estimate the relative impact of slag (which was visually apparently as a significant mass in some fish collected from the northern reach of the site) and to help understand how it might best be addressed in future data collection and analysis. The approach was presented in a Supplemental QAPP (CH2M HILL, 2006c). This timely and unplanned effort attempted to optimize the use of the samples in hand. Although this analysis is not ideal or comprehensive, we believe it was a reasonable response to the potentially significant and unanticipated field observations. EPA's data identifies that high metals in gut contents may be from sediment, slag, or gut tissue, as the slag was analyzed along with the gut. The results indicate that the assumptions should be tested in a new study that analyzes stomach contents independent of tissues. Additional and/or alternative analyses are at this time considered data gaps that will be addressed in the TCAI RI/FS. More discussion on this topic is provided later in these comments.
	G2	The Fish Sample Collection Area of 1a if often cited throughout the report. Consider clarifying where in particular this FSCA is located and also how it differs in relation to FSCA 1. A better description of the other FSCAs in relation to the sediment sampling focus areas is requested. These descriptions would also assist in the comparison between tissue and sediment concentrations. Also, why were FSCAs grouped into reaches? Great variability can exist between FSCAs that are grouped into a single reach. Doing so potentially loses the ability to make more location-specific evaluations.	Comment noted. Text will be added to better describe the FSCAs.	
TF2	G3	There is no application of lipid content to the discussion or interpretation of the results, particularly the organic contaminants. Lipid normalization graphics for organic contaminants in tissue, even in an appendix, is requested. This type of analysis, for example, may further benefit interpreting the relatively high PCB levels found in walleye, which generally are lower in fat.	The analysis presented in the Draft Phase I Fish Tissue Data Evaluation Report was intended for illustrative purposes and is not intended to be a comprehensive analysis of the fish tissue data. In addition, the analysis approach used for the Phase I fish tissue data should not be interpreted as the only, or even preferred, approach to analyzing and presenting these data. Additional and/or alternative analyses of this type of data are at this time considered data gaps, which USEPA expects will be filled as part of the UCR human health and ecological risk	Normalization of the total PCB, PCB congeners, and dioxin and furan congener results to lipid content is recommended where the results would be expressed as ug PCB/g lipid. Note that the analyses presented in the Draft Phase I Fish Tissue Data Evaluation Report were intended for illustrative purposes and are not intended to be a comprehensive analysis of the fish tissue data. In addition, the analysis approach used for the Phase I fish tissue data should not be interpreted as the only, or even preferred,

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			assessment.	approach to analyzing and presenting these data. Additional and/or alternative analyses of the Phase I fish tissue data will need to be performed in support of the human health and ecological risk assessment, including the additional analyses requested by the various commentors.
TF3	G4	A presentation of the data associated with fish size and also fish age is warranted. The data was collected and would be useful to provide the data in a statistically evaluated tabular form and also within a figure.	The reporting of the Phase I fish tissue data was designed to facilitate its use by interested parties. As such, an effort was made to present the data in their entirety in a format that is accessible for future analysis. The data and the analysis presented in the Draft Phase I Fish Tissue Data Evaluation Report was intended for illustrative purposes and is not intended to be a comprehensive presentation and analysis of the fish tissue data collected. All the requested information is provided in detail in the Phase I Fish Tissue Field Summary Report. The Phase I data are available from USEPA. Electronic copies of the organized field and analytical data from the Draft Phase I Fish Tissue Data Evaluation Report and Phase I Fish Tissue Field Data Report will be provided in Excel format with the final data evaluation report.	Exploratory analyses of the effects of the size, age, and/or sex on individual composite results and the variance observed in the results by FSCA for a given analyte and target species will be undertaken with the results provided in a statistically evaluated tabular form and also within a figure
TF4	G5	The report will benefit by the addition of a discussion providing population estimates for the target species. For example, this will help indicate the representativeness of sample sizes within certain FSCAs and across the study area relative to the general populations.	See comment response to G3 above. See Comment for Teck Cominco associated with WDOE Comment G3.	An assessment of population estimates for the target species of the Phase I fish tissue program should be provided.
TF5	G6	The following additional charts, as an appendix, also are requested in the final: Charts showing fillet results vs. sediment concentrations similar to figures 3-66 to -74.	See comment response to G3 above. See Comment for Teck Cominco associated with WDOE Comment G3.	The following additional charts should be made: Charts showing fillet results vs. sediment concentrations similar to Figures 3-66 to -74[(See .Final Fish Data Evaluation Report (EPA 2007 in production.)]
	S1	Section 3 – Data Evaluation 3.1.1 Screening Process – For the Ecological Criteria discussion on page 3-2 [and used in table 3-1] please add discussion that briefly summarizes and explains for the general reader the bases for the screening values so as to provide context to the references (Dyer, Windward) and associated screening values.	Comment noted. Text will be added.	
	S2	Section 3 – Data Evaluation 3.2.2 Estimated Whole Body Results from Fillet and Offal Analysis – The accuracy, reliability, and application	A weight proportional approach was used to estimate whole body concentrations from fillet and offal analysis. The accuracy and reliability of this approach as applied to the Phase I fish tissue results is consistent with the accuracy and reliability of	

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		of this method is questioned.	the analytical results on whole body samples.	
	S3	3.2.2 Results of Largescale Sucker Gut/Gut Contents Analysis: Section 3.2.3.1 Methods - The sentence that reads, "The results of the gutless whole body, gut/gut contents analysis and percent ADFW can be used to assess the potential contribution of slag to the analysis of whole body largescale sucker samples" may be too far reaching in assuming that sediment found within the gut can be characterized as slag while only doing a visual inspection of the guts. To fully assess the sediment contents associated with the gut a chemical analysis is required rather than just a visual inspection. This comment also applies to other parts of the report where similar conclusions are drawn.	Commented noted. Text will be changed.	
	S4	Section 3.2.3.2 Results - The first whole sentence at the top of page 3-11. Should the second "zinc" be a different contaminant? The way it currently reads is that the relationship found with zinc is more pronounced than itself.	Commented noted. Text will be changed.	
	S5	The first whole paragraph on page 3-11 - The sentences that read, "This (these) patterns suggest that there is a potential for sediment in the gut to bias any whole body lead measurements from the most upstream locations" and "The relationship between percent lead associated with the gut and percent AFDW of the gut/gut contents is poor, suggesting little influence of sediment on the lead measurements in the gut/gut contents samples and a low potential bias of lead whole body measurements" are confusing and possibly conflict each other and should be changed with a more appropriate statement.	Commented noted. Text will be changed.	
	S6	3.3 Nature and Extent of Contaminants in Fish (CSM Update): Sections 3.3.1 Evaluation of Trends by Species and Locations and 3.3.2 Statistical Comparisons - Discussion of trends that are potentially not statistically demonstrated with ones that may be can lead to confusion. Please consider this in the revisions. Both assessments have value, but they need to lead toward something. If non-statistical trends are discussed they should be readily distinguishable. Also, please add discussion as to why the P value of 0.1 was selected to determine significance? As a side note: is it possible that the greater than sign (>) in many spots throughout Section 3.3.2 should actually be switched to less than	Commented noted. Text will be changed to add clarification.	

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		signs to show significance.		
	S7	Section 3.3.1.1 Whole Body Tissue - The third sentence in the first full paragraph on page 3-13. To what FSCA in particular is the statement referring to?	Commented noted. Text will be changed.	
	S8	Table 3-11. Hypothetical Fishes B and F look to be the same and can be combined with an expanded conclusion to address both conclusions proposed for Hypothetical Fishes B and F.	Commented noted. Text will be changed to add clarification.	
	S9	Figures 3-33 and 34 should have the same scale on the y-axis to make them more comparable.	Comment noted. The Figure in question will be changed.	
	S10	Figures 3-66 through 78. The corresponding A Figures should be converted to mg/kg wet weight rather than the current µg/kg wet weight to make the figures more comparable to the corresponding B Figures.	Comment noted. The units will be changed.	
	S11	Section 4 – Data Gaps and Recommendations This section could be stronger. A few examples are: • Walleye and PCBs – There is a need for further exploring the nature of the condition, especially in the lower reservoir. The movement of fish in the system and the sources and mechanisms of contamination found is important to achieving improvements. • Burbot – The elevated arsenic and some other contaminants is an important topic. • Burbot – Fillets should be considered in the future. • For future sampling events, a chemical analysis of the sediment found in the guts of the fish should be considered to evaluate the contribution of slag. Should be don pending RA	Comment noted. Section 4.0 will be revised to provide more detailed recommendations.	
		Department of Interior Comments November 27, 2006		
TF6	G1	At this point in the RI/FS, we are still in the process of determining chemicals of concern (COCs), which should not be limited to the contaminants of interest (COIs) in the fish report. The primary purpose of the fish tissue data evaluation report was to present the data; the report was not expected to be a screening level risk assessment nor a determination or elimination of potential COCs. Section 3.1.1 states "Site-specific contaminants of concern (COCs) for UCR fish tissue will	The data evaluation report was prepared to facilitate information sharing, communicate preliminary Phase I findings, and provide context for subsequent RI/FS scoping documents and work plans. Comparison values were used to illustrate broad trends and patterns, but were not used as a screening risk assessment or for selection of contaminants of potential concern (COPC). These important steps will occur in subsequent stages of the RI/FS. To avoid confusion, the use of the term "Contaminant of Interest" (COI) will be replaced with	The comparisons between identified benchmarks and selected contaminants of potential concern does not limit the scope of potentially valid contaminants of concern, or limit the potentially appropriate benchmark comparisons. All contaminants or chemicals detected as part of this evaluation are of interest and/or concern until they are eliminated from consideration in the Screening Level Ecological Risk Assessment or in the refinement step (Step 3) of the Baseline Ecological Risk Assessment.

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		be identified as part of the human health assessment conducted by USEPA and an ecological risk assessment that will be conducted by Teck Cominco American, Inc., and overseen by USEPA." And later "These screening values were selected to help focus the data evaluation…". Therefore, it is expected that refinement of the COC list will not be limited to the COIs presented in the report, and that an identification of COCs and screening level assessments for human health and for ecological risk will take place in subsequent documents.	the term "Preliminary Contaminant of Interest" (PCOI) in the data evaluation report. In addition, the term "screening" will be replaced with terms such as "comparison" so to not imply a risk-based process. The rationale, methods, formulas, and citations used for selection of the "comparison values" are sufficient to reproduce the results during subsequent analysis. For example, 280 grams (10 ounces) per day represents the 95th percentile for adult consumers of fish from a large, national survey of limited duration (USEPA, 2002). Both the ingestion rate and the exposure frequency were increased to adjust the Region 3 human health based fish preliminary remediation goals (PRGs) downward to derive more protective initial comparison values.	
TF7	G2	The report screens out (or does not further evaluate) several compounds that exceed screening levels identified in fish tissues. These include antimony, manganese, thallium, vanadium, individual PCB congeners, and several dioxin and furan congeners. These COCs should be evaluated in the screening level assessments.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	The following COCs should be included in the screening level risk assessments: Antimony, manganese, thallium, vanadium, individual PCB congeners, and several dioxin and furan congeners.
TF8	G3	The fish tissue study should have analyzed organochlorine pesticides, polycyclic aromatic hydrocarbons (PAHs), Teck Cominco specialty metals (e.g., indium, germanium), fire retardants, and other potential COCs.	The selection of the preliminary target analytes was done based on historical data and to try to maximize the utility of the data, within project constraints, relative to the stated objectives of the Phase I study. Other potential contaminants of concern in fish tissues are considered potential data gaps at this time, which USEPA expects to be filled as part of the UCR ecological risk assessment. This may include speciated arsenic analyses for the human health risk assessment.	Tissue studies designed and implemented to determine the concentration of the following analyte groups in target species wild be part of future fish tissue assessments done for the RI: • Pesticides • Polycyclic aromatic hydrocarbons (PAHs); • Specialty metals (e.g., indium, germanium); and • Fire retardants In addition, PCB congener analyses will be done on all fish tissues collected in the future for both human health and ecological risk assessment needs. Speciated arsenic analyses will be done on all fish tissue collected in the future for the human health risk assessment. Tissue studies will be designed and implemented to determine the concentration of the target analytes, in particular speciated arsenic, in fillets of burbot.
TF9	G4	The lack of correlation between fish tissue concentrations and sediment concentrations is not surprising. The lack of correlation may be due to the lack of sediment samples from fish collection areas, fish behavior, variability in sediment concentrations throughout sampling areas, variability in sediment bioavailability, and other factors. The use of composite samples to determine tissue levels assumes that all of the fish in the composite have the same exposure	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	A study designed and implemented to focus collection of largescale suckers in several locations throughout the site in parallel with detailed sediment characterization to better define relationships between sediment and tissue concentrations will be conducted.

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		history. A sample size of five is too small to elucidate the true relations.		
TF10	G5	Data evaluation based on three reaches, rather than the six sampling locations, is premature. Differences between locations within reach should have been compared to determine if lumping of locations within each reach was valid. The report identifies significant differences between reaches within species, but does not adequately evaluate the data to determine if there are any consistent trends between contaminants within species and between species.	The analysis presented in the Draft Phase I Fish Tissue Data Evaluation Report was intended for illustrative purposes and is not intended to be a comprehensive analysis of the fish tissue data. In addition, the analysis approach used for the Phase I fish tissue data should not be interpreted as the only, or even preferred, approach to analyzing and presenting these data. The need for additional and/or alternative analyses is a potential data gap, which USEPA feels should be filled as part of the UCR human health and ecological risk assessments if identified as a data need during future planning efforts.	The following analyses of the Phase I fish tissue data will be undertaken in support of the UCR human health and ecological risk assessments: A statistical comparison of results by analyte among target species. A statistical comparison of the results by analyte and FSCA among target species. A statistical comparison of the results by analyte and target species among all FSCAs. A statistical comparison of results by analyte and target species among FSCAs in a given sampling reach. In addition to these univariate statistical analyses, interactions and other multivariate associations between analytes within FSCAs and target species should be considered. Potential associations between PCOIs in tissues of target fish species and those in sediment and water should also be considered for evaluation.
	G6	The report should state that tissue residues may not correlate to toxicity, particularly for species where contaminant sensitivity is unknown. Tissue residues for metals are not strongly correlated with toxicity since metal toxicity is related to the rate of accumulation on gills and in organs, and the rate of detoxification and elimination (See Barron et al., 2002). Contaminant sensitivity in white sturgeon and other species is unknown, and studies to determine sensitivity are warranted.	Comment noted. Text will be added to clarify this point.	
TF11	G7	The report fails to adequately evaluate polychlorinated biphenyls (PCBs), dioxins and furans adequately, and suggests that all but total PCBs and 2,3,7,8 TCDF should be eliminated as COIs or COCs. Several of the PCB congeners that were measured are co-planar PCBs with dioxin-like toxicity. In the screening ecological and human health risk assessments, a TEQ analysis should be done for PCBs, dioxins, and furans. Lipid-normalized concentrations should also be discussed. The 2005 WHO reevaluation of toxic equivalent factors (TEFs) should be referenced in this report (van den Berg et al. 2006).	Initial project constraints specified a study design that called for PCB congener analyses on a subset (i.e., approximately 20 percent) of the targeted samples. Because of the limited number of PCB congener results completed, a detailed presentation of the results was not undertaken. However, most congeners were commonly detected. Twenty-eight congeners were detected in all target species and tissue types and 23 were detected in between ten and twelve. Exceedences of greater than ten times comparison values were seen for congeners in all species and tissue, ranging from three congeners in walleye fillet to 56 in largescale suckers. Additional and/or alternative analyses are considered data gaps that are expected to be filled as part of the human health and ecological risk assessments.	The following analyses of the Phase I fish tissue data should be undertaken in support of the UCR human health and ecological risk assessments: An assessment of PCB congener distribution by species for each location in both fillets and whole-body fish, with focus on co-planar (dioxin-like) congeners. An assessment of PCB congener distribution by location for each target species in both fillets and whole-body fish, with focus on co-planar congeners. For future phases of fish tissue sampling, future evaluation of dioxins and furans, as well as co-planar PCB data, should be done on a toxicity equivalency (TEQ) basis.

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	G8	QA/QC data validation and handling of QC failures is concerning. The report identifies samples that were qualified, but the report indicates only QC samples were qualified and not the samples associated with QC samples. All samples within a sample run should be qualified as estimates for an element when a QC samples fails and is identified as an estimate. For example, 10 matrix samples were analyzed and ten failed QC for manganese and were qualified as J (estimated value). However, only a few samples were qualified as estimates for manganese in the database.	The analyst(s) at Manchester Lab and the data validator were asked to check and verify the Mn data especially the matrix spike recoveries that were outside the control limits. A total of 17 pairs of MS/MSDs were analyzed for metals. Only 3 matrix spikes that were outside the control limits and all of the Mn results were qualified accordingly as estimated, "J", in the associated samples. It was also determined that the variability in results was determined to be attributed on the non-heterogeneity of the tissue samples (per method, only 1 gram of the tissue sample was used for metals and 0.2 gram for mercury), therefore, bias could not be really assigned on the associated results. It will be helpful if DOI will more explicit and list the 10 MS/MSD pairs that did not meet the QC requirements. Text will be added to clarify the criteria for which samples were qualified based on QC results.	
	G9	Data qualification may be much more extensive than indicated in the report. Data qualifiers are not consistent between the October database and the October report. For dioxin, furan, and PCB congeners, samples with detection concentrations <5 times the value measured in the respective blanks were reported as non-detects. The report needs to indicate how estimated (J-qualified) data could have bias the interpretation of the data.	The validation qualification is customary and appropriate based on the 5x or 10x rule specified as per EPA Data Validation Guidelines, i.e, if a target compound is detected in both the method blank and the associated samples, the target compound reported in the sample could not be considered as real detection unless the concentration is >5x the value (or 10x the value if the compound is a common laboratory artifact) in the associated method blank, due to contamination. Anything <5x the blank values are qualified as non-detects, "U". Anything reported >5x or >10x is reported without validation qualifiers. This process eliminates the possibility of reporting low level false positives due to lab contamination. Qualifying the reported low level sample results as a non-detect does not really bias the data as low. The draw back on this qualification will be the elevated reporting limits of the target compound flagged as non-detect at the level of detection or at the Method Reporting Limits (MRLs).	
	G10	Uncertainty is not adequately discussed in the report. The uncertainty of reported concentrations as a result of QA/QC failures, inadequate sample sizes and spatial coverage, and limitations of the chosen targeted sampling scheme should be discussed.	The data evaluation report was prepared to facilitate information sharing, communicate preliminary Phase I findings, and provide context for subsequent RI/FS scoping documents and work plans. The report does provide recommendations for future data collection and analysis that would be required to complete the human health and ecological risk assessments. It is premature to discuss uncertainty of the data set until the all data collection is completed.	
	G11	Detection limits used in the report need to be explained. Were data evaluated based on method detection limits or contract required detection limits? The relationship between detection limits and screening levels needs to be presented in tables and discussed.	Comment noted. Text will be added to clarify the basis of the detection limits used.	

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TF12	G12	The analysis of the sucker gut versus gutless issue concentrations in the report is concerning. As per discussion with the contractor, the sucker gut consisted of gut contents, digestive tract, and all associated tissues including pyloric caeca. Liver was included or partially included in some of these samples. The report is not clear about the composition of these samples, nor the limitations regarding data evaluation. Interpretation of this data should be qualitative rather than quantitative. The report also assumes the metals in slag and sediment are not bioavailable, which may or may not be true.	USEPA conducted the largescale sucker gut analysis in response to unforeseen field observations. We realized that the potential for copious deposits of slag in the gut of large-scale suckers would add to the uncertainties of the tissue measurements and the future use of those data. The large-scale sucker gut analysis was completed to estimate the relative impact of slag (which was visually apparently as a significant mass in some fish collected from the northern reach of the site) and to help understand how it might best be addressed in future data collection and analysis. The approach was presented in a Supplemental QAPP (CH2M HILL, 2006c). This timely and unplanned effort attempted to optimize the use of the samples in hand. Although this analysis is not ideal or comprehensive, we believe it was a reasonable response to the potentially significant and unanticipated field observations. Additional and/or alternative analyses are at this time considered data gaps, which USEPA expects to be filled as part of the UCR ecological risk assessment.	A specific study designed and implemented to determine the bioavailability of metals both associated with slag and with aqueous releases to bottom-feeding fish such as the largescale sucker should be conducted.
TF13	G13	There are a number of documents cited in the planning and scoping documents for the fish tissue study that contain historical fish tissue information. However, a historical or long-term trend perspective on how these data compare to earlier studies is not provided. Such and effort in the screening ecological and human health risk assessment would be informative and some indication of trends may be possible, specifically in comparison to the US EPA and USGS work.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	An assessment of the historical or long-term trend assessment of fish tissue concentrations in comparison to the US EPA and USGS work should be conducted. Such and effort will assist the screening ecological and human health risk assessments.
TF14	G14	The size range of fish was limited, and the data or a summary of that data is not presented. Particularly for biomagnifying compounds (e.g., PCBs, dioxins, furans), larger, older fish will likely accumulate the contaminants to higher concentrations. The report needs to discuss the size ranges used and potential effects on data interpretation.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	Tissue studies designed and implemented to determine the concentration of contaminants in smaller size classes of other target species will be conducted.
TF15	G15	Composite sampling used in the study limits data interpretation, particularly with respect to ecological risk. Although composite sampling provides good estimates of mean concentrations within a species at a location, the true variability, maximum concentration, and distribution is lost.	A compositing approach was used to maximize the number of individuals from the population that would be included in the sample while minimizing analytical costs, but still allowing for estimation of the variance of the individuals around the mean concentration for the population. However, a compositing approach to sampling precludes measurement of contaminant concentrations in individual fish and the calculation of certain measures of central tendency. It is anticipated that additional and/or alternative sampling and analyses will be required. Use of analyses of individual fish (or fillets) to improve estimates of the spread in the data may be a data gap, which USEPA expects to be filled as part of the human health and ecological risk assessments if identified as a data need during future	Future fish tissue sampling will include analysis of individual fish.

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			planning efforts.	
	G16	Arsenic speciation discussion should be more inclusive of ecological risks and screening levels, particularly with respect to potential ecological risk to fish. The ecological and human significance of these arsenic species needs to be explained. The arsenic speciation discussion should also emphasize that the majority of the inorganic arsenic data are censored and the true percentages of inorganic arsenic in fish cannot be determined from this data set. Perhaps the arsenic speciation data should be identified as “semi-quantitative” or “informational.” We also note that the detection limits do not meet the QAAP analytical concentration goals, and this is not discussed anywhere in the report.	Comment noted. Text will be added to further qualify the arsenic speciation results.	
TF16	G17	This report should include an analysis of lesions and hemorrhagic abnormalities in the fish compared to the fish tissue concentrations.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	An analysis of lesions and hemorrhagic abnormalities in the fish compared to the fish tissue concentrations should be performed.
	G18	Provide more transparency for the human health risk-based screening (RBC) values. While the source of these values is identified as “Region 3 PRGs Fish,” these values have actually been calculated by US EPA using Region 3 methodology but with some different input values. RBC calculations should be presented in an appendix with a spreadsheet or at least the formulas, inputs, and toxicity criteria used. The calculated RBC values presented could not be reproduced.	Comment noted. Additional text and information will be added.	
	S1	Section 2.1. Third bullet states that five of six sampling locations were co-located with sediment sampling locations. Figure 2-1 shows that although the sediment sampling locations were located within those fish sampling areas, the fish sampling locations were often much larger than sediment sampling locations. The differences between sediment and fish sampling locations need to be discussed.	Comment noted. Text will be added to provide further clarification.	
	S2	Section 2.1.1. After bullet points. The report needs to describe the morphological characteristics that distinguish wild from hatchery rainbow trout, and the uncertainty associated with this subjective determination.	Comment noted. Text will be added to provide further clarification.	
	S3	Section 2.1.1. Last paragraph. The study design was not adequate to determine the relative contribution of sediment and slag in the sucker gut. The paragraph	See comment response to G12.	

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		should be modified to remove speculation. The sampling design of the study was able to show that the stomach contents of suckers contained sediment or slag, and that the stomach contents likely increased the whole body concentration of metals. Because the gut samples also contained the digestive tract, pyloric caeca, liver, and other tissues, the relative contribution of metals in stomach contents cannot be determined with any accuracy.		
	S4	Section 2.1.2 Last paragraph. The report needs to describe the fish size range, how size ranges were modified in the field, and how the collected fish conformed or deviated from the US EPA guidance referenced in the paragraph.	See response to WDOE comment G4.	
	S5	Section 2.1.3. Why did fish sampling locations differ from sediment sampling locations? Why were fish sampling locations much larger than sediment sampling locations? Is there greater uncertainty when the two did not overlap?	The FSCAs were located within five of the six sediment focus areas as described in the Phase I Fish Tissue Approach and Rational Document (CH2M HILL, 2005) and the Phase I Fish Tissue Quality Assurance Project Plan (CH2M HILL, 2005). Per the QAPP the FSCA size was increased if necessary to collect the target number of fish.	
	S6	Section 2.2.1. Procedure #5 states that the external exam forms are provided in the appendix to the fish tissue field report. We requested these forms, but only received a portion of the forms. External analysis from fish numbers 192-249, 386-434, 480-767, and 910-999 were not included. The remainder of completed forms should be available for review.	The missing forms have been forwarded.	
	S7	Section 2.2.1. Procedure #8 states that otoliths and opercula were removed for aging purposes, yet the data is not presented or evaluated here. Although the data are available, an evaluation relative to the measured chemistry is warranted.	See response to WDOE comment G4.	
	S8	Section 2.2.2. Third paragraph indicates the number of fish collected. The field sampling report indicated that some that were collected were not used in composites. The field summary report (July 21, 2006) indicated that some fish were randomly culled if they were in the appropriate size range, yet the field summary report identifies several culled fish that does not seem probable from a random selection (Tables 4-12, 4-67, field summary report). The field summary report also indicates some fish collected were not processed further following collection, but presents no explanation as to why (Tables 4-2, 4-35, 4-50, 4-85, field summary report). The data evaluation report needs to present that data	Text will be added to clarify how samples were assigned for processing and assignment to composites.	

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		and discuss which fish were culled and why.		
	S9	Section 2.2.2. How were composites handled between major sampling events? The first event was mid-September and the other was mid-October. Were composites only within events, or were fish composited between events?	Composites only contained fish captured within a sampling event. Text will be added to clarify this point.	
	S10	Section 2.2.2. The target size range and deviations from the original study plan need to be presented rather than just stating that we had a target size range. The actual range in size should be presented in a table.	See response to WDOE comment G4.	
	S11	Section 2.2.3. Laboratory processing needs to state the cleaning procedure between each sample. Field processing used disposable tools to avoid cross-contamination, but laboratory processing used heavy duty steel blades and laboratory processors.	Text will be added to describe decontamination procedures.	
	S12	Section 2.2.3. Sucker processing needs to be clear about how fish were isolated to avoid cross-contamination while thawing in warm water.	The approach was presented in a Supplemental QAPP (CH2M HILL, 2006c). Additional clarification will be added to the report.	
	S13	Section 2.2.3. Sucker processing needs to be clear about what tissues and organs were included in the gut samples. We were told that the samples contained some amount of liver tissue. A full description is warranted.	Text will be added to provide more detail on what the gut sample consisted of.	
	S14	Section 2.2.3. Page 2-8, first paragraph. The data on fish size in each composite needs to be presented. Procedure 13 also needs to describe samples where consultation with the TOPO and QAO were necessary.	See response to WDOE comment G4.	
	S15	Section 2.3. Last paragraph. Coplanar (TCDD-like) PCB congeners, at a minimum, should be analyzed and interpreted in the screening risk assessments.	See comment response G7.	
	S16	Section 2.3.1. Add specifics about audits and QA/QC. Who did the audits and what was their affiliation.	Comment noted. The requested information is provided in the Phase I Fish Tissue Quality Assurance Project Plan (CH2M HILL, 2005	
	S17	Section 2.3.3.3. Do QC results go in the methods, or in results?	Comment noted. The QC results will be moved to Section 3 of the report.	
	S18	Section 2.3.3.3. TAL metals. Matrix spike analysis and duplicate samples that failed do not seem to have affected the samples run with those QC samples. If a QC sample fails, the samples run with those QC samples also fail and must be qualified as estimates. For example, ten spike samples were run for manganese, and all ten failed, yet only a small percentage of manganese samples were qualified as estimates. If all	The analyst(s) at Manchester Lab and the data validator were asked to check and verify the Mn data especially the matrix spike recoveries that were outside the control limits. A total of 17 pairs of MS/MSDs were analyzed for metals. Only 3 matrix spikes that were outside the control limits and all of the Mn results were qualified accordingly as estimated, “J”, in the associated samples. It was also determined that the variability in results was determined to be attributed on the non-	

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		ten failed, all manganese samples must be qualified. The data analysis should also describe the potential bias from QC failures. Do the data suggest that there is a consistent bias high or bias low, or just an inconsistency or low accuracy? A table should present the data on QC failures such as percent recovery of spikes and RPDs of duplicates.	heterogeneity of the tissue samples (per method, only 1 gram of the tissue sample was used for metals and 0.2 gram for mercury), therefore, bias could not be really assigned on the associated results. It will be helpful if DOI will more explicit and list the 10 MS/MSD pairs that did not meet the QC requirements. Text will be added to clarify the criteria for which samples were qualified based on QC results.	
	S19	Section 2.3.3.3 TAL metals table. The table reports laboratory sample identification numbers, but there is no way to cross-reference those samples to actual field sample identification numbers. The field sample identification numbers should be used here.	Comment noted. The table will be modified to include field sample identification numbers.	
	S20	Section 2.3.3.3 PCB. Matrix spike analysis indicates that samples were qualified due to peak co-elutions, but that information is not presented. Which other samples were qualified, and what does that mean?	The matrix spike analyses were not used in determining peak co-elution in samples analyzed for PCB Aroclors. Most of the tissue primary extracts for PCB analyses had multiple analyses and multiple clean-ups. Peak co-elution due to the presence of multiple PCB Aroclors in the sample was determined and subsequently flagged as estimated by evaluating each sample chromatogram after each extract clean-up and re-analysis for both columns. When multiple Aroclors are detected in the sample, the analyst and the data validator manually identified fully resolved peaks that are not common to the Aroclors and used them for quantification. However, there were instances when the complexity of the sample matrix (high organic material and lipids) prevents the isolation of individual peaks for each Aroclor in the sample and even with several clean-ups and re-analyses, a clean chromatographic resolution for each of the Aroclors could not be attained, and therefore, peaks could not be isolated from each other for quantification (presence of Aroclors 1254 and 1260, Aroclors 1248 & 1254, Aroclors 1248, 1254 & 1260 combinations). In cases like this, the PCB Aroclor results were reported as combined Aroclors flagged as estimated. The reported results are the averages of values calculated from both columns and bias could not be accurately determined. Matrix spike and matrix spike duplicate results could not be used to determine bias due to the interferences caused by the significant levels of Aroclors native to the fish tissue samples.	
	S21	Section 2.3.3.3 Dioxin Furan, and PCB congener handling of method blank detections is a concern. This section describes that samples with detected concentrations <5 times the value of respective blanks were qualified as non-detects. This is inappropriate and will bias the analysis low.	The validation qualification is customary and appropriate based on the 5x or 10x rule specified as per EPA Data Validation Guidelines, i.e, if a target compound is detected in both the method blank and the associated samples, the target compound reported in the sample could not be considered as real detection unless the concentration is >5x the value (or 10x the value if the compound is a common laboratory artifact) in the associated method blank, due to contamination. Anything	

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			<5x the blank values are qualified as non-detects, "U". Anything reported >5x or >10x is reported without validation qualifiers. This process eliminates the possibility of reporting low level false positives due to lab contamination. Qualifying the reported low level sample results as a non-detect does not really bias the data as low. The draw back on this qualification will be the elevated reporting limits of the target compound flagged as non-detect at the level of detection or at the Method Reporting Limits (MRLs).	
	S22	Section 2.3.3.3. QC sample description seems too brief. Were no external reference standards run? Were there no duplicates or spikes run for dioxins, furans, and PCB congeners?	Comment noted. Text will be added to provide further clarification.	
	S23	Section 2.3.3.3. Detection limit calculation and description needs to be presented. Were non-detects based on method detection limits or contract required detection limits? What were those detection limits applicable to the data evaluation? Add those detection limits to Table 3-1.	Comment noted. Text will be added to provide further clarification.	
TF17	S24	Section 3.1.1. Ecological criteria. The Ecological Risk Screening Values for metals and PCB Aroclors were from Dyer et al, 2000 and Dioxins/Furans and PCB Congeners were from Windward, 2004. Why and how were these criteria selected? Why are they considered more appropriate than other screening levels? For example, New York State has an ecological screening level of 110 ppb PCB, whereas this report identifies 440 ppb as the ecological screening level. The values for antimony, beryllium and thallium presented in Table 3-1 were not found in Dyer et al and it is not clear where they are from. A more exhaustive screening level search should be conducted, which could include state (e.g., New York, Washington) and Canadian screening levels. Rationale for selection of these screening values should be included in the screening ecological and human health risk assessments.	Comparison values were used to illustrate broad trends and patterns, but were not used as a screening risk assessment or for selection of contaminants of potential concern (COPC). These important steps will occur in subsequent stages of the RI/FS. EPA expects that a thorough selection process for ecological screening criteria will be done during the Screening Level and Baseline Ecological Risk Assessment.	A thorough selection process for ecological screening criteria shall be done during the Screening Level and Baseline Ecological Risk Assessments.
	S25	Section 3.1.1. Page 3-4. The report indicates that fourteen dioxin and furan congeners exceeded at least one screening level, yet only one (2,3,7,8 TCDF) was further evaluated. PCBs were only evaluated as total PCBs. The dioxin, furan, and coplanar PCBs should be evaluated based on 2,3,7,8 TCDD toxic equivalency (TEQ). Data on dioxins, furans, and PCBs should also be evaluated on a lipid basis.	See comment response G7.	
	S26	Section 3.1.1. The contaminants of interest should not be used to limit possible COCs. Organochlorine	See comment response to DOI comment G3.	

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		pesticides, PAHs, and Teck Cominco specialty metals were not evaluated. Screening levels should be further evaluated based on other literature sources. Additional evaluations of PCBs, dioxins, and furans should be completed.		
	S27	Section 3.1.2. The percent metals associated with sucker gut can only be used to illustrate that gut contents likely influenced some whole body sucker results. The study design was not adequate to subtract the gut contents analysis from whole body analysis to get ecologically-relevant tissue residues. The study design was also not adequate to determine the bioavailability of stomach contents containing sediment or slag.	See comment response G12.	
	S28	Section 3.2.1. PCBs, dioxins, and furans should have been analyzed based on 2,3,7,8 TCDD toxic equivalency. Some coplanar PCB congeners are relatively high in concentration, and PCBs may be of higher concern than dioxins and furans.	See comment response to DOI comment G3.	
	S29	Section 3.2.1. The arsenic speciation interpretation is too brief with respect to potential ecological risk. The statement (page 3-7): “As a bounding estimate on the percentage of inorganic arsenic present in fillets, ratios were calculated by dividing the inorganic arsenic detection limit by the mass of total elemental arsenic. The true ratio is unknown, but could be as high as shown in Figure 3-24 or as low as Zero,” needs further explanation. For human health as well, an expanded discussion is also warranted regarding the uncertainties of assuming a fish filet contains up to 19.6% of inorganic arsenic based on a non-detected inorganic value. The majority of the inorganic arsenic data is censored and the true percentages of inorganic arsenic in fish cannot be determined from this data set. We also note that the detection limits do not meet the QAAP analytical concentration goals. The QAPP Table 2-3 provided analytical concentration goals for inorganic arsenic based on human health of 0.64 ug/kg and 6.4 ug/kg based on cancer risk levels of 1 x 10-6 and 1 x 10-5, respectively. QAPP Table 2-4 identified 6.4 ug/kg as the analytical concentration goal for inorganic arsenic, but the actual laboratory quantitation limit was listed as “to be determined” and footnoted as information provided later once the specific laboratories conducting the analysis had been selected. The QAPP goal of 6.4 ug/kg was not met for any of the 30 non-detected samples as indicated by the values on Table 3-10.	Comment noted. Text will be added to further qualify the speciated-arsenic results.	

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	S30	Section 3.2.2 and 3.2.3.1 equations have errors. In both cases, the second parenthetical calculation should be multiplication rather than addition.	Commented noted. The typographical errors will be corrected.	
	S31	Section 3.2.3. Far too much time and effort has been put on sucker gut and gutless whole body analysis. The data warrant only descriptive interpretation that suggests that stomach contents may have influenced the whole body results. Interpretation of percent influence on whole body results is not valid.	See comment response G12.	
	S32	Section 3.3.1 is vague as to what statistical comparisons were completed. Section 3.3.1.1 presents trends for which no statistical comparisons were completed. No decisions should be made based on non-statistical trends.	Comment noted.	
	S33	Section 3.3.2. Statistical trends were apparently completed by reach containing two sampling locations per reach. Statistical comparisons between sampling locations within each reach should be completed prior to comparing reaches.	See comment response G5.	
	S34	Section 3.3.2. Page 3-16, last paragraph. A more detailed discussion of fish sampling locations compared to sediment sampling locations is warranted. Fish sampling locations were usually much larger than sediment sampling locations. How did this influence the data, or limit interpretation of correlations between fish and sediment concentrations?	Comment noted. Text will be added to further clarify this point.	
	S35	Section 3.3.2. Why was an alpha of 0.1 used?	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
	S36	Section 3.3.2.1. Page 3-16. Table 3-19 provides coefficient of variation and Figure 3-65 provides statistical power curves. The statistical power for comparisons should be presented rather than making the reader extrapolate between tables and figures.	The presentation of the power curves was intended to allow the reader to determine the statistical power for three levels of difference and for two levels of sample sizes (see Figure 3-65). The approach was taken in an effort to streamline the document and not burden it with multiple tables (i.e., 6 tables containing 1080 different power calculations).	
	S37	Section 3.3.2.2. The fish sampling locations were usually much larger than sediment sampling locations. What assumptions were made in order to allow comparisons between fish tissue concentrations and sediment concentrations? What uncertainty is associated with these assumptions? Were comparisons done by reach	Text will be added to provide details of the comparison of the fish sampling and sediment sampling areas.	

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		or by sampling location? Were there significant differences between sampling locations for sediment or fish tissues if comparisons were done by reach?		
	S38	Section 3.3.3. The two references alluded to report 1994 data. A second, follow-up study was conducted to provide subsequent information to both studies in 1998 and reported in Munn 2000. The Washington Department of Ecology Publications in 1989, 1990, and 1991 could also be included for trend analysis.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
	S39	Section 3.3.4. First paragraph. Second to last sentence, edit to include diet:"…exposed to the contaminants through direct uptake (i.e., …) through feeding on biota…" This should be through direct uptake, or through diet (i.e. feeding on biota also contaminated, suspended particulates, or sediment.	Comment noted. Text will be changed.	
	S40	Section 3.3.4, third paragraph. Is the list in parenthesis in the first sentence an i.e., or e.g.? Are other metals found in slag?	Comment noted. Text will be changed.	
	S41	Section 3.3.4, third paragraph, Page 3-22 second to last sentence. Add reference for PCBs being similar in those species which include sturgeon.	Comment noted. Text will be changed.	
	S42	Section 3.3.4, Page 3-22, first bullet. The report can't conclude whether the elevated metals in suckers are from slag or sediment in stomach contents due to problems with the study design (discussed several times in this review).	Comment noted. Text will be changed.	
	S43	Section 3.3.4, Page 3-22, fourth bullet. The report can't conclude that elevated sucker PCB is from exposure to sediment rather than water or food chain pathways. The study design was not adequate for this conclusion as discussed elsewhere in this review.	Comment noted. Text will be changed.	
	S44	Section 3.3.4., first paragraph after bullets. Add diet to the pathway in first sentence.	Comment noted. Text will be changed.	
	S45	Table 3-1. QAPP Table 2-3 human health RBCs do not match Table 3-1 RBCs. QAPP Table 2-3 presents human health criterion for fish tissue based on EPA Region 3 RBCs for fish tissue modified to include a fish ingestion rate of 170 g/day, a target hazard quotient (HQ) goal of 0.1 for non-cancer, and target risk of 1 x10-6 or 1 x 10-5 for cancer. [Note - Region 3 published RBCs are based on a fish ingestion rate of 54 g/day, HQs of 1 and cancer goals of 1 x 10-6]. QAPP Table 2-3 used the lower of human or ecological criterion to	See comment response G1.	

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		establish analytical concentration goals and the majority of the analytical goals selected were based on human health criteria. In contrast, the RBCs used to select COIs on Table 3-1 are lower than the human health criterion presented on QAPP Table 2-3 because RBCs on Table 3-1 used a fish ingestion rate of 280 g/day. There is neither discussion in the report as to why this change was made nor any discussion as to whether the change might have impacts on the quality of the data (e.g., a larger amount of censored data with reporting limits above RBCs). The differences between the values on QAPP Table 2-3 and Table 3-1 are not large, but should be reviewed for data quality impacts and discussed in the text.		
	S46	Table 3-1. No human health criteria for antimony shown on Table 3-1, nor is a human health values for antimony on Table 2-3 of the QAPP. QAPP Table 2-3 indicates that an RBC for antimony is not available and there is a blank for antimony under the human health criteria on Table 3-1. Therefore, in the QAPP the ecological criteria of 30 ug/kg was selected as the analytical goal and in Section 3 antimony concentrations in tissue were evaluated by comparing the data to the ecological criteria. Antimony was not selected as a COI and only largescale suckers had any exceedances over the screening value (Table 3-3). However, there is a Region 3 fish tissue RBC for antimony, and, using the QAPP and data evaluation modifications described above, human health criteria are 17 ug/kg and 10 ug/kg, respectively, both lower than the ecological value. This error should be corrected and the tissue data for antimony re-evaluated to see whether a screening value of 10 ug/kg versus 30 ug/kg would affect COI selection or the data quality evaluation. Antimony was not selected as a COI, although there were exceedances over the screening value of 30 ug/kg.	Comment noted. Text will be changed.	
	S47	Table 3-1. We could not reproduce the following RBCs: Barium (we get 5.2 mg/kg based on barium's 2005 RfD – less stringent. If this is why we could not reproduce the 1.8 mg/kg value on Table 3-1 this may have an effect on the selection of COIs because a revised RBC would be higher. Barium was selected as a COI based on very few exceedances above screening criteria). PCB-1016 (we get a value of 1.8 ug/kg using a fish ingestion rate of 280 g/day and an RfD of 7 x 10-5 mg/kg-day)	Comment noted. Table 3-1 will be corrected for errors and omissions.	

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		PCB Aroclors except 1016 (we get 0.3 ug/kg) 2,3,78-TCDD (we get 0.004 pg/g). For the dioxin/furan and PCB congeners listed on Table 3-1 there are no Region 3 RBC values (except for 2,3,78-TCDD) and it is not clear how some of the values were derived. For example, what TEFs were used - the World Health Organization (WHO) 1998 values or the latest WHO recommendations released earlier this year? Why is the RBC for 2,3,7,8-TCDF, with a TEF value of 0.1, not an order of magnitude higher than the RBC for 2,3,7,8-TCDD? The values shown on Table 3-1 are 0.001 pg/g and 0.004 pg/g, respectively, we get 0.004 pg/g and 0.04 pg/g. If the 2,3,7,8-TCDF value should be 0.04 pg/g would this affect the selection of COIs?		
	S48	Table 3-1. As noted in our general comments, we do not agree with screening the congeners separately, but if this is done, some of the values on Table 3-1 should be corrected. For the non “dioxin-like” PCB congeners, we disagree with using an RBC based on the RfD for Aroclor 1254 (we assume that is what was done because then we can reproduce the screening value of 522 pg/g on Table 3-1 but this is not explained in the text). The toxicity of this group of chemicals as separate from total PCBs or the dioxin-like PCBs has not been sufficiently explored, and we recommend using the toxicity criteria for total PCBs for all 209 congeners summed for the purposes of screening. For the 12 “dioxin-like” PCB congeners, we recommend using the 2,3,7,8-TCDD RBC and comparing that to the dioxin-like PCBs normalized to TCDD as described above. For the separate RBCs for the dioxin-like PCB congeners on Table 3-1, WHO considers 12 PCB congeners to be dioxin-like and thus 12 have TEFs and, if individual RBCs are calculated, RBCs should be derived using the 2,3,7,8 –TCDD toxicity criteria. However, only 10 are shown on Table 3-1 with dioxin-based RBCs, PCBs 157 and 167 are missing. In addition, PCB 169 has a TEF of 0.01 (1998 WHO TEFs) and should have a different RBC than the congeners that have TEFs of 0.0001 (PCBs 77, 81, 105, 118, 123, and 189); therefore, the RBC shown on Table 3-1 for PCB 169 should be lower. We note that the latest revised WHO TEFs have changed TEFs for 10 of the 12 PCB congeners. Most of the PCB TEFs have been lowered (less toxic). We recommend using the 2005	Comment noted. Table 3-1 will be corrected for errors and omissions.	

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		TEFs (van den Berg et al. 2006).		
	S49	Table 3-1. The values for antimony, beryllium and thallium were not found in Dyer et al.	Comment noted. A corrected citation will be included.	
	S50	Table 3-1. Add detection limits applicable to the data as a 6th column. Discuss how screening levels less than applicable detection limits were evaluated.	Comment noted. Additional text will be added to clarify this point.	
	S51	Table 3-3. Why were antimony, beryllium, manganese, thallium, vanadium, and dioxin/furan congeners other than 2,3,7,8 TCDF excluded as contaminants of interest in the report? Why were PCB congeners, specifically coplanar PCBs excluded from analysis?	See comment response G1.	
	S52	Table 3-5 is incomplete. The table only presents congeners 1 to 64.	Comment noted. The full table listing all 206 congeners will be included.	
	S53	Table 3-11 the table correctly identifies that high metals in gut contents may be from sediment, slag, or gut tissue. However, the report is written to suggest that the majority of metals in gut tissue are from sediment or slag, a conclusion that may be a good assumption, but is not valid based on the samples analyzed. The results indicate that the assumption should be tested in a new study that analyzes stomach contents independent of tissues.	See response to WDOE comment G1.	
	S54	Tables 3-12 to 3-14. The column headings need to provide field sample id and sample matrix in the column.	Comment noted. The additional information will be added.	
	S55	Table 3-13. Copper analysis from several gut samples were qualified “U”, but the same samples with the same reported values are not qualified in the October database.	Comment noted. This discrepancy will be corrected.	
	S56	Tables 3-17 and 3-18, add units for contaminants.	Comment noted. Units will be added to the tables.	
	S57	Table 3-17. Adjust print for page breaks. The PCB data is labeled on page 2 of table, and data is on page 3.	Comment noted. The print format will be corrected.	
	S58	Table 3-20 and similar. Are sampling locations within reach significantly different? If so, presentation of data by reach is not valid. Sixth column is not “between fish variability” since individual fish were not analyzed. The column should be “between composite variability”. Significant differences found in Table 3-21 and similar should be added to respective data tables (e.g., Table 3-20).	The analysis presented in the Draft Phase I Fish Tissue Data Evaluation Report was intended for illustrative purposes and is not intended to be a comprehensive analysis of the fish tissue data. In addition, the analysis approach used should not be interpreted as the only, or even preferred, approach to analyzing and presenting these data. Additional or alternative analyses are data gaps, which USEPA feels should be filled as part of the UCR human health and ecological risk assessment if identified as a need during future planning efforts. The information presented in column six of the tables in	

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			question is an estimate of between fish variability. The variability in COI concentrations in individual fish was estimated using the following approach. Within a sampling area, fish were randomly assigned to the replicate composite samples. When fish are randomly selected within a locale for compositing, the expected value of the observed concentration (C) is the mean (μ) of the individual fish concentrations; i.e., $$E(C) = \mu$$ If several composites are created randomly and analyzed, their observed variability $\left(s_C^2\right)$ has the expected value: $$E\left(s_C^2\right) = \frac{\sigma^2}{k}$$ Where: σ^2 = variance in individual fish concentrations k = number of fish forming the composite Hence, an estimator of σ^2, the fish-to-fish variability, is: $$\hat{\sigma}^2 = k \cdot s_C^2$$ Where: $$s_C^2 = \frac{\sum_{i=1}^{n}\left(C_i - \bar{C}\right)^2}{(n-1)}$$ And where: $$\bar{C} = \frac{\sum_{i=1}^{n} C_i}{n},$$ n = number of composite samples formed at a locale Hence, although individual fish tissues were not analyzed,	

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			careful compositing preserved some of the information on fish–to-fish variability in contaminant concentrations	
	S59	Figures 3-25 to 3-28. Location FSCA1a needs to be more adequately described in the text, including number of replicates used in comparisons between FSCA1 and FSCA1a.	See response to WDOE comment G2.	
	S60	Figures 3-29 to 3-32. These figures do show a trend that higher sediment content in the gut samples can be associated with higher metal concentrations, but they also illustrate the problems associated with drawing conclusions of sucker whole body concentrations. The figures show high variability. A better illustration would use concentrations rather than percent to filter out those samples that have relatively low sediment content. As identified earlier, far too much emphasis is placed on this analysis.	Comment noted. See TCAI response for WDOE comment G	
	S61	Section 4. Expand on uncertainty either in sections of the report or in section 4. The uncertainty of reported concentrations as a result of QA/QC failures should be discussed. The report identifies uncertainty associated with applying these results other species such as sturgeon. The report should discuss the relationship between tissue residue concentrations and toxicity, specifically for species with unknown sensitivity such as sturgeon. The fourth paragraph of section 4 makes statements that cannot be supported by the methods used (sucker gut with sediment and viscera). Without a sediment or slag-specific analysis from ingested contents, those conclusions cannot be drawn. Bioavailability conclusions based on this analysis cannot be supported because of variable concentrations in ingested material within an individual.	See comment response G10.	
	S62	Section 4. Paragraph 3. The study identifies sturgeon may have a uniquely great exposure potential. However, risk and toxicity is not entirely dependent on tissue accumulation. Tissue residues for metals are not strongly correlated with toxicity since metal toxicity is related to the rate of accumulation on gills and in organs, and the rate of detoxification and elimination. Contaminant sensitivity in white sturgeon is unknown, and studies to determine sensitivity are warranted.	See comment response G6.	
	S63	Section 4. Paragraph 4. The conclusion of contaminant uptake in the second sentence is not shown by the study, but suggested or assumed. The whole body results do not show that contaminants are not taken up equally, but rather suggest that contaminants are not	Comment noted. Text will be changed.	

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		taken up equally.		
	S64	Section 4. Last paragraph. Data assessment should include PCBs, and should include a 2,3,7,8 TCDD toxic equivalency analysis. Upon further analysis suggested in this review, the paragraph will likely need to be revised to include PCB, dioxin and furan congeners.	See comment response G7.	
		Confederated Tribes of the Colville Reservation (CCT) Comments November 28, 2006		
TF18	G1	Introduction - The overall objective of the RI/FS for the UCR is to identify site contamination, assess potential risk to human or ecological receptors, and develop remedial approaches to mitigate unacceptable risk. The Phase I fish tissue sampling program was designed to gather data to support (1) the human and ecological risk assessments, and (2) analyses to address whether to issue an updated fish advisory for Lake Roosevelt. The Phase I fish tissue sampling program was also designed to meet the following secondary objectives: • Characterize the spatial patterns of tissue contaminants • Establish baseline tissue contaminant levels for comparison with future surveys • Correlate tissue concentrations with contaminant concentrations in sediment • Compare tissue contaminant levels among fish species • Compare tissue contaminant levels among river reaches • Characterize the variation in tissue contaminant concentrations among individual fish of a species All of the primary and secondary objectives above were achieved to a degree. The data collected during Phase I are a good first step toward characterizing the nature and extent of contamination in the UCR site. However, it is critical to recognize at least two inherent limitations for using and interpreting the data collected during the Phase I fish tissue sampling effort. First, the results and analyses are valid for the specific areas that were sampled, but may not be valid for other areas within the UCR site. The Data Evaluation report appears to	The study was intended as the first phase of an investigation of contaminants in biota within the UCR site. Additional and/or alternative data collection and analyses beyond the scope of the Phase I fish tissue study are at this time considered data gaps, which USEPA expects to be filled as part of the UCR human health and ecological risk assessments.	

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		assume that the fish sampling areas accurately represent levels of contamination in fish in other areas throughout the UCR, but no data are provided to substantiate this implicit assumption. Presumably this assumption is based on an erroneous conclusion in the Sediment Sampling Data Evaluation report (CH2MHILL 2006a) that levels of contamination in sediment sample focus areas are representative of contamination in other areas of the UCR. To the contrary, comparison of sediment samples collected in focus versus near-focus areas indicates that focus areas do not appear to be representative of the rest of the UCR site (see the CCT's Comments on Draft Phase 1 Sediment Sampling Data Evaluation Upper Columbia River Site RI/FS, dated 28 July 2006). Second, the relatively small sample sizes of fish collected seriously limits the statistical power of many analyses and, therefore, the conclusions that can be drawn from such analyses. Further sampling of the same (and additional) fish species throughout the UCR is warranted to better characterize the nature and extent of contamination in fish in the UCR. One species that is especially important to study in subsequent phases of the RI/FS is white sturgeon, Acipenser transmontanus, as is noted in section 4 (Data Gaps and Recommendations) of the report.	By necessity, the Phase I fish tissue study focused on target species that were chosen to represent key species in the UCR fish community and selected potential exposure pathways. It is uncertain whether the results from the current study can or should be applied to other species. The results seen in the largescale sucker suggest that the potential for exposure to all contaminants appears to be particularly high for bottom-feeding species. Piscivorous species, such as walleye and burbot, also have the potential for greater exposure to contaminants such as PCBs and mercury. These results suggest that the white sturgeon may have a uniquely great exposure potential. The white sturgeon was considered as a candidate target species during the development of the Phase I study design. However, because of the sensitive nature of the white sturgeon population in Lake Roosevelt, nontraditional methods for collection of tissue samples were considered necessary if sturgeon were to be sampled. Given the timing of the field effort, it was not practical to include the white sturgeon as a target species during the Phase I sampling. Tissue contaminant analysis and toxicological studies involving the white sturgeon are considered data gaps, which USEPA expects to be filled as part of the human health and ecological risk assessments.	The following studies should be considered in subsequent phases of RI data collection: Tissue studies designed and implemented to determine the concentration of contaminants in various size classes of white sturgeon. Toxicological studies designed and implemented to assess the relative toxicity of various indicator contaminants to sensitive life stages of the white sturgeon. Tissue studies designed and implemented to determine the concentration of contaminants in various forage species (e.g., dace and sculpin) consumed by piscivorous fish and wildlife. Tissue studies designed and implemented to determine the concentration of contaminants in various trophic guilds (i.e., planktivore, detritivore, insectivore, etc.) not represented by other sampling criteria.
TF19	G2	Fish Sampling Locations. Limiting collection of fish to six relatively small Fish Sampling Collection Areas (FSCAs) within the 150 miles of affected river is questionable. Indeed the CCT commented on the Phase I Fish Sampling QAPP that "A sampling plan focus on specific fish species and sediment areas should be reserved for Phase II, where spatial trends and sediment relationships could be developed for species showing	The number and placement of FSCAs were selected to try to maximize the utility of the data relative to the stated objectives of the Phase I study. It was anticipated that, based on the Phase I results, additional and/or alternative sampling and analyses programs may be required. At this time, there may be data gaps associated with the spatial distribution and number of fish tissue sample locations. The need for additional data collection will be assessed, and the data gaps may be filled, as	The following studies are recommended in subsequent t phases of RI data collection: A study designed and implemented to target collection of recreationally important species from areas known to receive heavy recreational fishing activities. A study designed and implemented to collect fish in areas that, due

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		the highest potential in Phase I for site fidelity and relationship with sediment chemistry." Five of the six FSCAs in the UCR site were chosen to be co-located with "focus area sediment samples" (CH2MHILL 2005a: 6-5 through 6-7), but no explanation was provided regarding the value or utility of co-locating fish and sediment samples, nor was an explanation provided for not co-locating FSCA #5 with sediment focus area #5. Further, large-scale sucker is the only species of fish for which tissue data were analyzed with respect to co-located sediment data. This begs two questions. First, how were the locations of focus-area sediment samples selected? Second, given the answer to the first question, does it make sense to co-locate fish sampling in these same locations? "A variety of factors influenced the locations of the focus area [sediment samples]. These factors included river hydrodynamics, proximity to known source areas, historical distribution of COIs, recreational use, and adjacent land ownership. A description of the six focus areas and the rationale for their establishment are presented In addition, given the large size of the UCR size, the sediment focus areas "are intended to also serve as smaller, representative sub-areas within the study area that can be used as a gauge of anticipated sediment conditions for the larger areas that lie between Focus Areas." However, despite the hope that the Focus Areas accurately reflect levels of contamination in adjacent "near-focus" upstream and downstream stretches of river, and thus could be used as valid surrogates for these near-focus areas, analyses presented in the Phase 1 Sediment Sampling Data Evaluation (CH2MHILL 2006a) do not support this conclusion (see the CCT's Comments on Draft Phase 1 Sediment Sampling Data Evaluation Upper Columbia River Site RI/FS, dated 28 July 2006). Thus, additional sampling of fish (as well as sediment) at locations outside of FSCAs is warranted.	part of the UCR human health and ecological risk assessment.	to habitat features, are expected to be prime foraging areas for piscivorous wildlife. A study designed and implemented to focus collection of largescale suckers in several locations throughout the site in parallel with detailed sediment characterization to better define relationships between sediment and tissue concentrations. A study designed and implemented to explore relationships between exposure to mercury and 2,3,7,8 TCDF and concentrations in other media such as surface water, suspended particles, sediment, and food resources. The results of the current study suggest that exposure to mercury and 2,3,7,8 TCDF is greatest in the more lake-like portion of the UCR. The source of exposure is likely a combination of the water column, sediment, and the food web. A study designed and implemented to explore the sources of PCBs found in fish tissues at the site.
TF20	G3	Section 2.2.1. Fish Collecting and Handling, Page 2-5. The QAPP (CH2M HILL 2005b:3-11, and page 3 of Appendix C) states, "an external examination will be conducted to document the presence of external anomalies. The external examination will generally follow the Biomonitoring of Environmental Status and Trends (BEST) guidelines (USGS 2004), which are based upon methods developed by Goede (1993) and Adam et al. (1993)." The results of these external exams were recorded and are provided as an appendix to the Fish	The external exams were conducted to provide supplemental data for possible use during the ecological risk assessment. The focus of the Phase I Fish Tissue Sample Data Evaluation Report was on the results of the chemical analysis. The results of external exams were recorded and are provided as an appendix to the Fish Tissue Field Report (CH2MHILL 2006b). A summary, analysis or discussion of these data was beyond the scope of the Phase I Fish Tissue Sampling Data Evaluation Report. These data should be analyzed and reported as part of the ecological risk assessment.	The results of external exams were recorded and are provided as an appendix to the Fish Tissue Field Report (CH2MHILL 2006b). However, no summary, analysis or discussion of these data is presented in the Fish Tissue Sampling Data Evaluation Report. It is highly recommended that these data be summarized, analyzed and discussed

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		Tissue Field Report (CH2MHILL 2006b). However, no summary, analysis or discussion of these data is presented in the Fish Tissue Sampling Data Evaluation Report. These data should be summarized, analyzed and discussed in a revised draft of this report.		
	G4	Section 2.2.2 Collection Summary, page 2-6. States "During the September sampling event, 317 fish were collected and kept (Table 2-3), and, during the October event, 494 fish were collected and kept (see Table 2-4)." However, the total number of fish collected in September in Table 2-3 is 316, not 317. Further, the total number of fish collected in September based on Appendix A of the Phase I Fish Tissue Sampling Field Summary Report (hereafter Data Summary Report) is 319. Presumably, 319 is the correct number. Similarly, the total number of fish collected in October according to both Table 2-4 and Appendix A of the Data Summary Report is 492, not 494. These values should be corrected. Also, Tables 2-3 and 2-4 of the Data Evaluation Report are the same as Tables 3-7 and 3-8 of the Data Summary Report. Many of the data presented in these tables do not agree with data presented in the text and Appendix A of the Data Summary Report; these inconsistencies are summarized in Tables 1 and 2 of the Appendix1 to these comments.	Comment noted. The text and tables will be changed to address the noted errors.	
	G5	Section 3.1.1. Screening Process. Preliminary screening results are summarized by species and tissue type (fillet vs. whole body) in Tables 3-2 and 3-3 and Appendix A of the report. In the table below, the CCT compiled mean exceedance (hazard quotient) and mean percentage of samples exceeding an HQ of 1 for each COI for all species combined, using data provided in Tables 3-2 and 3-3 of the report. Maximum HQs for COIs in fillet tissues of individual fish species are 166.8 for metals (mercury in walleye), 116.0 for PCB aroclors (1254/1260 in walleye), and 569.5 for dioxins and furans (2,3,7,8-TCDF in wild rainbow trout). Maximum HQs for COIs in whole-body tissues of individual fish species are 277.8 for metals (lead in largescale sucker), 1163.9 for PCB aroclors (1254/1260 in largescale sucker), and 2706.5 for dioxins and furans (2,3,7,8-TCDF in largescale sucker). For COIs that exceed an HQ of 1 in fillet tissue in at least one fish species in this study, the mean HQ for fillet tissue of all species combined was 40.7 (range = 0.4 – 345.8). For COIs that exceed an HQ of 1 in whole-body tissue in at	This report was prepared to facilitate information sharing, to communicate preliminary Phase I findings, and to provide context for subsequent RI/FS scoping documents and work plans. Because this report was prepared in advance of the initial RI/FS work plans, it does not substitute for these critical steps. Given this, the objective was to present the nature and extent of fish tissue contaminants seen in the Phase I sampling and to present the data relative to the secondary objectives identified in the Phase I Fish Tissue Approach and Rational Document and the Phase I Fish Tissue Quality Assurance Project Plan, and the objectives presented above. . Comparison values were used to illustrate broad trends and patterns, but were not used as a screening risk assessment or for selection of contaminants of potential concern (COPC). These important steps will occur in subsequent stages of the RI/FS.	

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		least one fish species in this study, the mean HQ for whole-body tissue of all species combined was 78.7 (range = 0.3 – 1249.0). High maximum HQ values and high incidence of exceedances across fish species and sampling locations indicates that a large percentage of the metals, PCBS, and dioxins and furans listed in the table above pose serious potential risks to human health and the environment, and that significant additional data collection will be required to adequately characterize the full extent of contamination of the UCR by these COIs.		
TF21	G6	Section 3.1.2 Data Evaluation Approach and Comparisons to DQOs, page 3-5. In general this section is so vague as to be lacking in utility. The purported value of nearly all data sets is that they will, at least in part, "support refinement of the CSM, [and] help determine how data should be aggregated during risk assessments," but no explanations are provided to explain or justify how EPA believes these data will serve these purposes. Examples of this include the following: 1. "Percent metals associated with the gut/gut contents of largescale suckers. The results of the gut/gut contents evaluation will support refinement of exposure calculations for both the human health and ecological risk assessment. The results can also be used to guide the study design of any future fish tissue collection efforts required to complete the risk assessments." It is not at all clear how these data will inform the RI/FS process including future data collection efforts or refinement of exposure calculations for either human health or ecological risk assessment. It would be quite helpful to EPA and its partners to convene a meeting to discuss this issue and consider what insights can be derived and craft more specific direction to Cominco. 2. "Comparisons of COI concentration by fish collection areas for each target species. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments." Again, it is unclear how comparisons of tissue COI concentrations by fish collection areas for each target species will help refine the CSM or, at this early stage of data collection, help determine how data should be aggregated during the risk assessments. If EPA believes this to be the case, please provide	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	It is recommended that further analysis be done on how the results will support refinement of exposure calculations for the ecological risk assessment and study design of future fish collection efforts necessary to complete the ERA. It may be very helpful to all parties to have technical meetings to discuss insights from the existing data and how they can be applied to future efforts. These workshops could focus on the following example topics of interest/concern: 1. Percent metals associated with the gut/gut contents of largescale suckers 2. Comparisons of COI concentration by fish collection areas for each target species 3. Site-wide comparison by species for each screened COI 4. Comparisons of COI concentrations between species within a fish collection area 5. Comparisons of COI concentrations in fillet samples by fish collection area 6. Statistical comparison of COI concentrations by species between site reaches 7. Comparison of COIs in largescale sucker to COIs in sediment

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		additional specific explanation. 3. “Sitewide comparison by species for each screened COI. A sitewide comparison by species can be used for risk assessment planning and to further prioritize pathways.” The size of the UCR site is much larger than the home range of any of the fish species for which data are presented in the data evaluation report. It seems inappropriate to conduct site-wide comparisons of tissue concentrations of contaminants among fish species at the site. Such comparisons would be more informative and valuable at smaller spatial scales which are more appropriate to the size of the home range of the species in question and, thus, the area of contamination to which they are exposed. 4. “Comparisons of COI concentrations between species within a fish collection area. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments.” Again, it is unclear how comparisons of tissue COI concentrations within fish collection areas among target species will help refine the CSM or, at this early stage of data collection, help determine how data should be aggregated during the risk assessments. If EPA believes this to be the case, please provide additional specific explanation. Collaborative discussions on this issue among partners would be helpful prior to providing this greater specificity. 5. “Comparisons of COI concentrations in fillet samples by fish collection area. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments.” Again, it is unclear how comparisons of tissue COI concentrations by fish collection areas for each target species will help refine the CSM or, at this early stage of data collection, help determine how data should be aggregated during the risk assessments. If EPA believes this to be the case, please provide additional specific explanation. Collaborative discussions on this issue among partners would be helpful prior to providing this greater specificity. 6. “Statistical comparison of COI concentrations by species between site reaches. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments.” Again, it is unclear how comparisons of tissue COI concentrations among river reaches for each target species will help refine the CSM or, at this		

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		early stage of data collection, help determine how data should be aggregated during the risk assessments. If EPA believes this to be the case, please provide additional specific explanation. Collaborative discussions on this issue among partners would be helpful prior to providing this greater specificity. 7. "Comparison of COIs in largescale sucker to COIs in sediment. This evaluation will support refinement of the CSM and help determine how data should be aggregated during the risk assessments." Again, it is unclear how results of this analysis evaluation will support refinement of the CSM or help determine how data should be aggregated during the risk assessments. Regardless of whether concentrations of COIs in sediment are or are not correlated with concentrations of COIs in tissue of largescale suckers, (1) how would either outcome alter the existing draft CSM, and (2) how would a significant correlation influence refinement of the CSM differently than the lack of a statistically significant correlation? Collaborative discussions on this issue among partners would be helpful prior to providing greater specificity and responses to these questions. The report should be revised to explain in specific detail exactly which DQOs may be addressed by different data sets and analyses, and how the results of analyses will do so.		
	G7	Section 3.2.1. Analytical Results for All Tissue Types, pages 3-6 to 3-8. Data are summarized in Tables 3-8 and 3-9, Figures 3-1 through 3-22, and Appendix B. Key results are summarized on pages 3-6 through 3-8. Many of these data illustrate some significant differences in tissue concentrations (1) within fish species among FSCAs and river reaches, and (2) among fish species. These patterns should be used to develop improved plans for future data collection, e.g., which fish species should be sampled, where these fish species should be sampled, how many samples should be collected to address specific questions, and what analytes should be measured in these samples.	See comment response G2.	
	G8	Section 3.2.2 Estimated Whole Body Results from Fillet and Offal Analysis, page 3-8. The report presents the equation below: CEW = ((Cf * Wf) + (Co + Wo))/(Wf+Wo) Where:	See response to USDoI comment S30.	

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		CEW = Estimated whole body concentration of analyte in wet weight Cf = Concentration in wet weight of analyte in fillet composite Wf = Wet weight of fillet composite Co = Concentration in wet weight of analyte in offal composite Wo = Wet weight of offal composite The second term, (Co + Wo), in the numerator of the equation above is incorrect. It should be (Co * Wo). The equation above regards composite samples, as opposed to samples of individual fish. Some of the terms of the equation are not clearly defined as such and need to be clarified (additions are indicated in italics, and deletions by strikeout below). Specifically: CEW = Estimated mean whole body composite concentration of analyte in wet weight Cf = Concentration in wet weight of analyte in fillet composite Wf = Mean wet weight of all fillet tissue composite Co = Concentration in wet weight of analyte in offal composite Wo = Mean wet weight of all offal tissue composite The fillet and offal masses necessary to conduct the calculations above are not presented in the Data Evaluation report. They are presented only in the Fish Tissue Sampling Field Summary Report (CH2MHILL 2006b). These data should be included in the revised version of the Data Evaluation report. EI independently calculated the estimated concentrations of analytes in composite samples of walleye and hatchery and wild rainbow trout based on empirically measured concentrations of analytes in composite fillet and offal samples from these fish species. Despite the errors noted in the equation above, and unclear definitions of terms in the equation, in nearly all cases, EI's calculations agree with those in Appendix	Comment noted. All calculations were checked and errors were corrected.	

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		B (Analytical Results) of the report. Exceptions include the following: Regarding hatchery rainbow trout composite RH6EW15, discrepancies were detected The only other significant discrepancy is that tissue concentration data for total PCBs are presented for offal and fillet samples for walleye, hatchery rainbow trout and wild rainbow trout, but estimated whole body concentrations of total PCBs were not calculated or presented in the report.		
TF22	G9	Section 3.2.3 Results of Largescale Sucker Gut/Gut Contents Analysis It is important to note at the outset that the comparison of paired "gutless whole body" and "gut/gut content" samples from individual largescale suckers was not part of the 8 August 2005 draft of the Phase I Fish Tissue Sampling Approach and Rationale. Instead, this analysis was a post-hoc addition by CH2MHILL. Page 2-2 of the Approach and Rationale document states "During the sampling, the presence of sediment and slag was noted in the guts of largescale suckers collected from upstream sites. Slag was not observed in the guts of this species from sites downstream; however, a microscopic examination was not performed. Because the gut contents were included with the whole body homogenates used for tissue analysis, the resulting analytical data for metal concentrations in largescale sucker tissue, and hence the estimated ecological risk to suckers, may be biased high in general and in particular from upstream locations. Based on this observation, the study design was modified to include samples to estimate the relative contribution of contaminants (metals only) from slag in the gut to the final measured tissue concentration for suckers. Gutless whole body and gut tissue metal measurements and the ash-free dry weight (AFDW) of the gut tissue were measured and will be used to assess the contribution of sediment/slag to the whole body tissue measurements of largescale suckers." No explanation is provided regarding the process by which these changes to the sampling plan were discussed. To assess the effect of potential slag content in the gastrointestinal tract of largescale suckers on their whole-body tissue concentrations of slag-related metals, the CH2MHILL employed the following experimental design. 20 fish (10 from FSCA1, and 5 each from FSCAs 3 and 6) were randomly selected. From each fish the	See response to WDOE comment G1.	A specific study designed and implemented to determine the bioavailability of metals both associated with slag and with aqueous releases to bottom-feeding fish such as the largescale sucker may be needed for risk determination. If so, this type of study would benefit from consideration of the following suggestions: Develop an unconfounded design to address whether slag content in the gastrointestinal tract of largescale suckers may increase whole-body tissue concentrations of slag-related metals above actual whole-body tissue concentrations in the absence of slag in the gastrointestinal tract. The design would need a clear null hypothesis (see below), would need to distinguish potential effects of metals in the gut wall versus in gut contents, have an adequate control and account for any assumptions that metal concentrations in gut tissue are the same as that in the rest of the body (gutless whole-body tissue). To address whether slag content in the gastrointestinal tract may increase whole-body tissue concentrations of slag-related metals, an experimental design would have to be developed that isolates, as best as possible, the potential effect of the slag itself. A variety of approaches could be employed. A suggested design to illustrate the issues involved is as follows. For each fish: 1. Dissect and remove all gut contents (food and slag), but not gut tissue, from each fish to produce two paired samples: (a) whole fish minus gut contents, and (b) gut contents. 2. Examine the gut contents and separate as best as possible all slag from the rest of the gut contents. 3. Save and dry the slag that was separated from the gut contents. 4. Add the remaining gut contents (without the slag) to the whole-fish sample from which the gut contents were removed previously. 5. Quantify as best as possible the amount of slag in the gut contents. Quantification probably is best done by measuring its dry

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		gastrointestinal tract (esophagus, stomach and intestines) was removed. The resulting "gutless whole body" and "gut" tissue samples were homogenized and analyzed separately. Unfortunately, for multiple reasons the above experimental design is totally confounded and invalid for addressing whether slag content in the gastrointestinal tract of largescale suckers may increase whole-body tissue concentrations of slag-related metals above actual whole-body tissue concentrations in the absence of slag in the gastrointestinal tract. First, no null hypothesis is stated. Second, the implied null hypothesis is that metal concentrations in the paired "gut" and "gutless whole-body" tissues should be the same. This implied hypothesis is not the correct hypothesis to test to address the issue (the correct approach is discussed below). Third, because the "gut" samples are a homogenate of the gastrointestinal tissue and the contents (food and potentially slag) within the gastrointestinal tract, it is impossible to distinguish potential effects of metals in the gut tissue itself from metals in the gut contents. Fourth, there is no control in the experimental design. It is well known that concentrations of contaminants, including metals, differ widely among different organs and tissues (Paquin et al. 2003). Thus, there is no basis for assuming that metal concentrations in gut tissue are the same as that in the rest of the body (gutless whole-body tissue). As a result, the data presented in Tables 3-12 through 3-16 and Figures 3-25 through 3-34, although anecdotally interesting, are irrelevant to the RI/FS. Further, even if the data addressed the intended question, which they clearly do not, the question itself (whether slag in gut contents potentially inflates whole body concentrations of metals) is irrelevant to the RI/FS process. Ecological risk assessment is based, in part, on whole-body tissue concentrations of analytes, which includes the gut tissue and associated gut contents. The analysis conducted by CH2MHILL attempts to redefine how ecological risk assessment is done by implicitly arguing that it is justified to remove the gastrointestinal tract and its contents from fish prior to conducting whole-body tissue analyses for metals. To correctly address whether slag content in the gastrointestinal tract may increase whole-body tissue concentrations of slag-related metals, an experimental design would have to be developed that isolates, as best		mass (grams), but could be done less precisely based on volume (i.e., estimated mm3) or a ranked basis (e.g., none, low, medium, high). 6. Homogenize the whole-fish sample (with its associated gut contents [minus slag]]), retaining as much of the original mass as possible in the sample. 7. Divide the whole fish homogenate into two aliquots of equal mass. 8. Add one-half of the slag from the fish to one of the two homogenate aliquots; add no slag to the other aliquot. 9. Re-homogenize the aliquot to which slag was added. 10. Analyze both aliquots for concentrations of metals. 11. Compare the results (concentrations of analytes) from the whole-body tissue aliquot to which slag was added to results from the other whole-body tissue aliquot to which no slag was added. 12. For each pair of test results for a given analyte (e.g. zinc), determine the difference in tissue concentrations by subtracting the tissue concentration of the sample to which slag was not added from the sample to which slag was added. 13. The null hypothesis is that the mean difference should be zero. Thus, the simplest analysis of these data is a simple one-sample t-test of the mean difference in the paired samples against the null hypothesis value of zero. 14. An only slightly more sophisticated, but better, analysis would correlate the difference measures against the normalized value for the mass of slag measured in each fish (grams of slag/(mass of fish-mass of slag). The null hypothesis is that the slope of the regression line does not differ from zero. Whole body concentration for each analyte was estimated using the following equation: CEW = (CG/GC * WG/GC) + (CGWB + WGWB)/(WG/GC+WGWB) Where: CEW = Estimated whole body concentration of analyte in wet weight CG/GC = Concentration in wet weight of analyte in gut/cut content sample WG/GC = Wet weight of gut/gut contents sample CGWB = Concentration in wet weight of analyte in gutless whole

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		as possible, the potential effect of the slag itself. A variety of approaches could be employed, but the best design would be as follows. For each fish: 1. Dissect and remove all gut contents (food and slag), but not gut tissue, from each fish to produce two paired samples: (a) whole fish minus gut contents, and (b) gut contents. 2. Examine the gut contents and separate as best as possible all slag from the rest of the gut contents. 3. Save and dry the slag that was separated from the gut contents. 4. Add the remaining gut contents (without the slag) to the whole-fish sample from which the gut contents were removed previously. 5. Quantify as best as possible the amount of slag in the gut contents. Quantification probably is best done by measuring its dry mass (grams), but could be done less precisely based on volume (i.e., estimated mm3) or a ranked basis (e.g., none, low, medium, high). 6. Homogenize the whole-fish sample (with its associated gut contents [minus slag]]), retaining as much of the original mass as possible in the sample. 7. Divide the whole fish homogenate into two aliquots of equal mass. 8. Add one-half of the slag from the fish to one of the two homogenate aliquots; add no slag to the other aliquot. 9. Re-homogenize the aliquot to which slag was added. 10. Analyze both aliquots for concentrations of metals. 11. Compare the results (concentrations of analytes) from the whole-body tissue aliquot to which slag was added to results from the other whole-body tissue aliquot to which no slag was added. 12. For each pair of test results for a given analyte (e.g. zinc), determine the difference in tissue concentrations by subtracting the tissue concentration of the sample to which slag was not added from the sample to which slag was added. 13. The null hypothesis is that the mean difference should be zero. Thus, the simplest analysis of these data is a simple one-sample t-test of the mean difference in		body sample WGWB = Wet weight of gutless whole body sample Similar to the previous equation regarding fillet and offal analyses, the equation above contains errors. As indicated below, (1) an additional set of parentheses is required before the first term of the numerator and after the second term in the numerator, and (2) the addition sign in the second term of the numerator should be replaced with a multiplication sign. CEW = ((CG/GC * WG/GC) + (CGWB * WGWB))/(WG/GC+WGWB) Two of the terms in the equation above are also defined somewhat ambiguously. Suggested corrections are indicated below. Additions are in italics, and deletions are indicated by strikeouts: WG/GC = Total wet weight of gut/gut contents sample WGWB = Total wet weight of gutless whole body sample The percent of an analyte associated with the gut/gut contents was calculated using the following equation: %G/GC = (CG/GC * WG/GC/ (CG/GC * WG/GC + CGWB + WGWB)) * 100 Where: %G/GC = Percent of estimated whole body concentration of analyte in wet weight associated with the gut/gut contents As in the previous two equations, the equation above contains numerous errors. The correct equation is indicated below. Changes are indicated in red. %G/GC = ((CG/GC * WG/GC)/ (CG/GC * WG/GC) + (CGWB * WGWB)) * 100 The masses of the “gut/gut content” and “gutless” fish samples necessary to conduct the calculations above should be included as part of the study results.

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		the paired samples against the null hypothesis value of zero. 14. An only slightly more sophisticated, but better, analysis would correlate the difference measures against the normalized value for the mass of slag measured in each fish (grams of slag/(mass of fish-mass of slag). The null hypothesis is that the slope of the regression line does not differ from zero. Whole body concentration for each analyte was estimated using the following equation: CEW = (CG/GC * WG/GC) + (CGWB + WGWB)/(WG/GC+WGWB) Where: CEW = Estimated whole body concentration of analyte in wet weight CG/GC = Concentration in wet weight of analyte in gut/cut content sample WG/GC = Wet weight of gut/gut contents sample CGWB = Concentration in wet weight of analyte in gutless whole body sample WGWB = Wet weight of gutless whole body sample Similar to the previous equation regarding fillet and offal analyses, the equation above contains errors. As indicated below, (1) an additional set of parentheses is required before the first term of the numerator and after the second term in the numerator, and (2) the addition sign in the second term of the numerator should be replaced with a multiplication sign. CEW = ((CG/GC * WG/GC) + (CGWB * WGWB))/(WG/GC+WGWB) Two of the terms in the equation above are also defined somewhat ambiguously. Suggested corrections are indicated below. Additions are in italics, and deletions are indicated by strikeouts: WG/GC = Total wet weight of gut/gut contents sample WGWB = Total wet weight of gutless whole body sample The percent of an analyte associated with the gut/gut contents was calculated using the following equation:		

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		%G/GC = (CG/GC * WG/GC/ (CG/GC * WG/GC + CGWB + WGWB)) * 100 Where: %G/GC = Percent of estimated whole body concentration of analyte in wet weight associated with the gut/gut contents As in the previous two equations, the equation above contains numerous errors. The correct equation is indicated below. Changes are indicated in red. %G/GC = ((CG/GC * WG/GC)/ (CG/GC * WG/GC) + (CGWB * WGWB)) * 100 The masses of the “gut/gut content” and “gutless” fish samples necessary to conduct the calculations above are not presented in the Data Evaluation report. These data should be included in the revised version of the Data Evaluation report.		
	G10	Section 3.3.1.1. Whole body tissue. This section describes “increases,” “decreases,” and “apparent trends,” but these conclusions are based solely on visual inspection of the data, not on statistical analyses. This section should be omitted. Such discussion and conclusions should be confined to the following section (3.3.2 Statistical Comparisons).	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
TF23	G11	Section 3.3.2 Statistical Comparisons. Summary statistics of concentrations of COIs for each fish species, tissue type, FSCA and river reach are presented in Tables 3-20, and 3-21 through 3-39; plots of these data are presented in Figures 3-1 through 3-24 and 3-35 through 3- 49, and in Appendix E. These data illustrate very interesting differences in tissue concentrations of COIs among species, tissue types, and river reaches. It is especially noteworthy that spatial trends in the tissue concentrations of many COIs differ dramatically from one another. For example, tissue concentrations of zinc and selenium appear to be highest in the upper reach, arsenic is often highest in the middle reach, and mercury tends to be highest in the lower reach. However, these trends also differ somewhat among species. For example, copper is highest in largescale sucker in the upper reach, but is highest in walleye in the lower reach. Given this variability, determining appropriate remedial actions will be very challenging.	Comment noted. See Comment for Teck Cominco associated with WDOE Comment G3.	

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		Table 3-42 presents results of correlations between concentrations of 13 metals in whole-body samples of largescale sucker and sediment co-located sediment samples. Only one correlation was significant at a significance level of 0.05 (for copper). Iron and zinc showed nearly significant correlations (P = 0.056 and 0.059, respectively). It is noteworthy that the spatial extent of the sediment focus areas is much smaller than that of the “co-located” FSCAs. Thus, it is not possible to know the extent to which poor co-location of sediment and fish tissue samples contributed to the relatively weak and largely non-significant correlations. In any future studies attempt to investigate relationships between COI concentrations in sediment versus fish tissue, these data should be co-located at tightly as possible spatially and temporally.	Comment noted.	
		Data were not presented for any fish species for antimony, beryllium, cadmium, calcium, cobalt, magnesium, manganese, potassium, silver, sodium, thallium or vanadium. Concentrations of some of these analytes rarely (thallium) if ever (antimony, beryllium, vanadium) exceed detection limits; however, other analytes such as cobalt, magnesium, and manganese often exceed detection limits. Why were analyses of these data not presented? Please present.	See response to WDOE comment G3.	EPA recommends that analysis of the fish tissue data discuss the full suite of analytical results (e.g., analytes such as cobalt, magnesium, and manganese that exceeded detection limits) especially as they related to DQOs developed by Teck for the ERA.
		The report states that prior to conducting statistical comparisons, “nondetected values were assumed to be half the detection limit.” However, the report does not define what criteria were used in the data set to define detected versus nondetected values. The report should be revised to indicate that the following Project Qualifier codes were used to define detected (D) and nondetected (ND) values (F. Dillon, CH2MHILL, in litt. 21 Nov 2006). U - ND J - D C - D UJ - ND UJL - ND JL - D JK -ND K - ND	Comment noted. The calculations will be checked and errors will be corrected.	

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		Q - ND UQ - ND EMPC - ND NJ - D Many of the data presented in Table 3-17 and graphically displayed in Figures 3-35 through 3-49 are incorrect in that many of the mean values presented were calculated using the full detection limits for nondetected values rather than one-half the detection limits for these values. Specifically, this oversight appears to be true for all walleye and rainbow trout (hatchery and wild) whole-body tissue values that were estimated by combining offal and fillet samples together and for which any of the individual estimated whole-body composite samples within a FSCA were designated as having nondetected values. Further, in many cases, all of the individual estimated whole-body composite samples within a FSCA, for a given fish species and analyte, are indicated to have detectable levels of the analyte of concern, but one or more of the estimated individual whole-body composite tissue concentrations within the FSCA are calculated from fillet and or offal composite samples that have nondetected values. In these cases, the mean values presented in Table 3-17 also are incorrect because they have not taken into account the presence of nondetected values in offal or fillet samples that were used to calculate (estimate) whole body tissue concentrations. The same principle applies to the estimated concentrations of largescale sucker whole-body composite samples that were calculated from gut/gut content and corresponding “gutless whole-body” data from individual fish. One consequence of these errors, in addition to the values presented in Table 3-17 and Figures 3-35 through 3-49, is that they potentially invalidate comparison of whole-body tissue concentrations of metals (1) among fish species and (2) within fish species among FSCAs. These errors were not made in Table 3-18 (Summary of mean tissue concentrations in offal and fillet samples for walleye and rainbow trout). We would appreciate EPA correcting the report appropriately.		
	G12	Section 3.3.2.1 Fish Tissue Comparisons.	There is no consensus on the appropriate degrees of freedom for a composited sample, In the case of the Phase I fish tissue	

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		This section states "Asymptotic (1-α) 100 percent confidence intervals for mean concentrations were calculated as follows: $\hat{\bar{C}} \pm Z_{1-\frac{\alpha}{2}} \sqrt{\widehat{\mathrm{Var}}(\hat{\bar{C}})}$ Where: Z 0.975 = 1.96 for a 95 percent confidence interval" However, using this equation to calculate a confidence interval assumes that the sample size is very large (i.e. greater than 120), whereas the sample sizes available in this study vary from 2 to 5 in most cases (n=10 for some comparisons among reaches). Confidence intervals should be calculated using a t-distribution, i.e. by replacing "Z" with "t" in the equation above, and using the appropriate degrees of freedom. Please change the report appropriately.	sampling, it could either be the number of composites or the number of fish used in all the composites? This question also applies when using stratified random sampling. When you have two or more levels for the degrees of freedom or when variances cannot be pooled as required for a t-statistic, the most common approach is to use the asymptotic Z-statistic (see Cochran 1977 Sampling Techniques). Given this, at this time, we believe the Z-statistic is the most appropriate method for calculating the asymptotic confidence intervals.	
	G13	Section 3.3.3 Comparison to Past Studies, pages 3-19 through 3-21, Tables 3-43 through 3-45. This section compares the results of the Phase I fish sampling with results from three previous studies: • U.S. Geological Survey (USGS). 1995. Concentrations of Mercury and Other Trace Elements in Walleye, Smallmouth Bass, and Rainbow Trout in Franklin D. Roosevelt Lake and the Upper Columbia River, Washington. (USGS, 1995). • EVS Consultants (EVS). 1998. Assessment of Dioxins, Furans, and PCBs in Fish Tissue from Lake Roosevelt. (EVS, 1998). • Washington State Department of Ecology (Ecology). 1994. Contaminant Trends in Lake Roosevelt. (Ecology,1994). The report states a number of conclusions regarding temporal changes in concentrations of contaminants, and makes the following summary statements: "In summary, comparison of the current data to historical data from USGS, EVS Associates, and Ecology suggests the following:	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	

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		• Mercury may be declining in walleye and rainbow trout (i.e., both wild and hatchery) fillets. • 2,3,7,8 TCDF continues to decline in lake whitefish. • Metals appear to be unchanged in walleye and rainbow trout fillets and in largescale sucker whole body, with the exception of lead in the Northport area." However, in the section Titled Data Gaps and Recommendations (page 4-1), the report states "Because of limited and noncomparable historical data, statistical analysis of temporal trends was not possible, as noted in Section 3.3.3." Given the inability to statistically compare historical data to the current data, we suggest that the tentative conclusions reached in section 3.3.3 be removed entirely.		
	G14	Table 3-17 and Figures 3-35 through 3-49. Analytical data were collected on many metals for which data are not presented in Table 3-17 or Figures 3-35 through 3-49. Specifically, no data are presented for antimony, beryllium, cadmium (Table 3-17 only), calcium, cobalt, magnesium, manganese, potassium, silver, sodium, thallium, or vanadium. Please explain and/or provide data for these metals.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
	G15	Appendix E. Comparison of Contaminant of Interest Concentrations by River Reach. The significance of the data presented in the figures in Appendix E would be more readily apparent if the screening values (Tissue Toxicity Reference Values [TRVs]) were indicated on each figure. This would illustrate at a glance the reach(es) in which fish have tissue concentrations of contaminants that exceed TRVs. Similarly, on each figure, it would be useful to indicate the reaches, if any, in which the concentration of the COI differs significantly in concentration from other reaches.	The comparison values were used, for the purpose of the report, to prioritize the data for presentation. They are not intended to imply risk. Toxicity reference values will be selected as part of the screening and baseline ecological risk assessment. Therefore it is not appropriate to include the comparison values on the figures in question.	
	G16	At this point in the RI/FS, we are still in the process of determining chemicals of concern(COCs), which should not be limited to the contaminants of interest (COIs) in the fish report. The primary purpose of the fish tissue data evaluation report was to present the data; the report was not expected to be a screening level risk assessment nor a determination or elimination of potential COCs. Section 3.1.1 states "Site-specific	See response to USDoI comment G1.	

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		contaminants of concern (COCs) for UCR fish tissue will be identified as part of the human health assessment conducted by USEPA and an ecological risk assessment that will be conducted by Teck Cominco American, Inc., and overseen by USEPA." And later "These screening values were selected to help focus the data evaluation…". Therefore, it is expected that refinement of the COC list will not be limited to the COIs presented in the report, and that an identification of COCs and screening level assessments for human health and for ecological risk will take place in subsequent documents.		
	G17	The report screens out (or does not further evaluate) several compounds that exceed screening levels identified in fish tissues. These include antimony, manganese, thallium, vanadium, individual PCB congeners, and several dioxin and furan congeners. These COCs should be evaluated in the screening level assessments.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
TF24	G18	The fish tissue study should have analyzed organochlorine pesticides, polycyclic aromatic hydrocarbons (PAHs), Teck Cominco specialty metals (e.g., indium, germanium), fire retardants, and other potential COCs.	See response to USDoI comment G3.	. Tissue studies designed and implemented to determine the concentration of the following analyte groups in target species wild be part of future fish tissue assessments done for the RI: • Pesticides • Polycyclic aromatic hydrocarbons (PAHs); • Specialty metals (e.g., indium, germanium); and • Fire retardants In addition, PCB congener analyses will be done on all fish tissues collected in the future for both human health and ecological risk assessment needs. Speciated arsenic analyses will be done on all fish tissue collected in the future for the human health risk assessment. Tissue studies will be designed and implemented to determine the concentration of the target analytes, in particular speciated arsenic, in fillets of burbot.
TF25	G19	Data evaluation based on three reaches, rather than the six sampling locations, is premature. Differences between locations within reach should have been compared to determine if lumping of locations within each reach was valid. The report identifies significant differences between reaches within species, but does not adequately evaluate the data to determine if there are any consistent trends between contaminants within species and between species.	See response to WDOE comment G3.	The following analyses of the Phase I fish tissue data will be undertaken in support of the UCR human health and ecological risk assessments: A statistical comparison of results by analyte among target species. A statistical comparison of the results by analyte and FSCA among target species. A statistical comparison of the results by analyte and target species

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				among all FSCAs. A statistical comparison of results by analyte and target species among FSCAs in a given sampling reach. In addition to these univariate statistical analyses, interactions and other multivariate associations between analytes within FSCAs and target species should be considered. Potential associations between PCOIs in tissues of target fish species and those in sediment and water should also be considered for evaluation.
	G20	The report should state that tissue residues may not correlate to toxicity, particularly for species where contaminant sensitivity is unknown. Tissue residues for metals are not strongly correlated with toxicity since metal toxicity is related to the rate of accumulation on gills and in organs, and the rate of detoxification and elimination (See Barron et al., 2002). Contaminant sensitivity in white sturgeon and other species is unknown, and studies to determine sensitivity are warranted.	See response to USDoI comment G6.	
	G21	The report fails to adequately evaluate polychlorinated biphenyls (PCBs), dioxins and furans adequately, and suggests that all but total PCBs and 2,3,7,8 TCDF should be eliminated as COIs or COCs. Several of the PCB congeners that were measured are co-planar PCBs with dioxin-like toxicity. In the screening ecological and human health risk assessments, a TEQ analysis should be done for PCBs, dioxins, and furans. Lipid-normalized concentrations should also be discussed. The 2005 WHO reevaluation of toxic equivalent factors (TEFs) should be referenced in this report (van den Berg et al. 2006).	See response to USDoI comment G7.	
	G22	QA/QC data validation and handling of QC failures is concerning. The report identifies samples that were qualified, but the report indicates only QC samples were qualified and not the samples associated with QC samples. All samples within a sample run should be qualified as estimates for an element when a QC samples fails and is identified as an estimate. For example, 10 matrix samples were analyzed and ten failed QC for manganese and were qualified as J (estimated value). However, only a few samples were qualified as estimates for manganese in the database.	See response to USDoI comment G8.	
	G23	Data qualification may be much more extensive than indicated in the report. Data qualifiers are not consistent	See response to USDoI comment G9.	

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		between the October database and the October report. For dioxin, furan, and PCB congeners, samples with detection concentrations <5 times the value measured in the respective blanks were reported as non-detects. The report needs to indicate how estimated (J qualified) data could have bias the interpretation of the data.		
	G24	Uncertainty is not adequately discussed in the report. The uncertainty of reported concentrations as a result of QA/QC failures, inadequate sample sizes and spatial coverage, and limitations of the chosen targeted sampling scheme should be discussed.	See response to USDoI comment G10.	
	G25	Detection limits used in the report need to be explained. Were data evaluated based on method detection limits or contract required detection limits? The relationship between detection limits and screening levels needs to be presented in tables and discussed.	See response to USDoI comment G11.	
TF26	G26	The size range of fish was limited, and the data or a summary of that data is not presented. Particularly for biomagnifying compounds (e.g., PCBs, dioxins, furans), larger, older fish will likely accumulate the contaminants to higher concentrations. The report needs to discuss the size ranges used and potential effects on data interpretation. The CCT commented on the QAPP (CH2MHILL 2005b) that "Trapping data collected by the CCT Lake Roosevelt Habitat Improvement Project (See summary data below) indicates that the average wild adfluvial rainbow trout that utilize Lake Roosevelt is 18.2 inches; this is above the targeted length. The current targeted lengths do not reflect a representative size range of the rainbow trout within the lake. In addition to the fact that it may be difficult locating target size fish (13-17 inches), the target lengths are more representative of current year net pen releases. Tag recovery data on over 3500 rainbow trout showed an average length of 16.2 inches. Rainbow trout recently released from net pens will have minimal exposure to contaminants. They also will not reflect bioaccumulation through the food web, as they have been reared on hatchery feed." The mean length of individual wild and hatchery rainbow trout that comprised composites in each of the 6 FSCAs is considerably smaller, as indicated in the table below, than the 18 inch length that is more representative of rainbow trout within the UCR.	See response to WDOE comment G3. EPA will add the language that collected rainbow trout were smaller than the mean size in Lake Roosevelt which could result in an underestimate of the average tissue concentrations. See Comment for Teck Cominco associated with WDOE Comment G3.	Fish tissue studies wild be designed as necessary to account for the influence of size and age on tissue contaminant concentration

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		Mean length (inches) of individual rainbow trout comprising composite samples in each FSCA Rainbow Trout FSCA Hatchery Wild 1 17.64 2 16.79 3 16.44 17.53 4 15.48 5 15.30 16.47 6 15.82 14.58 Grand Average 15.76 16.60		
	G27	Composite sampling used in the study limits data interpretation, particularly with respect to ecological risk. Although composite sampling provides good estimates of mean concentrations within a species at a location, the true variability, maximum concentration, and distribution is lost. Tables in Section 3 of the report provide estimates of between-fish variability; however, these estimates have many limitations, including but not limited to the fact that they assume that concentrations of contaminants are normally distributed among individual fish in the sample. Thus, measurement of contaminant levels in individual fish may be preferable for some fish species in future data collection efforts.	See response to USDoI comment G15.	
	G28	Arsenic speciation discussion should be more inclusive of ecological risks and screening levels, particularly with respect to potential ecological risk to fish. The ecological and human significance of these arsenic species needs to be explained. The arsenic speciation discussion should also emphasize that the majority of the inorganic arsenic data are censored and the true percentages of inorganic arsenic in fish cannot be determined from this data set. Perhaps the arsenic speciation data should be identified as “semiquantitative” or “informational.” We also note that the detection limits do not meet the QAAP analytical concentration goals, and this is not discussed anywhere in the report.	See response to USDoI comment G16.	
	G29	Provide more transparency for the human health risk-	See response to USDoI comment G18.	

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		based screening (RBC) values. While the source of these values is identified as “Region 3 PRGs Fish,” these values have actually been calculated by US EPA using Region 3 methodology but with some different input values. RBC calculations should be presented in an appendix with a spreadsheet or at least the formulas, inputs, and toxicity criteria used. The calculated RBC values presented could not be reproduced.		
	S1	Page 2-2. Largescale sucker (Catostomas catosomas) should read (Catostomas macrocheilus)	Comment noted. Correction will be made.	
	S2	Page 2-5. States “Otoliths were removed from all species except the largescale suckers. The otoliths were removed by cutting into the skull of the fish with a disposable scalpel blade. Both otoliths were removed and placed into a small plastic vial with the fish identification information. For determining the age of rainbow trout, several scales were taken in addition to otoliths to be used for aging. For the largescale suckers, the opercula were removed to be used for age determination instead of otoliths.” Please provide references regarding aging methodologies for these fish species.	Comment noted. References will be provided.	
	S3	Page 3-3. Copper. States that “the maximum exceedance ratio was 4.2” in largescale wholebody sucker tissue. However, the highest exceedance ratio was 41.9 largescale whole-body sucker tissue.	Comment noted. The text will be corrected.	
	S4	Page 3-3, last paragraph. States “maximum exceedance ratios of screening levels for aroclor 1254 and 1260 were 189 and 216, respectively.” This is accurate; however, results for aroclor 1254/1260 combined indicate a maximum HQ of 1163.9 for whole-body largescale sucker tissue. We would appreciate your correcting the report.	Comment noted. The text will be corrected.	
	S5	Page 3-6, last sentence of section. Change “grouping” to “groupings.”	Comment noted. The text will be corrected.	
	S6	Page 3-8, 2nd paragraph. States that “the ratio of inorganic to organic …” “ratio” should be changed to “percentage.”	Comment noted. The text will be corrected.	
	S7	Page 3-8, 3rd paragraph. The third paragraph beginning with “The ratio of …” is identical to the paragraph above it. Please delete this paragraph.	Comment noted. The text will be corrected.	
	S8	Page 3-12. 3rd to last paragraph. Change “trends where	Comment noted. The text will be corrected.	

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		noted" to "trends were noted"		
	S9	Page 3-16. 5th paragraph. "at a significance level of when it is false" should read "at a significance level of α when it is false" where α typically equals 0.05.	Comment noted. The text will be corrected.	
	S10	Page 3-18. 5th paragraph. Change "PCBs where characterized" to "PCBs were characterized"	Comment noted. The text will be corrected.	
	S11	Page 3-19, 1st paragraph of 3.3.2.2. Change "COIs where lower" to "COIs were lower"	Comment noted. The text will be corrected.	
	S12	Tables 3-2, 3-3, 3-17. All data regarding metals in these tables are presented in alphabetical order except for data regarding mercury which are presented after zinc. Please place results regarding mercury in alphabetical order. There also are many rounding errors in both the means and standard deviations, e.g., the mean value (± 1 SD) for aluminum in largescale sucker samples in FSCA 6 is stated to be 51.1 ± 22.0, when in fact the value should be 50.85 ± 22.3. The value for the percentage of walleye fillet samples that exceed screening levels for thallium is listed as 300%; this value should be 100%.	Mercury was placed separately because it was reported in different unit than the rest of the metals.	
	S13	Table 3-18. The mean value for walleye fillet samples for aluminum for FSCA 1 ignored the value for sample WE1F15, presumably because it was a high (outlier) value, but no explanation for omission of this datum was presented in the report. Inclusion of this value would increase the mean value (± 1 SD) for aluminum in walleye fillet samples in FSCA from 1.25 (± 0.05) to 57.1 (± 124.8). Although most values in this table are correct, and are calculated using one-half detection limits for nondetected values, at least two values are significantly incorrect for unknown reasons: The sample size for the number of wild rainbow trout fillet samples in FSCA 1, regarding aluminum is stated to be 6, but in fact is 5. There also are many rounding errors in both the means and standard deviations, e.g., the mean value (± 1 SD) for uranium in walleye fillet samples in FSCA 1 is stated to be 0.00030 ± 0.00001, when in fact the value should be 0.00026 ± 0.00001. All data regarding metals in this table are presented in alphabetical order except for data regarding mercury which are presented after zinc. Please place results regarding mercury in alphabetical order.	Comment noted. Corrections will be made.	

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	S14	Table 3-19. Average Values of the Coefficient of Variation Between Composite Samples. The word "between" should be replaced with "among" in the title of this table.	Comment noted. The text will be corrected.	
	S15	Tables 3-20 and 3-22 through 3-39. All data regarding metals in these tables are presented in alphabetical order except for data regarding mercury which are presented after zinc. Please place results regarding mercury in alphabetical order.	See comment response S12.	
	S16	Figures 3-35 through 3-49. All data regarding metals in these figures are presented in alphabetical order except for data regarding mercury which are presented after zinc. Please place results regarding mercury in alphabetical order.	See comment response S12.	
		Spokane Tribe of Indians (STI) Comments November 28, 2006		
	G1	Upon review of this document it is apparent that comments and materials submitted in the past to the EPA ROMs are either not being considered or are not tricking down to technical personnel responsible for analyzing results of field studies. For example, the Tribe identified major errors and omissions associated with development of data quality objectives (DQOs). Specifically, decision rules and acceptable limits on decision errors must be specified prior to designing the study and prior to conducting the study. As currently stated in Table 2-1, the DQOs are non-specific. Specifying the DQOs in this manner is akin to writing the design specifications for a structure after the structure has been constructed. Construction QA/QC inspections on such a structure would necessarily pass all criteria. Another example of not communicating with the technical personnel is that the "screening" portion of the "data evaluation" is based on assumptions that may apply to the general population, but are fundamentally flawed when applied to the Spokane Tribe. EPA was forewarned of these concerns both verbally and in written communications. They were initially raised early in the Tribe's February 2, 2005 review of "DRAFT: Phase I Fish Tissue Sampling Approach and rationale – Upper Columbia River Site RI/FS, January 14, 2005" (Attached). In order to minimize such problems in the future, the	Comment noted.	

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		Tribe suggests that EPA's RPMs should consult its technical personnel before releasing these works to the Tribe and other partners for internal review.		
	G2	Like the Phase I Sediment Study, the results of this study are inconclusive due to inappropriate experimental design. Shortfalls in the design are rooted in inappropriate development of the DQOs. As voiced to EPA on numerous occasions, excess risk attributable to the release is the concern of the Tribe and others - not concentration in excess of a risk-based criterion initially developed for other purposes. Human health risk thresholds employed in this document ere developed for a population that does not use the resources at Lake Roosevelt. In the case of ecological risk, such thresholds were developed without the consideration of COCs in natural pre-release concentrations. Since the Tribe's management goals for the fisheries are based on cumulative risk to human health and since the Tribe has the right to consume on the order of 800-1000 g/d of fish and 4 L/d of surface water, the safe-level or allowable concentration of any given COC is very low. Since the goal of the sturgeon fishery – a fish that due to its lifestyle and feeding habits is believed to be a major concentrator of a wide variety of COCs – is to produce surgeon that can be consumed at subsistence level, the safe-level or allowable concentration of any given COC is very low. Considering that a large number of different site-related COCs are present and employing concepts described in RAGS as well as the STI-HSCA, the UCL95 of pre-release baseline of each COC defined for each exposure area (EA), should be the criteria used to discriminate between site-affected and unaffected areas. Please note that the EAs still have not been defined. The need for determining the EAs prior to designing studies was voiced early on verbally more that once and more recently in the following memos: •October 11, 2004 Memo entitled: "Transmittal of Draft documents/presentations associated with STI Data Needs for UCR Human Health Risk Assessment •February 10, 2005 Memo entitled: "Review of "DRAFT: Phase I Fish Tissue Sampling Approach and Rationale Upper Columbia River Site RI/FS, January 14, 2005"	The DQOs were developed to be consistent with USEPA guidance and with the objectives of the RI/FS scoping documents available at the time they were developed. USEPA believes the DQOs are applicable to the work completed. See response to USDoI Comment G1. See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	

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		In summary, the goal of this study should be to attempt to discriminate between samples that are affected by releases and those that are not affected by releases – not statistically discriminating between samples of different portions of fish believed by EPA to represent a given area characterized by differing geomorphic qualities. As discussed with EPA, unaffected samples would be acquired from reference or control areas. Instead, EPA uses statistics generated during a synoptic survey to infer geospatial or regionalized correlations between COCs measured in specific fish tissues. In some instances EPA concludes that a given COC in two samples (sub-population) representing the same tissue, but acquired from different locations are different at a specified probability (p>0.1). In other instances, they cannot infer a difference (even at a very liberal p>0.1). When considering the fact that fish are not sessile and migrate in search of reproductive, dietary, and other needs, one would not expect the time series spatial domain representing a given COC measured in different media to be stationary in either time or space. This fact will only complicate future comparative analyses. The complexity of such future analyses will be further compounded by the fact that the basis for such comparisons (this dataset) is of limited use due to po9or experimental design. In summary, the rational, DQOs, and statistical approach used in this document really demonstrates EPA's lack of understanding the "problem" as well as the requisite information required to generate a solution.		
	G3	The Data Gaps and Recommendations (Section 4.0) was drafted assuming that the "baseline" is indeed adequately characterized. As pointed-out below, the current baseline Phase I Assessment is woefully inadequate and cannot serve as the basis for future comparative studies. The Tribe recommends that at least another phase is necessary. Currently, this work falls far short and supporting future work of equal quality, as is done in section 4.0, will only propagate equally inconclusive studies making future temporal comparisons highly unlikely	Commented noted. The recommendations in Section 4 will be modified to provide more specificity.	
	G4	Based on the results, statistical characterization of the fish samples may only be appropriate for the full-pooled	See response to WDOE comment G3.	

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		sample. Like the sediment data, the only means in discriminating between georeferenced sample sets is via relaxing statistical parameters. Again, the Tribe was very concerned long ago when we recommended that pertinent statistical parameters (alpha and RPS) be defined a priority in the DQOs statements.	See Comment for Teck Cominco associated with WDOE Comment G3.	
	G5	Figures 3-1 through 3-64 should be regenerated with the error bars set to 2 standard deviations (or LCL05 and UCL95) instead of 1 standard deviation.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
	G6	Upon analysis of the tabular data, the Tribe identified instances in which it appears that EPA has included some of the replicate samples thereby artificially influencing some of the summary statistics. It is our understanding that USFWS already ahs made EPA aware of this problem.	Comment noted. All data tables will be checked and corrected for error and omissions.	
TF27	G7	The gut/gutless and AFDW/Total DW analyses (Table 3-11) was conducted to minimize "bias" associated with the contents of the whole gut. Bias is only introduced when one is consistently erroneously attempting to let the results of a series of observations represent the requisite characteristic. For example, attempting to quantify concentrations in fish tissue when only whole fish samples are available. In such instances when the receptor only consumes tissue, the samples may indeed be "biased-high". However, when the whole fish is consumed by receptors, including Tribal members and other piscivore or omnivores, who rely on the largescale sucker for sustenance, then the sample is not necessarily biased in either direction. As mentioned in previous comments, in order to minimize future sampling needs, EPA should consider remedies that protect the most at-risk population. Employing this approach will negate the need for a myriad of "specialized" analyses. Perhaps this cost savings could be directed at providing a more robust sampling design in which decisions based on statistical analyses can be made more reliable.	See response to WDOE comment G1.	A specific study designed and implemented to determine the bioavailability of metals both associated with slag and with aqueous releases to bottom-feeding fish such as the largescale sucker will be conducted.
	S1	Page 2-1: Section 1.2 Phase I fish Tissue Study Design; Paragraph 3: "The Phase I fish tissue sampling program was then designed in consideration of the specific data needs identified in the DQO process, the unique site characteristics, and comments received from affected landowner, land managers, and regulators, including	Comment noted. See comment response G1.	

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		CCT, the **Spokane Tribe of Indians (STI)**, U.S. Department of the Interior (DOI) agencies, Washington State Department of Ecology (Ecology), and WDOH." [Emphasis Added] Please note that problems still persist with the DQOs as well as specific data gaps associated with the Tribes fish consumption rate (See General Comment No. 1)		
	S2	Page 2-2; Section 2.1.1 Target Species and Tissue Types; Paragraph 3: "During the sampling, the presence of sediment and slag was noted in the guts of largescale suckers collected from upstream sites. Slag was not observed in the guts of this species from sites downstream; however, a microscopic examination was not performed. [Emphasis Added] Hazardous COIs/COCs are the focus – not slag. Although COEs/COCs have been shown to be associated with slag, it has not been determined that these COIs/COCs are present in effective concentrations that are a concern. It is quite possible that COIs/COCs in greater concentrations are associated with the fined sediments. These sediments would not necessarily appear black in color. Slag was not observed in the guts of other species. However, these observations were based on the unaided eye and not microscopic analysis. Because the gut contents were included with the whole body homogenates used for tissue analysis, the resulting analytical data for metal concentration in largescale sucker tissue may be biased high in general and in particular from upstream locations. See General Comment No. 6. Samples would only be "biased high" if the results of the sample were used to characterize part of the fish other than the "whole fish". Based on this observation, the study design was modified to include samples to estimate the relative contribution of contaminants (metals only) from sediment and slag in the gut to the final measured tissue concentration for suckers. Gutless whole body and gut tissue and contents, hereafter referred to as "gut/gut contents," metal measurements and the ash-free dry weight (AFDW) of the gut/gut contents were measured and used to assess the contribution of the sediment/slag to the whole body tissue measurements of largescale	See response to WDOE comment G1.	

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		suckers." This entire approach does not consider the dynamic feeding behavior of the largescale sucker. The amount of sediment or food in the viscera is a function of the fish's daily feeding habit. It is quite likely that the fish gut contents vary widely over a single day. In other words the "hypothetical fish" in Table 3-11 could change over the period of a day. From a risk assessment standpoint, the configuration resulting in the UCL 95 exposure point concentration (EPC) for the type of fish consumed by the receptor in the exposure area (EA) should be employed.		
	S3	Page 3-1; Section 3.1.1 Screening Process: Entire section The screening process is not protective of the Tribe and should be removed from the analysis process. EPA is well aware of the Tribe's exposure factors, (such as fish and water consumption rates, 70 year lifetime, etc.) as well as how the Tribe assesses cumulative risk (i.e. multi-pathway, multi-COC, and multi-media). This issue has been raised with EPA numerous times associated screening-level risk assessments attempted on the Midnite Mine and the bunker Hill Superfund sites. This issue has been raised for this site as well (see Attachment). In order to minimize such problems in the future, the Tribe suggests that EPA's RPMs should consult its technical personnel before releasing these works to the Tribe. Specifically, Marc Stifelman should be consulted on this issue. Due to the presence of multiple COCs in excess of natural conditions measured in both surface water and sediments, the ecological screening thresholds employed in this exercise are not protective of the target receptors. Cumulative hazard indexes are recommended. In summary, any COC attributed to the release creates incremental risk to the ecological and human receptors. Therefore, the screening threshold should be conditions representative of the media if the release had not occurred. Employing any other criteria will result in an incorrect assessment of risk that ultimately could lead to selection of a remedy that is not protective of human health and the environment.	See response to USDoI Comment G1.	

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	S4	Page 3-5; Section 3.1.2 Data Evaluation Approach and Comparisons to DQOs; Bullet No. 1: •Inorganic/organic arsenic speciation by species. The results of the arsenic speciation will support refinement of arsenic exposure in human health risk assessment. [Emphasis added] Since both the sediment and the fish surveys were synoptic survey, nothing can be ascertained about the time variable component of the preferred species of arsenic in either medium. Therefore in the absence of such time-series information, EPA should assume that arsenic is in its most toxic form for the human and ecological risk assessments. The Tribe identified this concern in the February 19, 2005 Memo as well and suggested to not perform the speciation as a cost savings measure. Results of the speciation study indicate that all species of arsenic measured exceed the human health screening value (Page 3-3 bullet No. 2; please note that criteria that is protective of the Tribe will be much lower than the criteria use in this comparison). Since arsenic appears to pervasive in all species sampled and since a causal-effect for the temporal and spatial distribution of different species of arsenic is unknown, it is highly unlikely the arsenic species-specific consequences of each proposed remedies will be able to be estimated. Therefore, again, the Tribe recommends that EPA should assume that arsenic is in its most toxic form for the human and ecological risk assessments. On an aside, please note that “arsenobetanine” in Table 3-10 should be changed to “arsenobetaine”.	Comment noted. Comment noted. Table 3-10 will be corrected.	
	S5	Page 3-5; section 3.1.2 Data evaluation approach and Comparisons to DQOs; Bullet No. 2: •Percent metals associated with the gut/gut contents of largescale suckers. The results of the gut/gut contents evaluation **will support refinement of exposure calculations for both the human health and ecological risk assessment**. The results can also be used to guide the study design of any future fish tissue collection efforts required to complete the risk assessments. [Emphasis added] As discussed numerous times with EPA, some members	See response to WDOE comment G1.	

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		of the Spokane Tribe consume whole fish (including gut). Therefore, the HHRA will necessarily include whole fish as a dietary component. Discrimination between the source of the dose (i.e. viscera versus remainder of the fish) is not germane to the HHRA. Dose to some piscivores may be more refined, but its not clear that this "level m of refinement" will significantly reduce any uncertainties in the ERA. In summary, the emphasized statement above is not supported by this study.		
	S6	Page 3-5; Section 3.1.2 Data Evaluation Approach and Comparisons to DQOs; Bullet No. 3: •Comparisons of COI concentration by fish collection areas for each target species. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments. This statement presumes that a non-time variant spatial correlation is evident. Again there are no data to support this presumption. Depending on the species, the Tribe does not expect to observe a positive correlation – even if the requisite statistical power were achieved for the synoptic study. Analysis of the data using statistical criteria more appropriate for risk studies indicates that very few of the COCs differ between sample locations. This appears to be a function of low statistical power – yet another concern the Tribe voiced in previous comments. Aggregation of the fish data to develop exposure point concentration (EPCs) of COCs depends on the exposure areas used in the assessment and the type of fish consumed by the target receptors – the results of this study should not affect aspects of daily fish consumption. Again, the EAs have not been defined at this time.	See response to WDOE comment G5. See Comment for Teck Cominco associated with WDOE Comment G3.	
	S7	Page 3-5; Section 3.1.2 Data Evaluation Approach and Comparisons to DQOs; Bullet No. 4: •Sitewide comparison by species for each screened COI. A sitewide comparison by species can be used for risk assessment planning and to further prioritize pathways. The COIs should not be screened-out at this time (See General Comment No. 2). Again, the EPCs will depend on definition of the EAs. The statement on further	Comment noted. See comment response G1.	

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		prioritizing pathways needs clarification.		
	S8	Page 3-5; Section 3.1.2 data Evaluation Approach and Comparisons to DQOs; bullet No. 5: •Comparisons of COI concentrations between species within a fish collection area. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments. Aggregation of the fish data to develop exposure point concentration (EPCs) of COCs depends on the exposure areas used in the assessment and the type of fish consumed by the target receptors – the results of this study should not affect aspects of daily fish consumption. Again, the EAs have not been defined at this time.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3.	
	S9	Page 3-5; section 3.1.2 Data Evaluation Approach and Comparisons to DQOs; Bullet No. 6: •Comparisons of COI concentrations in fillet samples by fish collection area. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments. In light of the previous comments, please explain how the CSM will be refined. Aggregation of the fish data to develop exposure point concentrations (EPCs) of COCs depends on the exposure areas used in the assessment and the type of fish consumed by the target receptors – the results of this study should not affect aspects of daily fish consumption. Again, the EAs have not been defined at this time.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	.
	S10	Page 3-5; section 3.1.2 Data Evaluation Approach and Comparisons to DQOs; Bullet No. 7: •"Statistical comparison of COI concentrations by species between site reaches. This spatial presentation of the data will support refinement of the CSM and help determine how data should be aggregated during the risk assessments. This evaluation also meets the secondary objectives of developing baseline data for the UCR". Aggregation of the fish data to develop exposure point concentrations (EPCs) of COCs depends on the exposure areas used in the assessment and the type of fish consumed by the target receptors – the results of	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	

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		this study should not affect aspects of daily fish consumption. Again, the EAs have not been defined at this time.		
	S11	Page 3-5; Section 3.1.2 data Evaluation Approach and Comparisons to DQOs; Bullet No. 8: •"Comparison of COIs in largescale sucker to COIs in sediment. This evaluation will support refinement of the CSM and help determine how data should be aggregated during the risk assessments." Aggregation of the fish data to develop exposure point concentrations (EPCs) of COCs depends on the exposure areas used in the assessment and the type of fish consumed by the target receptors – the results of this study should not affect aspects of daily fish consumption. Again, the EAs have not been defined at this time.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	
	S12	Page 3-6; section 3.2 Detailed Analytical Results for All Species; Entire Section and Subsections: Conclusions made in this section and all of its subsections are not supported when employing more rigorous statistical criteria as described above. Therefore, all of these conclusory statements should be revisited and revised as necessary.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	
	S13	Section 3.3.2.2 comparison of fish Tissue with Sediment; Entire Section: This section adds yet another unnecessary level of complexity to the "house of cars" constructed by the analyst. Again, aggregation of the fish data to develop exposure point concentration (EPCs) of COCs depends on the exposure areas used in the assessment and the type of fish consumed by the target receptors – the results of this study should not affect aspects of daily fish consumption. The Tribe recommends that this section be removed.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	
	S14	Section 3.3.3 comparison to Past Studies; Entire Section: Many of the conclusions made in this section are not supported when employing more rigorous statistical criteria as described above. Therefore, all of these conclusory statements should be revisited and revised as necessary.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	

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	S15	Section 3.3.4 Updated Conceptual Site Model; Entire Section: Many of the conclusions made in this section are not supported when employing more rigorous statistical criteria as described above. Therefore, all of these conclusory statements should be revisited and revised as necessary.	See response to WDOE comment G3. See Comment for Teck Cominco associated with WDOE Comment G3	
	S16	Page 3-22; Section 3.3.4 Updated conceptual Site Model; bullet No. 4; •"total PCB concentrations were similar for walleye, wild and hatchery rainbow trout, lake whitefish, and burbot. Largescale suckers contained about 2.5 times as much total PCB, suggesting that PCB exposure is greater from sediment than from water column or food chain transfer." The Tribe has major problems with this entire section, but this conclusory statement deeply concern the Tribe. First the statement of "2.5 times as much . . . " is not supported by the statistics, but more importantly, the analyst compares different species and subsequently falsely draws conclusions with respect to the abiotic media.	Comment noted. The text will be modified to indicate these are preliminary conclusions.	
	S17	Page 3-22; Section 3.3.4 Update Conceptual Site Model; Last Paragraph: "The current results presented above support the preliminary CSM and the assumption that UCR fish are exposed via both surface water (i.e., surface water and suspended particulates) and sediment. **The results indicate that the exposure varies depending on the species and location within the reservoir."** [Emphasis added] This statement also is a deep concern to the Tribe. First, a cause-effect relationship between sediment and concentration observed in fish tissue has not been established. Second, the data and subsequent statistics do not support the conclusion that exposure is species dependent or that exposure is a regionalized variable – either exposure to the receptor or exposure to those who rely on the receptor.	Comment noted. The conclusion drawn is appropriate for the data.	
TF28	S18	Page 4-1; Section 4.0 Data Gaps and Recommendations; Paragraph No. 2: "Because of limited and noncomparable historical data, statistical analysis of temporal trends was not possible,	Comment noted. The study design should not be interpreted as the only, or even preferred, approach to for the site. Additional and/or alternative data collection are at this time considered data gaps, which USEPA expects will be filled as part of the UCR human health and ecological risk assessment.	Additional and/or alternative fish tissue data collection are at this time considered data gaps, which EPA expects will be filled as part of the UCR human health and ecological risk assessment.

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		as noted in Section 3.3.3. **The Phase I fish tissue study was designed to provide baseline data for future studies investigating temporal trends of contaminants in UCR fish. The Phase I fish tissue study should be repeated at approximately 5-year intervals to assess temporal trends in fish tissue contaminant concentrations.** The details of the trend analysis will depend on the results of the human health risk assessment being conducted by USEPA and an ecological risk assessment that will be conducted by Teck Cominco American, Inc., and overseen by USEPA." [Emphasis added] The premise of this approach is that the "baseline" is indeed adequately characterized. As pointed-out in the previous comments, the current baseline Phase I Assessment is woefully inadequate (and was anticipated to be such based on the experimental design described in the work plan). The Tribe recommends at least another phase is necessary. This phase would be designed to statistically characterize the EPCs of COCs that represent the various EAs. Currently, this work falls far short and supporting future work of equal quality, as is done above, will only propagate equally inconclusive studies making future temporal comparisons highly unlikely.		