Elk Valley Water Quality Plan

Annex B

Technical Advisory Committee Action Item Summary Table

Teck

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Teck

For: Technical Advisory Committee Members
Elk Valley Water Quality Plan

Date: July 22, 2014

Subject: Status and location of Action Item Requests generated through the TAC process

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Throughout the TAC process, members of the TAC requested information to inform the process. Teck was assigned 122 of the 158 total action item deliverables. The attached table includes the full list of action items and the location or description of how each information request was provided to TAC.

Action Items Master List from TAC (Meetings #1 to #7 and Working Group)
July 22 2014

LEGEND:

Teck Owned Actions

Other Owned Actions

ID	TAC (Originated)Meeting #	# from meeting notes	Date Action Originated (dd/mm/yy)	Action Information	Location of the Deliverable
A-1	1	**1**	27/09/2013	Prepare a more detailed summary of the anticipated work packages and priority areas for TAC review.	Completed and Posted on TAC SharePoint
A-2	1	**2**	27/09/2013	Revise and update the Draft TAC Guidelines based on TAC member feedback.	Completed and Posted on TAC SharePoint
A-3	1	**3**	27/09/2013	TAC Members to provide any additional comments and suggested edits on the draft Planning Framework and draft TAC Guidelines documents.	Completed
A-4	1	**4**	27/09/2013	Provide data for current and projected levels of waste rock in the Elk Valley.	Available on TAC SharePoint Folder Background Information>Waste Rock Data
A-5	1	**5**	27/09/2013	Provide information on the geochemical characterization (Se) of waste rock in these proposed new development areas (e.g. in reference to existing waste rock characteristics).	Available on TAC SharePoint Folder Background Information>Geochemical Info on Waste rock
A-6	1	**6**	27/09/2013	Provide Quality Assurance (QA)/Quality Control (QC) protocols for monitoring data.	Available on TAC SharePoint Folder Background Information
A-7	1	**7**	27/09/2013	Provide raw water quality monitoring data to the TAC along with validation method where available.	Available on TAC SharePoint Folder Background Information>Water Quality Monitoring Data
A-8	1	**8**	27/09/2013	Provide raw monitoring data to the TAC for sediment, biota and toxicity testing.	Available on TAC SharePoint Folder Background Information in 3 separate folders>Sediment Monitoring Data, Toxicity Testing Data, Tissue Monitoring Data
A-9	1	**9**	27/09/2013	Add order station # to the monitoring stations listed on the x-axis of the Summary of Water Quality Monitoring Data.	Completed and added to data
A-10	1	**10**	27/09/2013	Provide flow data for closest flow monitoring stations to Order water quality monitoring stations.	Completed and added to Water Quality Monitoring Data file
A-11	1	**11**	27/09/2013	Develop some preliminary diagrams[1] to illustrate cause-effect relationships between water quality concentrations and the endpoints of concern (i.e. the "values" such as protection of aquatic ecosystem health as identified in the Order)	Available on TAC Sharepoint Folder TAC Meeting 2>Presentations. See workplan presentations for Selenium, Nitrate/Sulphate, and Cadmium
A-12	2	**1**	31/10/2013	TAC members to provide any final comments on Draft Planning Framework.	Completed and Posted on TAC SharePoint
A-13	2	**2**	31/10/2013	Teck to provide time series plots of WQ data (include the Order stations, relevant upstream stations, and the 2 long-term fed/prov WQ stations).	Completed and added to Water Quality Monitoring Data file
A-14	2	**3**	31/10/2013	Teck to provide a TAC work package on how possible ecological effects in tributaries will be considered and incorporated into the assessment for the EVWQP.	Available on TAC Sharepoint Folder TAC Meeting 4>Pre-reading>Approach for Considering Tributaries
A-15	2	**4**	31/10/2013	TAC Members for USGS and DEQ to provide Compass and MOE with a list of questions in relation to Lake Koocanusa that they would like clarity on.	Completed

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ID	TAC (Originated)Meeting #	# from meeting notes	Date Action Originated (dd/mm/yy)	Action Information	Location of the Deliverable
A-16	2	**5**	31/10/2013	MOE to provide a response on outstanding scope issues: whether an ecological effects assessment and assimilative capacity assessment for Lake Koocanusa needs to be undertaken for the Plan, whether the use of "all available" data includes US data, and clarify how additional Values (and Components) will be considered in the EVWQP.	Completed and included in TAC Internal Meeting Minutes from TAC Meeting #3 Notes on TAC Sharepoint
A-17	2	**6**	31/10/2013	Teck to consult with the Department of Interior Health in relation to the proposed approach for the EVWQP for Maintaining the Protection of Human Health (Work Package 7) and seek their participation at TAC Meeting ~~4~~5.	Completed and IHA attended Human Health working group meetings and TAC meeting #6
A-18	2	**7**	31/10/2013	TAC Chair to invite Interior Health Authority to attend TAC meeting #4 as observers.	Completed.
A-19	2	**8**	31/10/2013	MOE to develop a reference sheet on regulations and policies: --Focus on how regulations/polices are interpreted and applied --Include a 1-page summary of BC's selenium water quality and tissue guidelines for the protection of the aquatic ecosystem	Completed and uploaded on TAC Sharepoint>Background Materials
A-20	2	**9**	31/10/2013	Compass to write up how TAC "technical advice" will be documented and finalized through a TAC review process.	Completed and presented at TAC Meeting 3
A-21	2	**10**	31/10/2013	Compass/Teck to revise the influence diagrams as follows: -- Add mammals as a component for Protection of Human Health -- Add a pathway from waste rock directly to groundwater --Add a direct connection between surface water and human health	CSMs included in Synthesis Report
A-22	2	**11**	31/10/2013	Teck to provide rationale as to why site-specific toxicity test for mayflies was not carried out (include data and description of testing procedure).	Available on TAC Sharepoint Folder TAC Meeting 4>Pre-reading> Mayfly folder
A-23	2	**12**	31/10/2013	Teck to confirm topics and timing for Toxicology Working Group to meet prior to TAC Meeting #4. TAC members identified the following priority areas for input: --Lotic model for selenium concentration in tissue for receptors in lotic areas --Lentic model for selenium concentration in tissue for receptors in lentic areas	Completed as part of organization of meeting
A-24	2	**13**	31/10/2013	Teck to provide raw data and the study plan for site specific toxicity studies and any relevant water chemistry data.	Available on TAC Sharepoint Folder Background Information>Pre-reading> Mayfly folder
A-25	2	**14**	31/10/2013	Teck to confirm date of TAC Meeting #7. An earlier date of June 3, 4, &5 is being proposed by the TAC to allow time to integrate TAC comments before submitting the Plan.	Completed as part of organization of the meeting

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ID	TAC (Originated)Meeting #	# from meeting notes	Date Action Originated (dd/mm/yy)	Action Information	Location of the Deliverable
A-26	2	**15**	31/10/2013	Additional information to post on SharePoint: --Link to Order-in-Council decision for Line Creek Phase 2 Effluent Discharge Permit. --Link to teck.com/elkvalley --WQ Model documentation from Line Creek Phase 2 EA	Completed and Posted on TAC SharePoint
A-27	3	**1**	257/11/2013	Review and provide comments on TAC Meeting 2 notes.	Completed by TAC
A-28	3	**2**	25/11/2013	Appendix A (Mtg.2) – Compass will work with originators to finalize technical advice from meeting 2	Completed and incuded in the Master Advice Table
A-29	3	**3**	25/11/2013	Appendix B (Mtg.2) – TAC members to review and provide indication of support for technical advice.	Completed by TAC
A-30	3	**4**	25/11/2013	Develop an interface to help compile and compare the baseline datasets (water quality monitoring, sediments, fish tissue, toxicity, hydrology, etc.)	**Cancelled.**
A-31	3	**5**	25/11/2013	Provide names and emails for TAC members and alternates to Eric Urban for access to wiki with U.S. data.	Completed.
A-32	3	**6**	25/11/2013	MOE and Teck to discuss assessment of effects in the designated area of Lake Koocanusa and bring back a proposed approach to the TAC. Meeting 5	Available on TAC Sharepoint Folder Meeting 5>Presentations>Lake Kooocanusa Monitoring Overview
A-32A	4	**3**	02/06/2014	Teck to document their approach for setting targets and assessing effects in Lake Koocanusa. This documentation should include how Teck is deciding on long-term targets along with how Teck will show that long-term targets are protective. In making this document, Teck should refer to the direction from the Order Manager that is documented in TAC 3 notes and TAC advice related to the setting of targets in Lake Koocanusa.	Presented at TAC 5 and at Lake Koocanusa Working Group Meeting
A-33	3	**7**	25/11/2013	MOE will facilitate a government to government discussion (Canadian government (EC, MOE) and US Government (EPA/USGS, Montana) to address concerns in Lake Koocanusa and the scope of the EVWQP and TAC planning process (e.g. ecological effects assessment, migratory birds, etc.).	Completed at TAC Meeting 4 and in venues outside of TAC
A-34	3	**8**	25/11/2013	Provide third-party review of Water Quality Planning Tool.	Available on TAC Sharepoint Folder TAC Meeting 4>Pre-reading>Work packages 5 and 6
A-35	3	**9**	25/11/2013	For the geochemical source term inputs to the WQ Planning Model, provide flow and geochemistry data sets, and the source terms that will be used for the Coal Mountain Phase 2 Project.	Available on TAC Sharepoint Folder Background Information>Geochemical Information on Waste rock

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A-36	3	**10**	25/11/2013	Check with Fording River Operations on whether groundwater monitoring was implemented near the mouth of Kilmarnock creek and, if so, provide information to TAC. (Relates to the calibration of the WQ Planning Tool in this area and loading loss between Kilmarnock Creek and Fording River).	Available on TAC SharePoint Folder Background Information>Groundwater
A-37	3	**11**	25/11/2013	Provide spatial information (in table and diagram format) regarding the location of existing and future waste rock piles, waste rock drainage, estimated year when waste rock pile will no longer be active, mine contact water flow, location of existing and future pits, etc.	Available on TAC Sharepoint Folder TAC Meeting #4>pre-reading>Table and Maps of waste rock piles
A-38	3	**12**	26/11/2013	Provide a more detailed work package on mitigation measures and how they will be integrated into the WQ Planning model. Include assumptions regarding performance/effectiveness of mitigation measures (reduction potential for each order constituent), rationale for these assumptions and confidence levels of the various mitigation measures being incorporated into the Plan. Include information on the following:	Details of this action item included in the sub-items (a) (b) (c)
A-39	3	**12**	26/11/2013	(a) Data and research to support the net infiltration rates chosen for engineering and vegetation covers and assumptions of time to implement and become more effective;	This data and research will continue to be developed as R&D on covers continues and covers are contemplated as a management option.
A-40	3	**12**	26/11/2013	(b) Assess whether the pre-mitigation release rates and calibration assumptions (i.e. Se and SO_4) developed and used in the WQ Planning Model are still valid when covers are included (covers potentially change the water – constituent ratios and load coming out of the waste rock piles and may alter the input parameters used for unmitigated scenarios);	This is an uncertainty associated with evaluating covers as a management option and they cannot be meaningfully evaluated by way of the Planning Model at this time. As R&D on covers advance and covers are contemplated as a management option, the Planning Model will be updated.
A-41	3	**12**	26/11/2013	(c) Capture efficiency for non-contact diversions and contact water diversions to treatment facilities (including ponds, ditches and intakes);	The mitigation measures included in the initial implementation plan are limited to those measures that can be conservatively relied upon based on current technology (AWT and diversions). Research and development work on other potential mitigation measures (in situ treatment, enhancing fill discontinuities, covers) will refine both effectiveness and cost estimates and allow for a comparison based in part on economic factors. In addition, the effectiveness and cost of various mitigation measures will vary greatly depending on the specific circumstances under which they may be employed (i.e. location specific). Given current uncertainties and site specific complexities, it would be premature (and potentially misleading)

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A-42	3	**12**	26/11/2013	(d) Estimated % of each year that treatment facilities are operational;	This information is included in Chapter 6 of the Plan.
A-43	3	**12**	26/11/2013	(e) Estimates of influent and effluent quality for each treatment technology (both Order and non-Order constituents that may affect the receiving environment e.g. phosphorus and the potential for eutrophication in the designated area) in the WQ Planning Model supported by pilot testing results to demonstrate efficacy and percentage reduction targets;	This information is included in Chapter 8 of the Plan. Estimates of influent / effluent quality – Effluent quality will be presented in integrated assessment and included in Chapter 8. The regional planning model does not provide accurate predictions of influent quality at an individual tributary scale, so this will not be provided in the Plan.
A-44	3	**12**	26/11/2013	(f) Estimated timeframe when mitigation options could be implemented. For each type of measure provide lead-time required for implementation, which includes time for design, construction, and commissioning;	Available on TAC Sharepoint Folder Background Material>Mitigation Measures>Teck Memo
A-45	3	**12**	26/11/2013	(g) Rationale for why mitigation options are included or not included in the model - i.e. what are the components and indicators for evaluating mitigation measures.	This action item is similar to Item 48 and therefore was combined with that request.
A-46	3	**12**	26/11/2013	(h) Capital and operating costs of mitigation measures that are being incorporated into the EVWQP – if possible, provide rough estimates of capital and operating costs on a per-unit basis such as $ per m^3 water treated, $ per hectare covered, and $ per km diversion.	The mitigation measures included in the initial implementation plan are limited to those measures that can be conservatively relied upon based on current technology (AWT and diversions). Research and development work on other potential mitigation measures (in situ treatment, enhancing fill discontinuities, covers) will refine both effectiveness and cost estimates and allow for a comparison based in part on economic factors. In addition, the effectiveness and cost of various mitigation measures will vary greatly depending on the specific circumstances under which they may be employed (i.e. location specific). Given current uncertainties and site specific complexities, it would be premature (and potentially misleading)to use cost as a meaningful basis for comparison.
A-47	3	**12**	26/11/2013	(l) Rationale for the range of management options selected for modeling and for those that are excluded. For management scenarios that are excluded on the basis of cost (e.g. applying covers on all waste rock piles), provide a rough calculation of costs to validate exclusion.	Available on TAC Sharepoint Folder>Pre-reading>TAC Meeting 4>Work package 5 and 6.

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ID	TAC (Originated)Meeting #	# from meeting notes	Date Action Originated (dd/mm/yy)	Action Information	Location of the Deliverable
A-48	3	**12**	26/11/2013	For this work package, identify all loading sources and potential management/mitigation options and clearly rationalize to demonstrate nothing significant or reasonable is being excluded. Include more spatial information on the location of the waste rock dumps, drainage areas, water diversions, water management and covers that is clearly linked to items identified in the option tables. Provide additional information in the tables of water quality management/mitigation options, such as:	This information is included in the Plan at Chapter 6.
A-48a	Post Meeting Action		25/02/2014	**Additional input into existing columns of Tables 1 -5:** <u>Cover Considerations:</u> - add wording to title to clarify only geo-membrane covers considered. - rationale for why partial covers are not considered for Brownie Dump, Erickson Dump etc. (i.e. very large sources) - rationale for why re-sloping conditions are not suitable for covers on Erickson Dump. - <u>Note</u>: if reclamation covers (i.e. vegetation covers) are included as mitigation and incorporated into the water quality model, detailed rationale and additional information will be required to support. Also tables will be needed to convey how the various waste rock sources and vegetation covers were considered and which were brought forward into the WQP evaluation. Information on current status of reclamation and assumptions for reclamation achieved in the future (e.g.. hectares of reclamation, density and species coverage etc.) will be needed for the individual waste rock drainages. A Working Group should be established to discuss requirements in more detail. <u>Mine Affected Water Considerations:</u> - add wording to title to clarify that this means source areas carried forward for consideration of water treatment - rationale for exclusion of water treatment for waste rock drainages (i.e. Dry Creek/Harmer Creek at EVO, Porter Creek at GHO, South Pit at EVO etc.)	Available on TAC Sharepoint Folder>Shared Documents> Background Information>Mitigation Measures

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A-48b	Post Meeting Action		25/02/2014	**Additional Columns to include in Tables 1-5** (these may have to be included as separate tables for printing, but should be integrated into the same Excel file if possible): - Add "Water Quality and Flow" section and relate to specific waste rock drainage sources: - current water quality data (maximum and annual average concentrations and loadings) for order constituents for all waste rock drainages. - flow information (annual average) - Volume of mine-contact water in each drainage	
A-48c	Post Meeting Action		25/02/2014	**Additional Information to Include in Table 6** – Flooded Pits in the Elk Valley Water Quality Plan - For each flooded mining pit, identify pit spill routing (e.g.. Marten Pit and others) and information on whether spilling from flooded pits will intersect and flush waste rock. If so, this should be incorporated into the water quality model or alternate mitigation strategy identified. - For each flooded mining pit, identify the volume of backfilled waste rock that is flooded and removed from the water quality model as a source.	
A-49	3	**12**	26/11/2013	Management Option 1 – Waste Rock Sources for Active Water Treatment and/or Covers: List all waste rock spoils (some waste spoils currently missing) linked to drainage area for each mine. For each drainage area, provide current and future cumulative inventory of waste rock volumes. Compare the proportion of waste rock in each drainage to the proportion of waste rock on the mine site and in the valley to clearly show the relative significance of the mitigation options (active water treatment or covers).	Available on TAC Sharepoint Folder TAC 4>Pre-reading>Table and Maps of Waste Rock Piles and Mitigation Measures
A-50	3	**12**	26/11/2013	Management Option 2 – Clean Water Management (Diversions): Show the proportion of water diverted from waste rock spoils over non-diverted scenarios. Include information on hectares of watershed diverted, annual flow and % of watershed diverted.	Available on TAC Sharepoint Folder TAC 4>Pre-reading>Table and Maps of Waste Rock Piles and Mitigation Measures
A-51	3	**12**	26/11/2013	Management Option 3 – Mine affected Water Management (Conveyance): Link these options to the specific drainage(s) and waste rock sources that would be collected (i.e. those identified in Management Option 1) Identify all open pits and backfilled pits that will flood and spill (surface or subsurface), estimate the time to spilling, the proposed conveyance routing/management options, and all assumptions and rationale regarding loading reductions and attenuation.	Available on TAC Sharepoint Folder TAC 4>Pre-reading>Table and Maps of Waste Rock Piles and Mitigation Measures

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ID	TAC (Originated)Meeting #	# from meeting notes	Date Action Originated (dd/mm/yy)	Action Information	Location of the Deliverable
A-52	3	**12**	26/11/2013	Management Option 4 – Complex Covers: Provide information on the surface area of the dump, and the proportion of waste rock on the mine site and in the valley to show the relative significance of the mitigation option.	Available on TAC Sharepoint Folder TAC 4>Pre-reading>Table and Maps of Waste Rock Piles and Mitigation Measures
A-53	3	**13**	26-27/11/2013	Provide the future loading profile (net change) of the constituents going into Lake Koocanusa based on the WQ Planning Model (NB. Most interested in the near term effects from the scenarios)	Available on TAC Sharepoint Folder>Background Information>Lake Koocanusa>Loadings to Lake Koocanusa folder
A-54	Tox - WG	1	01/09/2014	Clarify how key data gaps related to amphibians and their sensitivity will be addressed (e.g., additional toxicity testing as a component to the AEMP)?	Available on TAC Sharepoint Folder>TAC Meeting 5>Presentations>Presentation to Aquatic Monitoring)
A-55	Tox - WG	2	01/09/2014	A few actions related to inventory work as follows: a) Confirm what biological inventory work has been done and is available (by life stage history, species)? b) Confirm what other species may be collected as a component to the AEMP? c) Confirm whether a secondary inventory has been carried out (or is planned) to assess possible historical ecosystem changes (e.g. by using nearby reference streams, Wigwam River)	Available on TAC Sharepoint Folder>TAC Meeting 5>Presentations>Presentation to Aquatic Monitoring)
A-56	Tox - WG	3	01/09/2014	For Elko, check 2009 elevated WCT muscle tissue data which implies differences in lentic and lotic areas.	Available on TAC Sharepoint Folder>Toxicology Working Group>Toxicology WG Information Requests>Fish Tissue Data>Elko River
A-57	Tox - WG	4	01/09/2014	Provide peer review critique (by Vince Palace) on Teck's appropriate selenium effects levels in EML (Valley Wide Selenium Plan)	Completed by MOE
A-58	Tox - WG	5	01/09/2014	Provide R-code information and all other information in the appendices (Appendix C - Bioaccumulation Modeling)	Available on TAC Sharepoint Folder>Background Information>TAC SharePoint>R-Code
A-59	Tox - WG	6	01/09/2014	Provide description and equations for how the hardness normalization was done for assessing Cadmium effects	Available on TAC Sharepoint Folder>Toxicology Working Group>Mtg 2>Presentation>Cadmium
A-60	Tox - WG	7	01/09/2014	Provide raw data to Kevin Brix (and other interested Working Group members) related to hardness relationships for sulphate and nitrate one week prior to TAC Meeting 4 (i.e. Jan 28)	Available on TAC Sharepoint Folder>Toxicology Working Group>Tox WG Information Requests>Nitrate Data and Analysis

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A-61	Tox - WG	8	01/09/2014	Confirm whether additional resources will be made available to support some independent analysis to be carried out by a colleague of Kevin Brix	Completed and funding arranged
A-62	4	~~1~~ 5	02/06/2014	Provide information on waste rock materials from the formations other than the misty Mountain formation (i.e. Morrisey Formation, Fernie Formation) from all 5 mines including: - Geochemical data - Current and future volume Source terms and loading rates: -Assessment of the implication to water quality model (either through sensitivity or incorporation)	Available on TAC Sharepoint Folder>Background Information>Waste rock data
A-63	4	~~2~~ 7	02/06/2014	In an updated version of documentation for cadmium ecological effects assessment, provide a summary of the toxicity data used to parameterize the Biotic Ligand Model for Cadmium (use the EPA data summary for copper as an example). This data summary will provide: **(1)** a breakdown of studies according to their associated information categories (i.e. % as reported original study; (ii) based on synthetic water recipe; (iii) based on other reported studies in same water; and (iv) estimated from pH and hardness), and **(2)** a similar breakdown for the lower 10% distribution of the ~~studies.~~ Toxicity data (use the EPA data summary for copper as an example) showing the measured or estimated model inputs (e.g., hardness, DOC, ion concentration). The values that are estimated should be explicitly identified.	This information was presented and discussed at the Toxicology Working Group meetings. The updated version of this request is included in Annex G of the Plan.
A-64	4	~~3~~ 8	02/06/2014	In an updated version of the documentation for cadmium ecological effects assessment, provide the BLM-normalized and hardness-normalized effect concentrations for toxicity test results used in the effects assessment (i.e.; selected records) in a separate table*, with records sorted and grouped by species and effect so that vales used in calculations of the geometric means can be reviewed (this would be in addition to Appendix A of the Evaluation of Potential Ecological Effects Associated with Cadmium provided at TAC 4). * Please provide the table in pdf and excel file format.	This information was presented and discussed at the Toxicology Working Group meetings. The updated version of this request is included in Annex G of the Plan.
~~A-65~~	~~4~~	~~4~~	~~02/06/2014~~	~~US government TAC members to follow-up with more specific information on what they want to see for loading data into Lake Koocanusa~~	

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A-66	4	~~5~~ 9	02/06/2014	Teck to check on wither the draft AEMP2012 Report could be released early to TAC members (Good to have for March Tox WG).	Available on TAC Sharepoint Folder>TAC Meeting 6>Pre-reading>Synthesis Report
A-67	4	~~6~~ 10	02/06/2014	For nitrate/sulphate assessment, confirm whether minimum data requirements can be met for species sensitivity distribution (SSD) analysis. If they can be met, do this analysis.	This information was presented and discussed at the Toxicology Working Group meetings. The updated version of this request is included in Annex F of the Plan.
A-68	4	~~7~~ 11	02/06/2014	Provide feedback on additional information to add to the mitigation measures table (provide by Dan L'heurex at TAC Mtg 4). Preliminary TAC feedback on additional information needed: -rationale for why partial covers are not considered for Brownie demo - rational for why partial covers are not considered for Brownie Dump and Erickson Dump - volume of waste rock in backfilled pits (i.e.; loading removed from model) - surface Ares of dumps	Completed by MEM and submitted to Teck
A-69	4	~~8~~ 12	02/06/2014	Provide example papers of decision analysis methodology for semi-structured problems	Available on TAC Sharepoint Folder> Background Information>Decision Analysis Papers
A-70	4	~~9~~ 13	02/06/2014	Provide results of the 2013-2014 Treatment Technology Pilot Study	Partially complete. See TAC Sharepoint Folder>Background Information>Pre-reading>Teck's Research and Development Program Note: As noted previously, a non-disclosure agreement between the proprietors of the technology used in the Pilot Study precludes the sharing of the results of the 2013-2014 Treatment Technology Pilot Study with TAC. However the attached Teck R&D Summary 2014 at page 8 includes Table 1: Summary of Active Water Treatment R&D Program. This table is a high level overview of Teck's Treatment Study program outcomes.
A-71	4	~~10~~ 14	02/06/2014	Provide verification of infiltration and drain down assumption for geomembrane and vegetative covers on the WQ Planning Model (such as O'Kane(2013)when available)	Available on TAC Sharepoint Folder>TAC Meeting 5>Pre-reading>Current Understanding of Covers Memo
A-72	4	~~11~~ 15	~~6/2/2014~~ 05/05/2014	Provide a sensitivity analysis for vegetation cover assumption in WQ Planning Model (30% reduction in infiltration). Sensitivity analysis should start with testing scenario that removes the benefit of re-vegetation. Note: if vegetation covers are in the Model, there should be a WG on this so MEME can bring in reclamation.	This information request was completed as part of the discussion at TAC 6 during the presentation of Chapter 7 Model update
A-73	4	~~12~~ 4	02/06/2014	US Govt to present their perspective on loading at TAC #5.	

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A-74	4	~~13~~ 16	02/06/2014	Consider whether tributaries management unit #4 should be broken in two sections (potentially with Michel creek as boundary to separate mine-affected and non-mined-affected tributaries). Provide the TAC with rationale for the decision either way.	Available on TAC Sharepoint Folder>TAC Meeting 5>Presentations>Covers Update
A-75	4	~~14~~ 17	02/06/2014	In producing the TAC package in the AEMP, identify the known gaps	Available on TAC Sharepoint Folder>TAC Meeting 5>Presentations> Approach to Aquatic Monitoring
A-76	4	~~15~~ 2	02/06/2014	Provide detailed picture(s) & description of how ecological effects matrices and Management Scenarios will be brought together to set targets.	This action item is addressed in Chapter 8 of the Plan.
A-77	4	~~16~~ 18	02/06/2014	Provide the TAC with the following information related to calcite: - pilot study of calcite management - data on trace elements found in calcite deposits - mineralogical work	Available on TAC Sharepoint Foloder>Toxicology Working Group> Tox WG#7> Pre-reading material> EVWQP Integrated Effects Spreadsheet
A-78	4	~~17~~ 19	02/06/2014	Discuss the data limitations of assessing calcite impacts and setting targets with the order Manager and bring back direction on what this means for fulfilling the Order.	Completed by MOE and discussed at TAC Meeting #5
A-79	4	~~18~~ 6	02/06/2014	Provide the spreadsheet with Se bioaccumulation data to run the R-code.	Available on TAC SharePoint Folder>Background Information> R-code
A-80	MESL request	email	13/03/2014	Teck to provide Excel versions of the toxicity data compilations for Golder report "Evaluation of Potential Aquatic Effects Associated with Nitrate and Sulphate	Available on TAC SharePoint Folder>Toxicology Working Group>Tox WG Info Requests>Toxicity Data NO_3 and SO_4 TAC 4 Report
A-81	Post Meeting Action	21	25/02/2014	Provide GIS coverage's showing the locations of waste rock management facilities and water sources (digital GIS files of maps provided at TAC 4).	Available on TAC SharePoint Folder>Background Information>Waste Rock Data
A-82	Post Meeting Action	22	TAC 6	Provide information on assumed post-treatment water quality characteristics (order and non-order) for each treatment facility, including variability.	This action item was completed at TAC 6 when the presentation on Chapter 4 was discussed.
A-83	Post Meeting Action	23	25/02/2014	provide information on the status of active reclamation of waste rock piles throughout the watershed, specifically: -Provide GIS coverage's that color-code reclamation status for each mining facility. -For waste-rock facilities that have not been subject to active reclamation, provide a rationale for not conducting reclamation, a schedule for conducting reclamation and a description of the type of reclamation that is anticipated for each facility.	This informaton included in the response to Action Item 81 and in materials presented at TAC Meeting #4

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A-84	HH WG 2	1		Ministry of Environment (Geneen Russo) to advise Teck on the selection of human health water quality guidelines for the baseline review.	Completed
A-85	HH WG 2	3	03/06/2014	Distribute the Firelight Dietary Study/Ktunaxa Dietary Study to Human Health Working Group	Available on TAC SharePoint Folder> Human Health Working Group>HH WG Information Requests
A-86	HH WG 2	3	03/06/2014	Provide relevant information on Ktunaxa consumption of fish, mammals, and plants from the Elk Valley and location of Ktunaxa fishing/hunting/gathering activities.	Available on TAC SharePoint Folder> TAC Meeting #6> Presentations>Final TAC 6 Human Health>Slide 30
A-87	Tox WG2	1	03/06/2014	Provide the updated Selenium (bioaccumulation model) dataset to TAC.	Included in Annex E of the Plan.
A-88	Tox WG2	2	03/06/2014	Provide the reference (selenium study) used in the rationale for the toxicological data quality categorization (e.g. field collected versus lab fed gamete).	Available on TAC SharePoint Folder> Toxicoloy Working Group>Tox WG Information Requests>Selenium Report App D Info>Toxicity Benchmarks>Rigby et al paper
A-89	Tox WG2	3a	03/06/2014	(a) In the Appendix D (Work Package 2b - Se) summary tables (e.g. 4-1, 4-4, 4-6, 4-8, 4-10) for selenium benchmarks, include the effects, endpoints and concentrations with confidence intervals added (that correspond to the figures).	Included in Annex E of the Plan.
A-90	Tox WG2	3b	03/06/2014	(b)Provide information on additional references that were not included in Appendix D, for consideration for selenium effects benchmarks.	Included in Annex E of the Plan.
A-91	Tox WG2	4	03/06/2014	Throughout documents, be explicit on what is meant by “individual” (e.g. WCT eggs vs. WCT individual fish; amphibian eggs vs. egg mass; periphyton composite samples vs. individual periphyton etc.). Re-label graphs and tables to more accurately characterize the Se concentration levels: “clutch” and not “eggs” (e.g. fish and amphibians).	Incorporated in the language of the Plan.
A-92	Tox WG2	5	03/06/2014	Develop preliminary multi-stressor impact hypotheses (CSM) to document and explain possible interactive pathways between the constituents of potential concern.	Available on TAC Sharepoint Site Folder>TAC Meeting 6>Pre-reading>Synthesis Report
A-93	Tox WG2	6	03/06/2014	Provide study(s) related to BLM and its use for assessing chronic effects from Cadmium	Discussed in Memo to Toxicology Working Group and at Toxicology Subgroup meeting. See TAC Sharepoint Site>Toxicology Working Group>Mtg 2 - Tox WG> Pre-reading>Teck Memo
A-94	Tox WG2	7	03/06/2014	Provide recommendation for how SO4 could be hardness normalized, if at all	Completed by Toxicology WG members.
A-95	Tox WG2	8	03/06/2014	Confirm whether the datasets from the additional periphyton and invertebrate investigations completed in 2013 (undertaken to inform the design of the RAEMP) were included in the bioaccumulation model datasets?	This was done and confirmed at Mtg 3 - Toxicology Working Group
A-96	Tox WG2	9	03/06/2014	KNC (Don) to confirm whether action items and advice specific to the BLM have been adequately addressed	Completed
A-97	5	1	04/04/2014	TAC Members to review and provide any additional technical advice from TAC Meeting 5 work packages (Appendices A & B).	Completed
A-98	5	2	04/04/2014	Distribute Great Northern Landscape Proposal for assessment of Lake	Completed and available on TAC Sharepoint
A-99	5	3	04/04/2014	Distribute memo on Burbot Data.	Completed and available on TAC Sharepoint
A-100	5	4	04/04/2014	Clarify the purpose and objectives for the proposed Lake Koocanusa Working Group meeting specific to the Elk Valley Water Quality Plan.	Completed by TAC

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A-101	5	5	04/04/2014	Plot the Lake Koocanusa zooplankton data in the selenium bioaccumulation model.	Included in Annex E of the Plan.
A-102	5	6	04/04/2014	Provide memo on the sampling, data analysis and interpretation protocols, for the proposed 3 sampling locations for the Lake Koocanusa Order Station.	Available on TAC Sharepoint site Folder>Lake Koocanusa Working Group>Pre-reading
A-103	5	7	04/04/2014	KNC to follow up with Teck on their desired information on the well sampling program (for e.g. the lateral distance of the well from the Elk River and Fording River).	Completed by KNC
A-104	5	8	04/04/2014	For the human health baseline evaluation, evaluate the available data on metal concentrations in wildlife tissue collected for environmental assessments.	Available on TAC Sharepoint site Folder>TAC Meeting 6>Pre-reading>Human Health Assessment report; also included as Annex L of the Plan
A-105	5	9	04/04/2014	Provide references supporting the Reference Condition Approach of collecting only one benthic invertebrate sample with the kick method in mine exposed areas.	Reference Condition approach is discussed in the AEMP
A-106	5	10	04/04/2014	EC to follow-up with US Federal Govt on providing available data of selenium tissue concentrations in migratory birds.	In Progress
A-107	5	11	04/04/2014	Provide examples of methodologies to consider interactive effects in the development of targets.	Completed by TAC members
A-108	5	12	04/04/2014	Provide examples for what qualifiers (or supporting quantitative analyses/information) to add to some of the general concluding statements in the AEMP.	Completed by TAC members
A-109	5	13	04/04/2014	Provide the table of what data was included or excluded from the selenium bioaccumulation model and the rationale. Provide the following in Excel format: -the data was used to develop the bioaccumulation models (including the data that was excluded from the analysis and rationale for exclusion) -updated r-code (or code used to run the models)	Available on TAC Sharepoint site>Toxicology Working Group>Tox WG Information Request>Se report-App C Bioaccumulation Models. Also included in Annex E of the Plan.
A-110	5	14	04/04/2014	Provide the updated selenium toxicity threshold tables in Appendix D of the Selenium Report, including the rationale for the studies that were selected and excluded. Note that the updated Appendix D tables are a higher priority than the selenium bioaccumulation model data table. - Provide the updated selenium toxicity threshold tables in Appendix D of the Selenium Report, including the rationale for the studies that were selected and excluded. -Provide the data and models that were used to develop the dose-response curves for the most sensitive receptors in Excel file format	Available on TAC SharePoint Folder>Toxicoloy Working Group>Tox WG Information Request>Se report-App D Toxicity Benchmarks. Also included in Annex E of the Plan.
A-111	5	15	04/04/2014	Provide the data and statistics that were used to develop the pooled slope relationship for nitrate effects.	Available on the TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests>Nitrate Data and Analysis>HDR Nitrate Slope Pooling Memo
A-112	5	16	04/04/2014	Provide the raw data used to develop the nitrate species sensitivity distribution (both the original data and the normalized data sets).	Available on the TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests>Nitrate Data and Analysis>Memo NO3 data-raw and hardness normalized

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A-113	5	17	04/04/2014	Calculate the HC5 value for the nitrate species sensitivity distribution (SSD) with and without algae included in the SSD.	Available on the TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests>Nitrate Data and Analysis>Nitrate SSD
A-114	5	18	04/04/2014	Return to the discussion of the value of monitoring periphyton community structure.	This dicussion took place at the Monitoring WG meeting #1
A-115	5	19	04/04/2014	Provide the EVWQP Phase 2 Public Consultation Discussion Guide to TAC Chair	www.teckelkvalley.com
A-116	5	20	04/04/2014	Provide EVWQP Phase 2 Public Consultation presentation materials to TAC Chair	Provided to the Chair prior to the Consultation
A-117	5	21	04/04/2014	Provide the surface water chemistry raw data for tributaries.	Available on TAC Sharepoint site Folder>Background Information>Water Quality Monitoring Data>Tributaries
A-118	5	22	04/04/2014	Provide the locations, selection rationale, and chemical and ecological characterization data for the reference areas used in the human health and ecological baseline evaluations, including those for Lake Koocanusa.	Available on TAC Sharepoint site Folder>Background Information>Aquatic Effects Monitoring Program>Teck memo
A-119	5	23	04/04/2014	Confirm whether raw data is required for the benthic invertebrates reference sites.	
A-120	5	24	04/04/2014	Provide information on the anticipated short-term water quality concentration forecasts and how this will inform the selection of short-term targets.	Included in Chapter 8 of the Plan.
A-121	5	25	16/06/2014	Provide a worst-case water quality scenario in the case that the West Line Creek and Fording River Treatment Plants do not perform as expected.	This was considered as part of the Plan Development and not addressed in a separate memo to TAC
A-122	5	26	04/04/2014	Provide response to the technical advice received to date on Lake Koocanusa to the US TAC members.	Provided at Lake Koocanusa WG meeting #1. Included in Annex A of the Plan.
A-123	5	27	04/04/2014	Clarify what documentation will be needed at the end of the TAC process in addition to the final meeting notes and technical appendices.	Completed by MOE and discussed at TAC Meeting #6 and #7
A-124	Post Meeting #5 Action	MESL email	08/04/2014	We'd like to put in a request for the matching water and egg tissue selenium data (and associated analysis scripts) that Adrian has used in the most recent version of the Se work (presented at the Tox WG meeting # 3 and the TAC #5 meeting). Ideally, we would like to have the excluded data explicitly identified in the spreadsheet (e.g., data used to create the scatter plot on page 11 of the April 3rd presentation).	Available on TAC Sharepoint Folder>Toxicology Working Group>Selenium Report - App C Se Bioaccumulation Datasets
A-125	Post Meeting #5 Action	MESL email	09/04/2014	MESL requested a copy of the Minnow Environmental Report 2012 (study design for the benthic invertebrate survey).	Available on TAC Sharepoint Folder>Background Information>AEMP
A-126	Post Meeting #5 Action	Brix		Lake Koocanusa Fish Tissue Data (Reference Data inclusive)	Available on TAC Sharepoint Folder>Toxicology Working Group>Tox WG Information request> Fish Tissue Data Folder
A-127	Post Meeting #5 Action	Celine	16/04/2014	Request for the Groundwater Report (should include sampling methodology and QA/QC)	Availabe on TAC Sharepoint Folder>TAC Meeting 7>Pre-reading
A-128	Tox WG3	1	28/03/2014	NO3 Hardness-dependence relationship plots – add confidence intervals on the data points	Avaiable on TAC Sharepoing Folder>Toxicology Working Group>Tox WG Information Requests>Nitrate Data and Analysis
A-129	Tox WG3	2	28/03/2014	Provide a table of the approximate hardness levels at each of the Order stations.	Included in Tables 3-4 & 3-5 of Annex F of the Plan

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A-130	Tox WG4	1	07/05/2014	Provide a comparison of invertebrate concentrations at the same stations between spring and fall. The purpose of this analysis is to gain greater understanding of how seasonal changes in selenium water quality concentrations affect selenium concentrations in invertebrates	Available on TAC Sharepoint Folder>Toxicology Working Group>Tox WG Info Requests>Seasonality of [Se Invertebrates]
A-131	Tox WG4	2	07/05/2014	Kevin Brix to recommend how to bound the sensitivity analysis on the selenium dose-response curves, or recommend another way to analyze the uncertainty in these curves	Completed
A-132	Tox WG4	3	07/05/2014	MOE to have Carl Schwarz review the TOX WG 4 selenium presentation and discussion (particularly the parts related to attenuation, temporal changes in selenium and the sensitivity analysis) and provide comments to Teck.	Completed
A-133	Tox WG4	4	07/05/2014	Provide the spreadsheet that was used in the SSD Master program to produce the Species Sensitivity Distributions for nitrate. In addition, provide the separate spreadsheet that specified the data processing to calculate geomeans for each species (with annotations as appropriate to document assumptions for data treatment).	Available on TAC Sharepoint Folder>Toxicology Working Group>Tox WG Information Requests>Nitrate Data and Analysis
A-134	Tox WG4	5	07/05/2014	Provide the methodology for the 4-step process to develop benchmarks for the protection of aquatic life for selenium and nitrate prior to the scheduled May 28 Tox Working Group Call. To the extent possible, the working group requested that this methodology include: ☐ an example calculation of integrated effect for an individual constituent with enough detail to show the estimated integrated effect on a tributary scale as well as the management unit scale; ☐ the multiple stressor conceptual site model(s) from the Synthesis Report; ☐ description of what is known about these multiple stressor pathways and what the uncertainties are; ☐ qualitative description of how these multiple stressors are considered in developing the benchmarks for protection of aquatic life.	Available on TAC Sharepoint Folder>Toxicology Working Group>Tox WG Info Requests>Selenium Integrated Effects Spreadsheet
A-135	Tox WG5	1	27/05/2014	Provide a map showing the Order Stations, Josephine Falls and the current management units (i.e. including any updates to the management units since the Tributaries work package presented at TAC 4).	Available on the TAC Sharepoint site Folder>Toxicology Working Group/ Tox WG Information Requests / Management Unit Map
A-136	Tox WG5	2	27/05/2014	Provide the equations and methods used to develop the juvenile fish growth and juvenile bird growth 10% critical effect size.	Available on TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests> Teck Memo Juvenile Fish

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A-137	Tox WG5	3	27/05/2014	Provide a map showing the location of Conner Lake, Fording River Oxbow, Goddard Marsh, and Clode Pond (the interest here is having a map of the places where data has been excluded in the selenium bioaccumulation models).	Available on the TAC Sharepoint site Folder> memo: CRV A-135 and A-137_Map
A-138	Tox WG5	4	27/05/2014	Distribute the bird egg moisture content analysis (originally discussed with K. Brix) to the TWG	Available on the TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests>RWBL Egg Moisture Sensitivity Analysis
A-139	6	4		Response to Technical Advisory Committee (TAC) Request: Provide the integrated Se spreadsheets with a memo describing how they were constructed, what they do and how they were used to set the target presented at TAC 6 for each MU	Available on TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests>Selenium Integrated Effects Spreadsheet
A-140	6	3		Teck to provide memo on changes to the cadmium equation.	Available on TAC Sharepoint site Folder>Toxicology Working Group>Tox WG Information Requests
A-141	6	1		TAC members to provide final comments on Draft Mtg. 5 notes and technical appendices A & B	Completed
A-142	6	2		TAC members to review and provide input into Appendix A (TAC Mtg. 6) and provide supplemental advice in Appendix B (TAC Mtg 6).	Completed.
A-143	6	5		Provide a comparison of the concentrations in tributaries estimated through scaling the Water Quality Planning Model results with the results of the finer scale water quality model used for the Line Creek Phase 2 assessment (for the purposes of evaluating the scaling method employed in assessing effects of target concentrations).	Included as advice
A-144	6	6		Ensure a clear resolution for the diagrams in the EVWQP and appendices.	Incorporated into the final draft of the Plan.
A-145	Post TAC 6			Calcite Request information	Available on TAC Sharepoint site Folder>Background Information>Calcite Monitoring
A-146	Monitoring WG#1	1		Provide list of water quality analytes being monitored in Lake Koocanusa	Available on TAC Sharepoint site Folder>Monitoring Working Group>Information Sharing>Surface water and Sediment Reference Plots
A-147	Monitoring WG#1	4		Provide standard operating procedure for Se tissue sampling in Lake Koocanusa	Details will be included in the monitoring design for Lake Koocanusa monitoring programs
A-148	Monitoring WG#1	5		Provide water quality distribution plots for reference areas by location and by concentration.	Available on TAC Sharepoint site Folder>Monitoring Working Group>Information Sharing>Surface water and Sediment Reference Plots
A-149	Monitoring WG#1	6		Provide documentation of the methods(including rationale for methods) for each column in the integrated Data Evaluation Table.	This will be included in the final draft of the Synthesis Report.
A-150	Monitoring WG#1	7		Distribute time series water quality plots in Synthesis Report	Available on The TAC Sharepoint site Folder>TAC Meeting 6>Pre-reading>Synthesis Report
A-151	Monitoring WG#1	8		Share correspondance on CABIN approach.	Availabel on TAC Sharepoint site Folder>Monitoring Working Group>Information Sharing
A-152	Monitoring WG#1	9		Provide technical report on perophyton community structure lab comparison (and point out the analysis of % blue-green algae, % greens and %diatoms).	Available on TAC Sharepoint site Folder>Monitoring Working Group>Information Sharing>Periphyton Group Variability

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A-153	Monitoring WG#2	3	30/06/2014	K. Brix to work with A. DeBruyn to provide an assessment of the uncertainty in the selenium effects assessment that could inform the definition of an early warning trigger based on selenium tissue concentrations.	Completed
A-154	HH WG#2	2	19/06/2014	Follow-up with groundwater consultant to see if they have data for arsenic levels in groundwater	Follow up completed
A-155	ToxWG #7	5	Post Plan	Consider providing a list of monitoring and special study recommendations to the TAC for advice on prioritization (also consider binning these recommendations into appropriate categories – such as “Bioacc Model” and “Tox Testing”)	This will be considered during Plan implementation.