The Technical Advisory Committee (TAC) for the Elk Valley Water Quality Plan (the "Plan") held their 7th meeting on July 8-10, 2014. This document is a record of the technical advice received at this meeting, and is Appendix A to the Meeting Notes.

The TAC process is structured around a review of work packages submitted to the TAC in advance of their meetings by Teck. These work packages relate to the analytical process that Teck is undertaking to inform decisions around the selection of water quality targets, management scenarios, and any additional monitoring and studies that will be included in the Plan. The advice in this table relates primarily to work packages that were reviewed and discussed at TAC Meeting #7.

Chapter 1 (Introduction) & Chapter 4 (Current Baseline Conditions)

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Ch. 1 Introduction	7A-1	Clarification needed for statement that "To date, studies and monitoring conducted by Teck indicate that selenium concentrations generally remain below levels that would affect populations of fish and other sensitive animals in the mainstem of the Elk River and the Fording River below Josephine Falls." . − Revise to reflect that selenium concentrations in some places are at levels that could affect a fish species population.	The word generally is too vague. Please clarify. From our understanding, there is at least one Order location, and numerous tributaries, where concentrations will still exceed critical effects levels.
Ch. 4 Current Baseline Conditions	7A-2	Provide engineering type schematics with baseline water quality concentrations for selenium and nitrate in the body of Chapter and all four in the annex.	Facilitates the evaluation of monitoring data.
Ch. 4 Current Baseline Conditions	7A-3	Related to the highlight bullet "Selenium and nitrate are the two constituents that most frequently exceed B.C. water quality guidelines in the Fording and Elk rivers; however, toxicity tests have not shown adverse effects on sensitive aquatic life" (Pg. 4-2, line 22-23): − Add text that the bioassessment data did show impacts in tributaries.	Improves technical accuracy of statement.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Ch. 4 Current Baseline Conditions	7A-4	Regarding the highlight bullet "Data collected to date indicate that selenium in fish tissues is below levels that would be harmful to fish populations" (Pg. 4-2): – refine wording to reflect that this conclusion depends on what datasets you do or do not include – consider that for some species, we do not know their sensitivity, so making a broad statement on this point is beyond what we know at this time.	Improves technical accuracy of statement.
Ch. 4 Current Baseline Conditions	7A-5	Regarding the highlight bullet "Data collected to date indicate that selenium in fish tissues is below levels that would be harmful to fish populations" (Pg. 4-2): – Add text that selenium concentrations in some species are approaching or exceeding guidelines (e.g. Longnose Sucker and Peamouth Chub)	Improves technical accuracy of statement.
Ch. 4 Current Baseline Conditions	7A-6	Include a table of the guidelines that were used to screen surface-water chemistry data from the Elk Valley in the main body of the report.	The first step of the evaluation of existing surface water chemistry data involves screening against Water Quality Guidelines (WQGs). The reader needs to know what WQGs were used in the screening process.
Ch. 4 Current Baseline Conditions	7A-7	Develop a single, consolidated conceptual site model (CSM) that includes both physical and chemical stressors. (Figure 4.2).	The current baseline conditions chapter of the Elk Valley Water Quality Plan (EVWQP) describes a CSM for the designated area. However, this CSM does not include physical stressors. This makes it difficult to develop hypotheses regarding the interactive effects of multiple stressors or the cumulative effects of multiple anthropogenic activities. Therefore, a single, consolidated CSM that includes both physical and chemical stressors needs to be developed.
Ch. 4 Current Baseline Conditions	7A-8	Include a table in Chapter 4 that provides a means of identifying the data used to evaluate current baseline conditions. This table needs to describe the data available for media type for each of the tributaries and mainstem by management unit. (*KNC to provide example*)	Presentation of the information in this way provides a broad perspective on the data that were used to facilitate a cursory characterization of current baseline conditions and supports subsequent identification of data gaps.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Synthesis Report	7A-9	Consider, for Synthesis Report, a sensitivity analysis that uses flow-weighted averages (Pg. 4-8, Line 12-13).	
Ch. 4 Current Baseline Conditions	7A-10	In addition to reporting the frequency of exceedance, calculate and report the maximum hazard quotients based on a comparison of measured Constituent of Interest (CoI) concentrations to each of the selected WQGs for each sampling station in each Management Unit (MU). The results of this analysis need to be tabulated and presented in the text of the main report for all analytes. (eg. Table 4.1)	Most of the underlying surface water chemistry data used in the evaluation of existing water quality conditions were obtained from grab samples collected on a monthly or less frequent basis. Therefore, all of these results (with the exception of samples collected as part of a 5-in-30 day sampling event) should be considered to represent mean monthly concentrations of the CoIs in surface water and should be compared to long-term WQGs. Hence, exceedance of a long-term WQGs in one or more surface water samples represents a condition that could adversely affect aquatic organisms. This analysis will provide relevant information on current water quality conditions.
Ch. 4 Current Baseline Conditions & Annex K.1 Synthesis Report - Surface Water Quality	7A-11	Remove high non-detects prior to identifying COPCs.	High non-detect values (i.e., samples with non-detect concentrations that are higher than the respective screening threshold) should be excluded prior to identifying Constituents of Potential Concern (COPCs) to reduce the probability of falsely identifying COPCs.
Ch. 4 Current Baseline Conditions	7A-12	In Section on fish populations (S. 4.3.5), include summary of information on Longnose Sucker.	Improves communication of technical data.
Ch. 4 Current Baseline Conditions	7A-13	Regarding summary text of Figure 4.15 "Cumulative distribution of fish ovary selenium concentrations from Lake Koocanusa in relation to concentration-response data for brown trout": – the statement that the total risk to fish populations is 1.4% is not an accurate statement on the risk to each species. Consider having a table with the integrated risk for each species in Ch. 4. – If Table can not be provided, remove Figure 4.15 and related text.	Improves technical accuracy of statement.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Ch. 4 Current Baseline Conditions	7A-14	Recommend using the draft USEPA water quality criteria in addition to the use of the draft fish tissue criteria (Pg. 4-36)	Makes the evaluation more comprehensive. It should be noted that both water and tissue criteria are draft at this time.
Ch. 4 Current Baseline Conditions	7A-15	In addition to using the upper confidence level of the mean, use the 95th percentile of the exposure for the calculation of hazard quotients for all management units. If this can not be done, provide a suitable caveat.	Due to the steepness of the Se dose response relationship, hazard quotients based on the upper confidence level of the mean may underestimate risk estimates.
Ch. 4 Current Baseline Conditions	7A-16	**Reference Areas:** For the evaluation of Se fish tissue concentrations, recommend changing "comparison to reference areas" to "comparison with non mine-influenced water bodies" with a disclaimer (i.e., footnote) stating that these sites have not been evaluated to determine if they are appropriate reference areas in terms of hydrological and biogeochemical similarity.

Recommend that as part of the Local Aquatic Effects Monitoring Program (LAEMP) and Regional Aquatic Effects Monitoring Program (RAEMP), a process to develop selection criteria, identify candidate reference areas, and evaluate the appropriateness of those reference areas (in terms of hydrological and biogeochemical similarity) is conducted. | These sites have not been evaluated to determine if they are appropriate reference areas in terms of hydrological and biogeochemical similarity. |

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Ch. 4 Current Baseline Conditions	7A-17	Do not include the integrated data evaluation report cards from the Synthesis Report in an appendix to the Plan until such time that they can be properly developed (i.e. in a manner consistent with the Conceptual Site Model and effects hypotheses) and validated. For Plan submission, include a placeholder for the report card tables and caveats on the description text.	The evaluation of overall environmental quality was summarized in the draft watershed report cards that were presented at TAC-Meeting 6. Each of the indicators of environmental quality used in the evaluation has a number of limitations that make it inappropriate for use at this time. For example, the Water Quality Index (WQI) is not sufficiently described and is inconsistent with the CCME (2001) WQI. The calcite index is not linked to biological effects; so, the classifications that were selected are arbitrary. The benthic invertebrate community structure analysis is strongly affected by the selection of reference station and the treatment/analysis of associated data. The benchmarks for calculating the metrics for assessing selenium in tissues are incompletely described. Collectively, these limitations render the various metrics of uncertain value for characterizing environmental quality conditions in the Elk Valley. Moreover, insufficient and inappropriate rationale has been provided on how the various metrics have been considered together to develop an overall rank for a sampling station. Importantly, key mining-related stressors that could substantially affect ecological receptors have not been evaluated in the report card [e.g., stream-bed substrate quality, Total Suspended Solids (TSS), changes in streamflow, exposure to groundwater during surface water recharge (i.e., during base flow periods), etc.]. Therefore, the integration of multiple data types and associated report card are not reliable tools for evaluating existing environmental conditions in the Elk Valley.
Ch. 4 Current Baseline Conditions	7A-18	Recommend changing the title of the "Canadian Water Quality Index" to another title.	The methods of the Canadian Water Quality Index were not followed to calculate the WQI values in this chapter.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Annex K. 2	7A-19	Add text that the frequency of exceedances may not reflect the actual differences in mean concentrations between exposed and non-mine affected areas, e.g., potentially influenced by the number of samples of certain species (S. 1.2.1).	The text seems to suggest that non-mine impacted (reference) fish, have Se concentrations that routinely exceed the guideline, more so than the fish in Lake Koocanusa. The statement is misleading as the percent of exceedances are strongly influenced by a few species of fish that have a high number of samples (see follow-up in item # 20 for further advice).
Annex K. 2	7A-20	Add text in this section describing differences between the mean selenium concentration in tissue (muscle and ovary) of the exposed areas (i.e. Lake Koocanusa) and non-mine impacted areas, specifically addressing why the mean in Lake Koocanusa appears to be higher than non-mine impacted sites in nearly all species. Also note whether the difference is statistically significant. (S. 1.2.3).	It is worth noting that the fish in Lake Koocanusa, when compared to non-mine impacted areas (regardless of whether or not they are "true" reference), appear to show elevated tissue concentrations in both ovaries and muscle. Please conduct a statistical test comparing the means of the non-mine impacted vs. Lake Koocanusa (exposed areas) by species type.

Annex K. 2	7A-21	Regarding the summary conclusion: "The strongest line of evidence for evaluating potential risks due to selenium is the concentration in fish ovaries; data available to date indicates that selenium risks to fish in Lake Koocanusa are negligible":
		  − It appears as if the data does not support this conclusion (ensure clarification is reflected in the body of the Plan)
		  − Use a t-test of the mean selenium tissue selenium concentrations in both ovaries and muscle for Lake Koocanusa and non mine-exposed sites (assuming data is normally distributed) to support or refute the contested statement.
			Improves technical accuracy of statement.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Annex K. 2	7A-22	Regarding the summary conclusion: "A total of 6% of ovary selenium samples collected from Lake Koocanusa exceeded the BC Ministry of Environment (BCMOE) guideline of 11 mg/kg dw, and 1% exceeded the draft US Environmental Protection Agency (USEPA) criterion of 15.2 mg/kg dw." (S. 4): – Recommend that this analysis compares individual fish species to guideline and remove the analysis based on grouping of fish species. Ensure this comparison is reflected in the text (and ensure this is reflected in the body of the Plan)	While summary statistics are useful in some instances, in this case, it would also be suitable to report the total number of exceedances on a fish by fish basis (perhaps in a table).
Annex K. 2	7A-23	Regarding the summary conclusion: "Selenium exceeded the WQG in 3 of 125 samples": – Include how many samples exceed the draft USEPA water quality criteria (and ensure this is reflected in the body of the Plan)	Improves communication of results.

Chapter 5 – Protection of Human Health and Groundwater

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 5 Human Health & Groundwater	7A-24	Reword the general statement that "managing of surface water will protect groundwater": − More evidence needs to be presented if this statement is made – such as data and analysis on the connections between surface water and groundwater	Insufficient evidence has been presented to make this statement.
Chapter 5 Human Health & Groundwater	7A-25	For Plan Implementation: Undertake additional studies to get more comprehensive information on: − groundwater flow system − GW-SW interaction − GW quality	
Chapter 5 Human Health & Groundwater	7A-26	Provide details and rationale on the groundwater monitoring suite and limitations of groundwater dataset.	
Chapter 5 Human Health & Groundwater	7A-27	Explicitly identify data gaps and discuss uncertainties associated with the human health assessment (i.e., present this important information as a bulleted list in the Chapter and in the accompanying report). *For additional context and Appendix 2, refer to D. MacDonald (TAC Member for KNC) letter (dated July 11, 2014).*	Information on data gaps and uncertainties is essential for understanding how much confidence can be placed in the results of the human health risk assessment. In addition, this information is needed to support the design of monitoring programs to address data gaps and/or supporting studies to address uncertainties. Additional comments on the assessment of protection of human health and groundwater draft and on the associated human health evaluation of current conditions are provided in Appendix 2.
Annex L	7A-28	Check the accuracy of all of the calculations used to evaluate potential effects on human health under baseline conditions. *For additional context and Appendix 2 refer to D. MacDonald (TAC Member for KNC) letter (dated July 11, 2014)*	As presented, at least some of the calculations used in the evaluation are not reproducible. Therefore, the underlying equations, benchmarks, and exposure point concentrations should all be checked to assure their accuracy (see Appendix 2 for more information).

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Annex L	7A-29	Include toddler as a receptor in the evaluation of potential effects on human health under baseline conditions.	According to Health Canada (2010) guidance, toddlers would normally be considered to be the critical receptor for threshold chemicals at a site where all age classes are present. Therefore, toddlers need to be included the evaluation of potential effects on human health under baseline conditions.

Chapter 6 – Management Options

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 6 Management Options	7A-30	Add that geomembrane covers were considered as a management option in the planning process.	**Rationale:** It's important to be able to follow the rationale for why water treatment and water diversion were chosen for the initial Implementation Plan.
		As a follow-up, please describe why they were excluded at this time since they appear to provide the greatest water-quality benefit, but at the highest implementation cost.	
Chapter 6 Management Options	7A-31	Important to include how the Implementation Plan actions were chosen from the table of complete management options reviewed by the TAC.	Improves rationale behind Implementation Plan and reduces questions around "what more could be done to improve water quality".
Chapter 6 Management Options	7A-32	Regarding management of residuals from water treatment plants, clarify that the information collected will be used to assess long-term sustainability, disposal strategies, and detailed design of future facilities.	Long term storage of water treatment residuals will be an important aspect of EVWQP implementation. It will be important to understand the long-term behaviour and storage requirements to ensure sustainable operation.

Chapter 6 Management Options	7A-33	For the description of the approach to assess management options:
		  – Clarify whether modeling was done for geomembrane covers and who was involved with the assessment of management options.
		  – Clarify the main driver behind choice of management options (cost, water quality benefits or both).
			This information provides context to the reader to know the process by which management options were evaluated, and what specific actions were proposed. It will be very helpful to understand the decision-making process upon which scenarios were selected (was it solely cost, water quality benefit, etc.?)

Chapter 7 – Calcite Management

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 7 Calcite Management	7A-34	For the purposes of describing current conditions, classify streams into three categories using the calcite monitoring data that were collected in 2013 (Appendix 5), including: 1. Unaffected Streams - These streams have calcite levels consistent with those observed in reference streams. Such streams have CIC values and CIP values less than or equal to the upper limit of background, as defined by the 95th percentiles calculated for reference sites. The 95th percentile value for CIC is 0.05, while the 95th percentile value for CIP is 0.345 (see Appendix 5). 2. Moderate-Affected Streams - These streams have calcite levels that are intermediate between unaffected streams and highly affected streams (i.e., CIP of 0.35 to <0.75 or CIC of >0.05 to <0.5); 3. Highly-Affected Streams - These streams have at least 75% of the pebbles showing evidence of calcite formation (i.e., CIP 0.75) or at least 25% of the streambed showing evidence of concretion (i.e., CIC 0.5). *For additional context and Appendix 5, refer to D. MacDonald (TAC Member for KNC) letter (dated July 11, 2014).*	A calcite index (CI) as developed to provide a basis for classifying streams in the Elk Valley based on the presence of calcite (CIP) and the degree of concretion of the streambed (CIC), where CI = CIP + CIC. The three classifications that were developed included a low CI range (0 to 0.99), a mid- CI range (1.0 to 1.99), and an upper CI range (2.00 to 3.00). While these range of CI values provide one means of classifying streams relative to calcite content, an alternate classification system that considers the potential effects may be more appropriate in the near-term. The unaffected classification identified above defines the reference envelope using the indicators incorporated into the CI. The highly-affected streams would be expected to have substantial reductions in benthic invertebrate productivity and/or reduced egg-to-fry survival rates for salmonids (i.e., with a high incidence of calcite or substantial concretion of streambed substrates) (see Appendix 5 for more analysis).
Chapter 7 Calcite Management	7A-35	Provide a definition of "receiving environment" or rename the term to something more accurate, (e.g. mine-influenced streams for calcite) (Pg. 7-14). *For additional comments on the calcite monitoring plan that was developed by Teck, refer to Appendix 3 in D. MacDonald (TAC Member for KNC) letter (dated July 11, 2014).*	In this chapter of the EVWQP, the term receiving environment refers to portions of the streams downstream of constructed works, such as settling ponds, culverts, and similar structures. This term should be replaced with a term that more accurately describes these mine works.

Chapter 8 - Targets

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**

Chapter 8 Targets	7A-36	Regarding the highlight bullet: "The B.C. Water Quality Guidelines for aquatic health, or their equivalent, have been set as the long-term water quality targets for selenium, nitrate, sulphate and cadmium at most order stations in the Elk Valley" (Pg. 8-2, line 14-19):
		   – Revise and expand the statement to reflect that the selenium target is not equivalent to WQGs for all but one Order Station, and characterize the cadmium target as a level 1 benchmark that offers a similar level of protection as the Canadian Council of Ministers of the Environment (CCME) WQG.
		   – Revise any other statements made in the Plan to be consistent with this advice.
			Improves communication of how targets have been set.

Chapter 8 Targets	7A-37	Provide definition of "maximum average monthly concentration", and change "average" to "mean" (Pg. 8-5). In definition provide additional information that describes that the monthly concentrations frequently or usually consist of one sample collected per moth.	The metrics used in the EVWQP should be clearly defined, including the methods used for calculating the metrics.
Chapter 8 Targets	7A-38	Regarding the sentence: "Identify "critical effect sizes" commonly accepted in toxicological literature that describe a level of effort to individuals that *does not result in changes* to populations or communities of sensitive aquatic species.": – Change "does not result" to "unlikely to result" and ensure this change is made throughout the Plan.	As originally stated, the statement is too strong.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 8 Targets	7A-39	Regarding the statement: "The US EPA identifies 20% as a critical effect size for most cases. It represents an effect that is statistically distinct from reference or control conditions, but is not expected to cause meaningful and measurable changes in a population (US EPA 1999, 2013)" (Pg. 8-10): – Since this citation is related to effects in laboratory studies, this citation should be used in relation to the development of benchmarks but not in managing effects at a management unit scale. – Ensure change is made throughout document (e.g. Pg. 8-26 and any reference to birds) and related Annexes (e.g. Annex E) Please also review the application of Suter et al. 1995 and Mebane 2010 to assure that these references are not being used out of context of the research.	Improves technical accuracy of statement and ensures that critical effect sizes are not taken out of context. .
Chapter 8 Targets	7A-40	Regarding the statement "The rate of selenium bioaccumulation rates varies in relationship to environmental conditions. It tends to be higher in still-water (lentic areas) exhibiting lower oxygen content. Lower bioaccumulation rates are observed in flowing, well-oxygenated (lotic) systems" (Pg. 8-11): – Add explanation that there is overlap of selenium bioaccumulation rates between lotic and lentic areas.	Provides a more comprehensive explanation of the variability in selenium bioaccumulation relationships.
Chapter 8 Targets	7A-41	Revise the number of bird species represented in the dataset from "37 bird species" to the actual # of bird species in the toxicity dataset (should be around 5 species) and reflect the change in the total # of species represented in the dataset (Pg. 8-11, 8-15 & throughout).	Improves technical accuracy.
Chapter 8 Targets	7A-42	Remove the statement "Consistent with guideline derivation procedures" (Pg. 8-11, Line 29-31). Also remove statement on Pg. 5 in Annex E.	Provides a more accurate description of methodology applied to develop toxicity benchmarks.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 8 Targets	7A-43	Add "interim" to level 1 and level 2 nitrate benchmarks.	The Toxicology Working Group (working group to the TAC) recommended that the site-specific toxicity testing results for *Ceriodaphnia dubia* be used to support the development of interim targets for the Elk Valley. However, additional long-term toxicity tests conducted with the amphipod, midge, and rainbow trout, and toxicity tests conducted with amphipods were also recommended to be completed and the results incorporated into the target derivation process.
Chapter 8 Targets	7A-44	Regarding statement **"**Although nitrate and sulphate could theoretically work in combination to create osmotic stress, the nitrate benchmarks (Section 8.2.5) are a small component of the total dissolved solids (TDS) content of waters in the Designated Area": − Can not equate a constituent's contribution to total dissolved solids to the potential effect on osmoregulation.	Improves technical accuracy of statement.
Chapter 8 Targets	7A-45	Regarding section on interactive effects and the mechanisms of action of the Order constituents, with the exception of selenium, the mechanisms of action for these constituents are poorly understood, so this section should not infer that these constituents have very different mechanisms of action from selenium (Pg. 8-21).	Improves technical accuracy of the analysis of interactive effects.
Chapter 8 Targets	7A-46	Statement that "Mixture effects are considered unlikely" is too strong considering uncertainties around mechanisms of action for the 4 Order Constituents (Pg. 8-21, Line 31).	Improves technical accuracy of the analysis of mixture effects.
Chapter 8 Targets	7A-47	*In Plan Implementation:* Recommend that an integrated effects assessment based on current concentrations be completed similar to the approach used in support of the long-term target development.	The approach that is being used to determine integrated effects for the long-term targets should also be completed based on current concentrations. The long-term integrated effects assume you are starting with robust healthy populations; however, this may not be the case depending on the current integrated effects in the management units.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 8 Targets	7A-48	Update Table 8-11 and related text to say <10% is the assessment criteria goal for birds and amphibians (Pg. 8-28, Line 25, Table 8-11, & throughout document).	The same effect level (<10%) as used for fish should also be used for birds and amphibians.
Chapter 8 Targets	7A-49	For statements such as "concentrations less than the Level 2 benthic community benchmark are met through the majority of the Management Unit (MU), including in the mainstem subunits of the Elk and Fording rivers": – Define "majority" of MU – Clarify what parts of the mainstem	Improves technical clarity of document.
Chapter 8 Targets	7A-50	Clarify that the target of 40 µg/L in Lower Fording River (MU 2) is not a Level 1 benchmark and bring forward the rationale that the 12% effect size is still protective but has a lower margin of safety. Also provide more information in this paragraph on why the level 1 benchmark is not achievable.	This clarification would improve the technical clarity and transparency of the EVWQP.
Chapter 8 Targets	7A-51	Clarify the rationale behind the choice of >50% for the goal related to "Proportion of management unit with concentrations <Level 1 benchmark for most sensitive endpoint" in the Integrated Assessment for selenium (Table 8-11).	Improves documentation of methodology.
Chapter 8 Targets	7A-52	Throughout the Plan, and this Chapter in particular, ensure text is clear that water treatment was designed to meet water quality targets at Order Stations and was not designed for meeting water quality targets in tributaries. *Suggested language:* "The initial implementation plan was developed by iterating a range of treatment options to identify the scenario that represents the least treatment required to achieve the concentration target at the Order Stations".	Improves technical clarity of document.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 8 Targets	7A-53	In Table 8-14 (the table with details of the Implementation Plan): – clarify and describe more clearly the details of management options that make up the implementation plan (e.g. Greenhills Creek is diverted and treated at Elk River side). – include details in this table on the watershed associated with treatment and diversion.	Improves utility of the table, especially for future regulatory use.
Chapter 8 Targets	7A-54	Regarding sentence: "The relationship between treatment volume and maximum monthly concentrations under high flows at FR5 (Figure 8-12) indicates that the Level 1 benchmark is not achievable for MU-2." – Define "maximum monthly concentrations".	Improves technical clarity.
Chapter 8 Targets	7A-55	**For water quality modeling plots:** – Include predicted water quality plots for selenium, nitrate and sulphate for all Order Stations, and explain why a plot is not provided for cadmium. – Need higher resolution and larger graphs – too difficult to see where the range of averages overlap. – Need unmitigated case reflected on all graphs. – Add y-axis labels to right-hand side of the graphs. – Provide context and legend up front for the plots.	The water quality plots are an important outcome of the EVWQP process.
Chapter 8 Targets	7A-56	Sulphate water quality concentrations are predicted to continue to rise and are predicted to eventually exceed the water quality guideline at certain locations in the Elk Valley with the initial Implementation Plan. Provide rationale for not addressing these issues in the EVWQP and explain what future work will be done to determine if water quality treatment for sulphate is necessary.	All reasonable and practical mitigation measures should be taken to minimize loadings of the order constituents to receiving waters (i.e., to ensure that concentrations of these COPCs are maintained at the lowest practical levels). However, no measures have been proposed to address increasing concentrations of sulphate. This needs to be corrected in the EVWQP.
Chapter 8 Targets	7A-57	Add more rationale for the water quality concentrations of the initial Implementation Plan: – e.g. Order Station ER2 – why the short-term level benchmark isn't met until 2023.	Improves rationale behind Implementation Plan and reduces questions around "what more could be done to improve water quality".

Chapter 10 – Monitoring & Chapter 11 – Adaptive Management

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 10 Monitoring	7A-58	For Table 10-1, the Conceptual Overview of the Aquatic Effects Monitoring Program: – Separate benthic invertebrate community structure and benthic invertebrate tissue sampling – Indicate both sampling and reporting frequency – Add supporting studies as a row – include a complete list of biological monitoring components for Lake Koocanusa	Facilitates the communication and evaluation of the monitoring program.
Chapter 10 Monitoring	7A-59	Incorporate sampling of selenium concentrations in periphyton and benthic invertebrate tissue on an annual basis.	Provides an indicator for selenium concentrations in sensitive receptors (birds, fish, amphibians), without the adverse impacts that may result if these sensitive receptors were monitored annually.
Chapter 10 Monitoring & Chapter 11 Adaptive Management	7A-60	In the Conceptual Site Model Table, express the "Effect" column as assessment endpoints and include all of the measurement endpoints.. Link adaptive management triggers to assessment endpoints and measurement endpoints that will be outlined in the Monitoring Chapter	Provides consistency and connections between conceptual site model, proposed monitoring under RAEMP, and adaptive management triggers
Chapter 10 Monitoring	7A-61	Add a map of monitoring locations for sediment quality and benthic invertebrates.	Facilitates the evaluation of monitoring for these components.
Chapter 10 Monitoring	7A-62	Provide breakdown of the frequency and location of monitoring for Lake Koocanusa (similar to what was done for management units 1-5).	Facilitates the communication and evaluation of the monitoring program.
Chapter 10 Monitoring	7A-63	Add a summary reference subsection on the additional supporting studies and incorporate the longer-term toxicity tests that were recommended through the Toxicology Working Group into the ecotoxicology assessment section.	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Chapter 10 Monitoring	7A-64	Recommend that groundwater monitoring is undertaken for the purposes of gaining information to facilitate the protection of groundwater (especially aquifers) even if groundwater is not currently being used as a drinking water source.	Need to protect future uses of groundwater.
Chapter 11 Adaptive Management	7A-65	**In the adaptive management chapter:** – Provide more detail on the frequency of monitoring, analysis (adaptive management loop) and reporting to regulatory agencies and the Public for all monitoring components – Outline the factors that would result in increased frequency of adaptive management analysis – Include feedback loops associated with new treatment coming on line (e.g. do loop before and after bringing treatment facilities on line)	The details of adaptive management are important for the Implementation Phase, especially for permitting.
Chapter 11 Adaptive Management	7A-66	In development of the full adaptive management evaluation methodology: – Recommend including triggers closer to sources.	Provides greater ability to monitor and adaptively manage individual sites/waste rock facilities, if required. Will also help to clearly identify those sites/facilities that may be responsible for unexpected increases.
Chapter 11 Adaptive Management	7A-67	Clarify the timeline and process for trigger development and reporting. Ensure consistency between Ch. 10 and Ch. 11.	Clarifying this information improves the technical clarity of the document and facilitates evaluation of the adaptive management framework.
Chapter 11 Adaptive Management	7A-68	Provide a specific timeframe for when the Water Quality Planning Model will be updated.	Specification of a model post-audit frequency will let decision-makers know how often model updates are expected.

Recommendations from Working Groups

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Monitoring	7A-69	**Toxicology WG Recommendation #6-1:** Recommend the design and implementation of a robust monitoring program to monitor selenium tissue concentrations in water, periphyton, invertebrates, fish, and birds for the purposes of validating the selenium bioaccumulation models for the Elk Valley and validating the toxicity benchmarks derived by these models. To reduce uncertainty in the selenium bioaccumulation models, recommend that the monitoring program undertakes better measurement of selenium water concentrations on a temporal basis to enable better estimation of selenium exposure for periphyton, invertebrates, fish and birds.	
Selenium Bioaccumulation Modeling & Monitoring	7A-70	**Toxicology WG Recommendation #6-2:** Recommend the definition of clear hypotheses for bioaccumulation model verification that would be tested through the monitoring program, and the inclusion of associated triggers in the adaptive management plan that would require the re-evaluation of targets depending on the results of the hypotheses testing.	
Selenium Toxicity Benchmarks	7A-71	**Toxicology WG Recommendation #6-3:** Recommend that selenium toxicity benchmarks presented at TAC Meeting #6 be described as a "best estimate with residual uncertainties" and recommend that these values are not described as "protective".	
Nitrate Ecological Effects Assessment	7A-72	**Toxicology WG Recommendation #6-4:** Recommend the following process for deriving nitrate benchmarks: – base the benchmarks on the results of site-specific toxicity testing for the most sensitive species (*C. dubia*); – adjust the *C. dubia* results using the hardness normalization procedure to derive site-specific nitrate benchmarks; – recognize uncertainties in the hardness normalization procedure and conduct additional toxicity testing to confirm the hardness relationship.	This approach is recommended instead of using a Species Sensitivity Distribution (SSD) approach because the site-specific tests resulted in a more conservative benchmark.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Nitrate Ecological Effects Assessment	7A-73	**Toxicology WG Recommendation #6-5:** Recommend the documentation of the results of the Species Sensitivity Distribution approach (SSD) in the Plan appendices along with a description of the uncertainties in the SSD approach.	
Nitrate Ecological Effects Assessment Monitoring	7A-74	**Toxicology WG Recommendation #6-6:** Recommend the use of the pooled hardness relationship for the evaluation tables in the Nitrate Benchmark Derivation Report with the caveat that there are a number of uncertainties in this relationship (such as the lack of information on the nitrate-hardness toxicity relationship for some species).	
Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-75	**Toxicology WG Recommendation #7-1:** Recommend the following study objective to address the uncertainty of "effect of fish size on selenium bioaccumulation" in the EVWQP selenium ecological effects assessment: **Objective of Study:** Test whether there is an effect of fish size on selenium bioaccumulation when there is a more balanced dataset of the range of fish sizes.	Previous work suggested there may be a difference in bioaccumulation between small sized fish and larger sized fish.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**

Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-76	**Toxicology WG Recommendation #7-2:**
		 Recommend the following study objective to address the uncertainty of "seasonality of invertebrate selenium concentrations relative to the period of uptake by Westslope Cutthroat Trout" in the EVWQP selenium ecological effects assessment:
		
		 Study Objectives:
		 1. Assess temporal variability in selenium invertebrate concentrations for multiple sites (within the bounds of health and safety restrictions)
		
		 2. If variability exists, gain understanding of:
		   a. the critical period that affects selenium concentrations in fish eggs (timing of egg provisioning), and,
		   b. the link between dietary variability and variability in selenium egg concentrations.
			At least some (perhaps much) of the variability in the Se bioaccumulation model describing trophic transfer from invertebrates to fish may be the result of matching samples that are not appropriately linked temporally. Understanding the temporal link between invertebrate selenium concentrations and consequent egg selenium concentrations will reduce uncertainty in the model.

Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-77	**Toxicology WG Recommendation #7-3:** Recommend the following study objective to address the uncertainty of "habitat use by fish" in the EVWQP selenium ecological effects assessment: **Objective of Study:** Use the results of the Westslope Cutthroat Trout Telemetry Study in the Upper Fording River to evaluate the effect of habitat use on the conclusions of the integrated effects assessment for management units in the Elk Valley.	For the integrated assessment, Teck has made the assumption that fish use habitat in proportion to the area. The telemetry data will provide data on fish use patterns which can be used to refine the assessment.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**

Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-78	**Toxicology WG Recommendation #7-4:**
		Recommend the following study objective to address the uncertainty of "representativeness of Westslope Cutthroat Trout (WCT) and Red-winged black bird (RWBL) bioaccumulation models to other species" in the EVWQP selenium ecological effects assessment:
		
		Objective of Study: Further evaluate the assumption that other species are adequately characterized by the Westslope Cutthroat Trout and Red-winged black bird bioaccumulation models.
		
		Comments on Study Design:
		  – Need synoptic sampling (which can be done for fish, but is harder for birds)
		  – When designing sampling related to bird bioaccumulation:
		    o Think carefully about measurement of exposure for birds and the size of territory that would require sampling
		    o Consider that bioaccumulation variability between bird species is low
		    o Variability in bird egg selenium concentration is tied to short-term diet of invertebrates; a composite sample of invertebrates should potentially be the same biomass as a daily food intake for the bird species
			Data are not available to make bioaccumulation models for all sensitive species. A WCT bioaccumulation model is being used to estimate bioaccumulation for all fish species. A red-winged blackbird model is being used to estimate bioaccumulation for all bird species.

Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-79	**Toxicology WG Recommendation #7-5:** Recommend the following study objectives to address the uncertainties of "sensitivity of amphibians to selenium and bioaccumulation of selenium by amphibians" in the EVWQP selenium ecological effects assessment: **Study Objectives:** 1. Assess sensitivity of amphibians to selenium (esp. metamorphosis endpoint) 2. If sensitivity is found, assess selenium bioaccumulation in amphibians.	The assessment of amphibians in the EVWQP was very limited due to lack of adequate data. Additional studies to address this uncertainty are needed.

Summary Table

Category	#	Description of "Technical Advice" from Mtg	Rationale
Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-80	**Toxicology WG Recommendation #7-6:** Recommend the following study objectives to address the uncertainties related to "potential interactive effects of selenium on multiple endpoints and with other stressors" in the EVWQP selenium ecological effects assessment: **Study Objectives:** 1. Develop population models (which is to protect against population crashes due to interactive effects and multiple stressors) 2. Separate effects due to interactive effects of selenium on multiple endpoints and multiple stressors through lab studies (this is to protect against long-term (15-year) small declines due to interactive effects and multiple stressors) 3. Assess toxicity for new endpoints and species that have not yet been measured with site water that is spiked to match short-term and long-term target levels (nitrate, sulphate, cadmium, and selenium) **Comments on Study Objectives:** While this is a high priority uncertainty to address, it is recognized that addressing this uncertainty is a difficult and long-term goal.	The combined effects from multiple stressors on multiple endpoints may be higher than those predicted from individual stressors. There needs to be consideration of other stressors that are not included in the evaluation table (e.g. changes in stream-bed substrate and composition).

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Selenium – Residual Uncertainties in the Se Effects Assessment and Follow-up Studies	7A-81	**Toxicology WG Recommendation #7-7:** Recommend the following study objective to address uncertainty related to the "frequency and timing of sampling that is needed to characterize selenium concentrations in water for the purposes of modeling selenium bioaccumulation" in the EVWQP selenium ecological effects assessment: **Study Objective:** 1. Determine the temporal lag between Se concentrations in the water and consequent Se concentrations in fish eggs with the objective of identifying the critical period (both timing and duration) in which water Se should be sampled for bioaccumulation modeling. 2. Determine the extent to which variability in water Se within the critical period influences subsequent fish egg Se allowing for an analysis of sampling frequency. **Recommendations on studies:** This study is likely best accomplished through a series of experiments to determine pharmaco-kinetic parameters in a model food chain for the system. The study should consider the kinetics of Se uptake and depuration from water to periphyton, water and food to a model invertebrate, water and food to westslope cutthroat trout. It will be important to characterize Se kinetics to fish ovaries, not just the whole body of the fish. This study should be undertaken using radio-isotopic tracers.	Same rationale as Toxicology WG Recommendation #7-2: At least some (perhaps much) of the variability in the Se bioaccumulation model describing trophic transfer from invertebrates to fish may be the result of matching samples that are not appropriately linked temporally. Understanding the temporal link between invertebrate Se and consequent egg Se will reduce uncertainty in the model.
Selenium – Lake Koocanusa	7A-82	**Toxicology WG Recommendation #7-8:** Recommend the following study objective to address uncertainty related to selenium bioaccumulation in Lake Koocanusa: **Study Objective:** Collect data to allow for the development of a selenium bioaccumulation model for Lake Koocanusa.	Because data are currently limited, a selenium bioaccumulation model for the Lake was not developed.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Selenium Evaluation (Integrated Effects) Tables for Management Units	7A-83	**Toxicology WG Recommendation #7-9:** Add a column in the selenium evaluation tables with the predicted tissue concentration.	This information in the table will help to assess the models.
Multiple Stressor Effects Assessment	7A-84	**Toxicology WG Recommendation #7-10:** The effects assessment for multiple stressors should consider the stressor of habitat loss due to mining projects.	Many uncertainties exist in the habitat compensation process (such as habitat enhancement/expansion may not occur in the same management unit), therefore, the stressor of "habitat loss" due to mining projects should be included in the multiple stressor evaluation even if habitat loss will be compensated.
Cadmium	7A-85a	**Toxicology WG Recommendation #7-11a:** Recommend that the level 1 (EC10) cadmium benchmark is derived by taking a geomean of the EC10 cadmium concentrations from Barata and Baird (2000) and the EC16 cadmium concentration from Biesinger and Christensen (1972).	The study by Barata and Baird (2000) did not measure Cd concentrations in the exposure. As a result, these data are unreliable and should not be used by themselves to set benchmarks or WQG but should be averaged with other, more reliable data. Following recommendation #2: The CCME guidance would rely only on this unreliable studies to set the benchmark while the draft BC WQG uses a different reliable study, but then applies a safety factor that brings the WQG exactly back to the value obtained using the Barata and Baird study (i.e., effectively relies on an unreliable study to set the benchmark).
	7A-85b	**Toxicology WG Recommendation #7-11b:** Recommend that either the draft BC WQG is used as the level 1 cadmium benchmark **or** that the cadmium derivation benchmark process follows CCME guidance and does not take the geomean of the EC10 cadmium concentrations from Barata and Baird (2000) and the EC16 cadmium concentration from Biesinger and Christensen (1972).	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Cadmium	7A-86	**Toxicology WG Recommendation #7-12:** Recommend that the cadmium benchmarks are not characterized as "equivalent to water quality guidelines" if the derivation method takes a geomean of the EC10 cadmium concentrations from Barata and Baird (2000) and the EC16 cadmium concentration from Biesinger and Christensen (1972).	Taking a geomean of these studies is not consistent with CCME guidance for guideline development, thus the benchmark should not be characterized as "equivalent to water quality guidelines".

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Site-Specific Toxicity Testing for Nitrate	7A-87	**Toxicology WG Recommendation #7-13:** Recommend the following site-specific toxicity testing is undertaken to address uncertainties related to the derivation of level 1 toxicity benchmarks for nitrate: 1. Test amphibian larvae cultured in the lab and run the test through to metamorphosis to evaluate the effects of nitrate on amphibians (must test a species that is resident to the Elk Valley); 2. Long-term tests (42-d) with the amphipod, *Hyalella azteca* should be conducted with site-water to evaluate the effects of nitrate on the growth and reproduction of this species; 3. Long-term toxicity tests (i.e., life-cycle tests) with the midge, *Chironomus dilutus*, should be conducted with site water to evaluate the effects of nitrate on the reproduction and emergence of this species; 4. Long-term early life-stage toxicity tests with a salmonid species (e.g., rainbow trout, *Oncorhynchus mykiss*) should be conducted with site water at various hardness levels (i.e., the Elk River and the Fording River) to better understand the sensitivity of this family to nitrate toxicity in the study area, and the relationship between water hardness and toxicity; 5. Toxicity tests conducted with site-water should be conducted with waters collected at various times of the year to evaluate seasonal variability in the toxicity of nitrate to sensitive aquatic species; and, Recommendations on studies: • The site-specific toxicity tests should be conducted in a manner that provides explicit information on the role of water hardness in modifying the toxicity of nitrate. • The results from all of the above tests should be used to validate the interim site-specific nitrate benchmarks derived for the Elk Valley Water Quality Plan; • The sensitivity testing for amphibians, *Hyalella azteca, Chironomus dilutus,* and *Oncorhynchus mykiss* should be done prior to the toxicity tests with site water to evaluate seasonal variability in toxicity for sensitive aquatic species. • The toxicity tests with site water to evaluate seasonal variability in toxicity for sensitive aquatic species should be part of the long-term monitoring program.	Long-term tests typically result in lower estimates of the statistical endpoints as the exposure duration (to the substance of interest) is longer and more appropriate for applying to field conditions. In addition, and importantly, we are recommending these long-term toxicity tests (i.e., 42-d *Hyalella azteca* and life-cycle *Chironomus dilutus* tests) to understand the effects of nitrate on effects endpoints that are expected to be more sensitive than survival or growth. In the 42-d *Hyalella Azteca* test, reproduction is also assessed (not available in the shorter 14-d test). In the life-cycle *Chironomus dilutus* test (typically ranging from 53 to 60-d), emergence and reproduction are also assessed (not available in the shorter 10-d test).

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Monitoring Objectives / Key Monitoring Questions	7A-88	**Monitoring WG Recommendation #1-1:** Recommend that the monitoring program supports an adaptive management process with quantitative triggers.	
Monitoring Objectives / Key Monitoring Questions	7A-89	**Monitoring WG Recommendation #1-2:** Recommend the addition of the following key questions to the Regional Aquatic Effects Monitoring Program (RAEMP): – Are Elk Valley Water Quality Plan Objectives being met? – Are the water quality targets and timelines in the EVWQP being met ? – Are any early-warning triggers (in the adaptive management plan) being reached? – Are planning tools making the right predictions and are assumptions still valid? – What are current loads to receiving waters in the Elk Valley and how are they changing over time? – Is there a change over time in trophic status?	
Reference Areas	7A-90	**Monitoring WG Recommendation #1-3:** Recommend evaluating whether an appropriate reference dataset exists for comparison with Lake Koocanusa fish tissue (Note that there may not be an appropriate reference dataset for this purpose).	Lake Koocanusa is a reservoir that varies from completely mixed to strongly stratified depending on time of year, and has significant variation in pool elevation. It is unclear whether suitable reference locations exists for such an environment.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Reference Areas	7A-91	**Monitoring WG Recommendation #1-4:** Recommend the following actions are taken when defining reference conditions: – define criteria that will be used to evaluate and choose reference sites; – consider temporal, spatial characteristics, and for biota, consider life history aspects. – Have at least 3 years of water quality data, and conduct 5/30 sampling events at a minimum during low flows and high flows. Check for biases in the reference data sets by examining the distributions of data and calculating the average along with the 95th percentile for each site separately.	
RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-92	**Monitoring WG Recommendation #1-5:** In reporting monitoring results, recommend being clear on whether fish are from Lake Koocanusa or management unit 6, or whether effects are occurring in Lake Koocanusa or management unit 6.	Improves clarity.
RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-93	**Monitoring WG Recommendation #1-6:** Recommend an additional monitoring station in Lake Koocanusa upstream of the Elk River and downstream of Sand Creek.	The purpose of this monitoring station is to have a station within the lake upstream of the Elk River Arm that is unlikely to be influenced by discharges from the Elk River and far enough into the lake that fine sediment from the Kootenay River has had an opportunity to settle out.
RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-94	**Monitoring WG Recommendation #1-7:** Recommend providing a rationale in the EVWQP for why surface water toxicity testing is not being done in Lake Koocanusa.	
RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-95a	**Monitoring WG Recommendation #1-8a:** Recommend sediment toxicity testing for Lake Koocanusa (upstream and downstream of Elk River) for the purposes of defining baseline conditions. The objective of such sampling would be to obtain synoptic near-field, mid-field, and far-field toxicity test results (i.e., along a potential concentration gradient) that could be used to establish baseline conditions and, potentially, develop concentration-response relationships.	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
	7A-95b	**Monitoring WG Recommendation #1-8b:** Examine sediment toxicity testing closer to sources to evaluate if Lake Koocanusa sediment toxicity testing is needed.	If sediment toxicity is not observed closer to sources, it is unlikely sediment toxicity associated with the mine will be observed in the Lake.

RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-96	**Monitoring WG Recommendation #1-9:**
		Recommend the following actions are taken to allow for the development of a Lake Koocanusa selenium bioaccumulation model:
		
		   – Collect zooplankton in the field for tissue analysis;
		   – Consider doing controlled lab studies on the phytoplankton from the lake. These studies should be performed on species representative of the phytoplankton community in the Lake (i.e., not necessarily *Selenastrum*) to assess inter-species variability.
			Separation of phytoplankton from other seston in the field is extremely difficult and a major source of variability in estimating Kds. Developing Kds in the laboratory will result in more reliable data and allow for evaluation of how different water quality parameters (e.g., P, SO_4) effect Se uptake into phytoplankton.

RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-97	**Monitoring WG Recommendation #1-10:** Recommend monitoring zooplankton and fish tissue in Lake Koocanusa annually for three years.	There is currently limited data for the Lake and a more frequent sampling program than every 3 years is needed. After this 3 year period, the data should be evaluated to determine if switching to monitoring every 3 years is reasonable.
RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-98	**Monitoring WG Recommendation #1-11:** Recommend sampling benthic invertebrates in Lake Koocanusa.	Benthic invertebrates are eaten by Peamouth Chub.
RAEMP and EVWQP Monitoring – Lake Koocanusa	7A-99	**Monitoring WG Recommendation #1-12:** Recommend a monitoring approach for Lake Koocanusa that defines and tests hypotheses.	
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-100	**Monitoring WG Recommendation #1-13:** Within the Monitoring design document, recommend including comprehensive tables with performance criteria for measurement and analyses for each of the components.	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-101	**Monitoring WG Recommendation #1-14:** Monitoring Design Framework: Recommend a monitoring design framework that includes hypotheses based on a single conceptual site model (CSM should provide sufficient text to describe differences between constituent groups and each mining area and describe all stressors).	
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-102	**Monitoring WG Recommendation #1-15:** Frequency of Monitoring: Consider having key indicators and core stations that are monitored every year for periphyton and benthic invertebrates. *Note – advice needed on the location of these core stations.*	
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-103	**Monitoring WG Recommendation #1-16:** Timing of Sampling: Consider what special studies are needed to confirm the critical timing of sampling for each receptor.	
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-104	**Monitoring WG Recommendation #1-17:** Water Quality: Recommend weekly water quality monitoring during high and low flow periods.	
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-105	**Monitoring WG Recommendation #1-18:** **Sediment:** For all sediment toxicity testing, recommend the use of the most sensitive long-term sediment toxicity tests (e.g. 42-day tests with *Hyallela* and consider new recommendations for feeding).	The 10-14 day tests previously used by Teck are considerably less sensitive than the 42-d test.
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-106	**Monitoring WG Recommendation #1-19:** **Periphyton:** Recommend existing periphyton community structure data be further evaluated to evaluate between-lab variability in reporting of abundance for broad taxonomic groups (e.g., green algae, blue-green algae, diatoms, etc.).	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**

RAEMP and EVWQP Monitoring – General and Elk Valley	7A-107	**Monitoring WG Recommendation #1-20:**
		Benthic Invertebrates: Recommend a study to compare the BACI and CABIN approach at a number of core locations. Use multiple stressor data to evaluate the sensitivity of the BACI and CABIN approach. For the BACI approach, use an experimental design with hypothesis testing (use data from study area and other areas to identify maximum number of replicate samples that need to be collected at each station).
			Note: KNC and UBC have both identified purposes for this study:
			
			KNC: The purpose of the study is to evaluate whether the BACI approach should be used instead of the CABIN approach. The following are concerns with the CABIN approach:
			
			   – Limitations for hypothesis testing
			
			   – composite kick sampling gives no statistical power
			
			   – abundance of organisms by taxonomic groups is not evaluated explicitly
			
			UBC: The purpose of the study is to evaluate whether different results are obtained by the BACI and CABIN approaches. Both approaches have strengths and weaknesses. It will be useful to understand if significantly different results are obtained between the two approaches and the factors that drive any observed differences.

RAEMP and EVWQP Monitoring – General and Elk Valley	7A-108	**Monitoring WG Recommendation #1-21:** Calcite: Where possible, target areas for calcite monitoring with consistent levels of calcite (from year to year) and be careful to not choose unique calcite sites. Where possible, target areas for calcite monitoring with consistent levels of calcite (from year to year) and be careful to not choose unique calcite sites.	Temporal variation in calcite formation will make it difficult to assess the dose-response of the biota to calcite.

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-109	**Monitoring WG Recommendation #1-22:** For calcite and benthic invertebrate monitoring: – recommend quadrant sampling to ensure non-disturbance of stream-bed and synoptic sampling; – include comprehensive physical habitat characterization (depth, flow, gradient).	
RAEMP and EVWQP Monitoring – General and Elk Valley	7A-110	**Monitoring WG Recommendation #1-23:** **Calcite:** Recommend an analysis of the other factors contributing to calcite deposition to inform parameters that are measured during calcite monitoring (and could inform questions around cause and effect for calcite).	
Integrated Data Evaluation 'Report Cards'	7A-111	**Monitoring WG Recommendation #1-24:** Recommend that the Synthesis Report clearly documents the methods (including rationale for methods) for each column in the Integrated Data Evaluation Table .	
Integrated Data Evaluation 'Report Cards'	7A-112	**Monitoring WG Recommendation #1-25** Recommend removing the column of "overall rank" in the Integrated Data Evaluation Table.	
Integrated Data Evaluation 'Report Cards'	7A-113	**Monitoring WG Recommendation #1-26:** Consider the presentation of an overall rank according to each environmental receptor (WQ, benthos, fish, birds) rather than an integrated overall rank across multiple receptors. (*Note, D. MacDonald also suggested that there might be other ways to organize the table to show multiple stressors by receptor*).	
Integrated Data Evaluation 'Report Cards'	7A-114	**Monitoring WG Recommendation #1-27:** Consider which index should be used for calcite (1st term & 2nd term or combined) in the Integrated Data Evaluation tables.	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Integrated Data Evaluation 'Report Cards'	7A-115	**Monitoring WG Recommendation #2-1:** Recommend that documentation clearly states that the Synthesis Report's Water Quality Index is different than the Canadian Water Quality Index (especially on summary documentation such as the Report Cards).	
Integrated Data Evaluation 'Report Cards'	7A-116	**Monitoring WG Recommendation #2-2:** Recommend the inclusion of Cd and Zn in the Synthesis Report's Water Quality Index.	
Integrated Data Evaluation 'Report Cards'	7A-117	**Monitoring WG Recommendation #2-3:** In Step 1 of the surface water evaluation process for each management unit, recommend the use of a more sensitive screening statistic than median concentrations (e.g. monthly max average).	
Integrated Data Evaluation 'Report Cards'	7A-118	**Monitoring WG Recommendation #2-4:** Recommend using the lower sediment quality guideline in the Synthesis Report's Sediment Quality Index.	
Integrated Data Evaluation 'Report Cards'	7A-119	**Monitoring WG Recommendation #2-5:** Recommend undertaking an analysis of the ecological impacts for sites that have a mean selenium hazard quotient ≤ 1 and a maximum selenium hazard quotient > 1 to evaluate whether the impacts warrant the categorization of "fair" in the Synthesis Report's Integrated Data Evaluation Report Cards.	If the analysis finds effects in the area of 10%-15%, then "fair" is a reasonable description.
Integrated Data Evaluation 'Report Cards'	7A-120	**Monitoring WG Recommendation #2-6:** Recommend providing a sub-table to the Report Cards that provides more detailed information on selenium tissue hazard quotients (HQs) for vertebrates – such as HQs by fish species.	
Integrated Data Evaluation 'Report Cards'	7A-121	**Monitoring WG Recommendation #2-7:** Recommend that the preface to the Integrated Data Evaluation Report Cards clearly outlines where further information can be found on (1) the methodology and assumptions and (2) underlying data.	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
EVWQP Monitoring	7A-122	**Monitoring WG Recommendation #2-8:** Recommend that a commitment to report constituent loads is made in the Plan.	Reporting constituent loads facilitates further analysis around understanding the fate and transport of constituents of potential concern (esp. in regards to Lake Koocanusa).
EVWQP Monitoring	7A-123	**Monitoring WG Recommendation #2-9:** Add content in the EVWQP Monitoring Chapter on other monitoring programs that can be used to inform the EVWQP adaptive management process.	Adding context regarding other monitoring programs will help readers understand that there are multiple programs providing data that will be used to evaluate performance of the EVWQP.
Adaptive Management	7A-124	**Monitoring WG Recommendation #2-10:** Provide an analysis of the uncertainty in the water quality predictions for tributaries by comparing the estimates derived from the Water Quality Planning Model results with the estimates of finer scale water quality models that have been developed.	The approach used to estimate tributary concentrations in the EVWQP is new and uncertainty and conservatism of this method are not well understood. In order to illustrate conservatism and uncertainty, and understand how well this approach approximates values, tributary concentrations generated by the EVWQP water quality model need to be compared to results that have been calculated using a finer resolution model (i.e. the LCO2 EA water quality model) where the uncertainty and conservatism of inputs (flow, source terms) are understood and concentrations are better constrained.
Adaptive Management	7A-125	**Monitoring WG Recommendation #2-11:** Recommend that early warning triggers are defined for selenium tissue concentrations at a level that is conservative enough to be protective considering the residual uncertainties and gaps (e.g. Lake Koocanusa) in the selenium ecological effects assessment.	

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Human Health Assessment	7A-126	**Human Health WG Recommendation #2-1:** Recommend undertaking further sampling of selenium concentrations in game meats including organs that are consumed by local residents.	The human health Risk assessment provided by Environ indicates that for some residents, the daily intake may be approaching Health Canada's recommended upper intake level for Se. The contribution from sources other than fish is not known for residents of the Elk Valley. There is information indicating that Se concentrations in organ meat may be a significant source of Se. This needs further investigation to understand how this may influence the already relatively high daily intake estimated by Environ for residents in the Elk Valley.
Human Health Assessment	7A-127	**Human Health WG Recommendation #2-2:** Recommended making the necessary improvements to sampling design to facilitate seeing trends (if any exist) in selenium, cadmium and arsenic fish tissue concentrations by different species and locations in the Elk Valley.	Ongoing monitoring of contaminants in media that humans are exposed to is necessary to protect public health. While it is anticipated that contaminant levels will stabilize, Se and Cd are bioaccumulating substances and the fate and transport in the environment are not fully understood. Therefore ongoing monitoring is essential to provide current data for consideration of appropriate advisories.
Human Health Assessment	7A-128	**Human Health WG Recommendation #2-3:** Recommend that the Human Health Chapter in the EVWQP be clear on where and when selenium (and the other contaminants listed in the order) water quality concentrations are expected to be above the BC Drinking Water Quality Guidelines.	Public health is protected by maintaining contaminant levels below Health Canada guidelines. If these are exceeded, health officials may need to recommend further actions to protect public health. Therefore, there needs to be a clear understanding of where guidelines are exceeded. Please note that health-based guidelines are Maximum Acceptable Concentrations (not averages).

Summary Table			
Category	**#**	**Description of "Technical Advice" from Mtg**	**Rationale**
Human Health Assessment	7A-129	**Human Health WG Recommendation #2-4:** Recommend that the EVWQP use the current BC Drinking Water Quality Guideline and does not refer to the draft Canadian Drinking Water Quality Guideline.	Health Canada drinking water guidelines *may* be adopted by the BC Ministry of Health as a drinking water guideline and by the BC Ministry of Environment as a source water quality guideline. However, the review process by Health Canada and the provincial agencies is not yet completed and therefore the current guideline (10 µg/L) must be used for this plan. Health Canada, although in the process of reviewing technical information regarding selenium, has not made a decision whether the MAC for selenium will be changed. BC Ministry of Health would review and determine whether BC would adopt any change to the Health Canada guidelines. Therefore the current guideline (10 µg/L) must be used for this plan.