		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
1	CEAA-001	Proposed mitigation measures address the biophysical attributes which support the CULRTP. No description is provided as to how the mitigation measures address activity-based attributes of CULRTP. In particular, no information is provided on the ability of the Fish Habitat Offsetting Plan to mitigate effects to fishing use or associated activities or the effectiveness of that mitigation.	Where biophysical mitigation measures are proposed to mitigate activities associated with CULRTP, please provide a rationale as to why the mitigation measures are applicable. Provide a list of any additional mitigation measures, beyond the biophysical mitigation measures, that have been developed to specifically address the activity-based attributes of CULRTP. Provide a discussion of the anticipated effectiveness of all relevant mitigation measures to reduce effects to CULRTP for all Aboriginal groups.	Please see Supplemental Document 0707_KAM_Response to CEAA IR 001	8/Jul/16
1	CEAA-001.1	In addition to the low/moderate/high ranking for the effectiveness of mitigation measures, provide a description and where possible quantification of the effectiveness for each mitigation measure on reducing impacts to activities associated with CULRTP rather than a discussion of the effectiveness of the overall Environmental Management Plan.	Confirm that mitigation measures are based on the current design and layout of the Project.	1212_KAM_CEAA IR 001.1	13/Dec/16
2	CEAA-002	The EIS proposes two major mitigation measures (implementation of the Fish Habitat Offsetting Plan in Inks Lake and construction of the alternate access to Jacko Lake) which would potentially result in effects to the CULRTP by SSN.	Provide a description of potential effects to CULRTP for SSN resulting from the implementation of the Fish Habitat Offsetting Plan and construction of the alternate access to Jacko Lake.	KAM has abandoned the proposed Inks Lake Offsetting Plan and has produced a new plan (refer to Memo 0706_KAM_Fish Habitat and Fisheries Offsetting Plan). Key components of this plan include the following:• Expansion of the western arm of Jacko Lake by approximately 2.6 hectares at 892 metres above sea level to increase fish habitat and Aboriginal and recreational fishing areas and opportunity. The expansion of the western arm includes improved access to Jacko Lake via a new road, boat launch, day-use area and shoreline trails for fishers;• Enhancement of fish habitat at the outlet of Jacko Lake to support continuation of the SSN spring fishery. Access to this area of Peterson Creek will be retained throughout mine construction, operations and post-closure;• Flow augmentation in Jacko Creek (inlet to Jacko Lake) to improve spawning habitat for trout and to act as an attractant flow for rainbow trout to re-establish an asserted spring trout fishery in this inlet stream that is not currently utilized by fish or Aboriginal fishers. The goal of the restoration works on Upper Peterson Creek is to restore adequate flow, fish passage and habitat to enable Aboriginal fishing; and • Habitat improvements at the mouth of Peterson Creek to enhance rearing habitat for coho salmon as well as other salmonid and forage species in the South Thompson River system. The primary objective of this enhancement work is to benefit salmon productivity in the system, which has been stated to be a goal shared by SSN.The revised offsetting plan recognizes the cultural value of the Jacko Lake, Peterson Creek and Jacko Creek areas. The implementation of the revised plan is expected to enhance the Aboriginal spring fishery areas of Jacko Creek and Peterson Creek identified by SSN, with emphasis on habitat creation, restoration and improvement, as well as improved access.	8/Jul/16
2	CEAA-002.1	Per the original IR, provide a description of the effects to SSN's CULRTP resulting specifically from the implementation of the fish habitat offsetting plan and alternate access to Jacko Lake rather than from the project as a whole.		1209_KAM_CEAA IR 002.1	13/Dec/16
3	CEAA-003	The EIS identifies Jacko Lake and the surrounding area as a preferred location for fishing, hunting, plant gathering, and ceremonial use, but does not identify alternative locations for these activities for SSN. Information on alternate use locations is required to support the assertion of low and moderate magnitude effects.	Identify alternative fishing, hunting, plant gathering, and ceremonial use sites for SSN, and present a comparative analysis of the quality of resource, quality of experience, and access between the preferred location and the alternate sites.	Please see supplementary memo 0707_KAM_Response to CEAA IR 003.	8/Jul/16

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Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
3	CEAA-003.1	The response provided an analysis of effects to CULRTP at the preferred and alternate sites. Provide a comparative analysis of the value (i.e., quality of resource, quality of experience, and access) at the preferred location and alternate sites for fishing, hunting, plant gathering, and ceremonial use activities. Include consideration of alternate sites outside of the local study area where they have been identified by SSN.		1212_KAM_CEAA IR 003.1	13/Dec/16
4	CEAA-004	Neither table 8.5-27 nor page 8.5-109 identifies the geographic extent for determining the signififance of the environmental effects to SSN fishing practices.	Provide the results of an assessment, that includes the geographic extent as a factor, for the changes to the environment resulting from the project on SSN's fishing practices.	The lack of the geographic extent rating in Table 8.5-27 (Characterization of Residual Effects, Significance, Likelihood and Confidence on Current Use of Lands and Resources for Traditional Purposes for SSN) for fishing practices was an error that occurred when the document was converted from Microsoft Word format to PDF format. The geographic extent is ranked as local as project effects are limited to streams and lakes within the LSA.	8/Jul/16

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5	CEAA-005	The EIS has numerous references to fishing activities of the SSN and recreational fishing in Jacko Lake. There is no estimate of the scale and magnitude of fishing. Fish and fish habitat was identified as a valued component based on its importance to the recreational and Aboriginal fisheries.	Provide a quantification of the existing Aboriginal trout fisheries in Jacko Lake and an estimation of the economic and social value of these fisheries.	Please see supplementary memo 0706_KAM_Aboriginal Fisheries Valuation.Since the writing of the Application/EIS was completed, KAM has received additional information through on-going consultation activities, the SSN review process and research conducted as part of the writing of the three Addenda to the Application/EIS. The information received indicates that Jacko Creek, at the inlet to Jacko Lake, as well as the outlet of Jacko Lake at Peterson Creek are SSN's current preferred traditional fishing locations, in addition to the mouth of Peterson Creek at Thompson River. Jacko Lake has been identified as an area of cultural significance for SSN, as it relates to the Trout Children Story, and is an important site for both Aboriginal and non-Aboriginal recreational fisheries. A quantification of the existing Aboriginal trout fishery at the outlet of Jacko Lake at Peterson Creek and the inlet to Jacko Lake at Jacko Creek, as well as an estimation of the economic and social value of this fishery, is described in Memo 0706_KAM_Aboriginal Fisheries Valuation, prepared in response to Information Request DFO-052. The response states:"The SSN has asserted that the spring fishery is of great social and economic importance to the SSN. The rainbow trout harvested as part of the aboriginal fishery are captured using traditional methods. The rainbow trout are funneled into the outflow channel, which is narrow (<1.5 m wide) and shallow (0.5 m deep approximately). This facilitates quick and easy capture of fish. Fishing at the outlet is considered a community food gathering activity, and the fish captured are distributed within the community. The rainbow trout are an important protein source for the aboriginal community (SSN, 2016). The SSN have asserted that before it was stocked, Secwepemc people utilized traditional fishing methods at the inflow and outflow of Jacko Lake for a naturally reproducing food fishery (SSN, 2016). Those fishers would take 'literally hundreds of pounds' of trout in an important food fishery (Ignace, 2015, quoted in Fortems, 2015). The SSN did fish for traditional purposes in 2015 at the outflow of Jacko Lake into Peterson Creek and successfully caught 6 fish. The SSN also fished at the inlet from Jacko Creek to Jacko Lake and were unable to locate any fish. KAM has no record of SSN fishing for traditional purposes in the area in 2016.Taking into consideration the importance of the spring fishery, KAM has changed the project design so impacts to the spring fishery are mitigated and Peterson Creek is preserved over a 150 m section immediately downstream of Jacko Lake (Supplementary Memo 0706_KAM_Peterson Creek Diversion System Update). The dam at the outlet of the lake will be rebuilt immediately downstream of its current location, and below the 200 m of open channel, the creek will flow through a culvert for 2.7 km. While this proposed design would result in some alteration of the fishery, the 200 m section of open channel will still be accessible for fishing, and where practicable, the habitat will be enhanced so that no loss in the total numbers of fish are anticipated. Improvements to spawning habitat around Jacko Lake are further aimed at enhancing the rainbow trout population downstream of Jacko Lake in Peterson Creek.To help estimate the economic value of the fishery, the price of rainbow trout sold in Kamloops (at the time of writing, June 2016) were considered:• Fisherman's Market: $16/lb. The rainbow trout come from Little Fort (a small community on the west bank of North Thompson River), and are flash frozen. This store sells vacuum packed fillets, not whole fish.• Real Canadian Superstore: $7 to $10 per whole rainbow trout (price per lb varies). The trout are farmed, in Surrey, BC.• Safeway: $1.99/100 g ($9/lb). The trout are farmed (winter) or wild (summer), depending on the season. In Peterson Creek, within the reach downstream of the dam, there were no fish captured during baseline sampling from 2007 to 2011 (though visual observations of large bodied mature rainbow trout were made). In 2014, five rainbow trout were captured with a fork length range of 465-520 mm. Using a length-weight regression from the Kootenay Lake rainbow trout sport fishery, this would give a mean weight of 1.5 kg (or 3.3 lbs) (Andrusak and Andrusak, 2006). Multiplying this mean weight by 800 fish gives 2,640 lbs of fish per spring season. Applying a market price of $16 per lb, the market value of the fishery could be conservatively estimated at $42,240.This valuation represents a monetary estimate of the direct use value (or market value) of the spring fishery, which is the value of consuming the fish; other non-market values, such as indirect use value (e.g., cultural or ceremonial use), option value (e.g., ability to fish in the future) and non-use values (e.g., intactness, stewardship), are not included. Indirect use, option and non-use values are less tangible values and more difficult to estimate because markets do not exists for those values. As described earlier, the SSN has asserted that the spring fishery is of great social and economic importance to them. The SSN has identified other non-market values associated with the rainbow trout fishery, including but not limited to stewardship, ceremonial, intergenerational transfer of traditional knowledge and family cohesion values. Primary data from SSN will be required in order to monetize such non-market values and develop broadly supported valuations." For additional detail and information please refer to the memo described above.	8/Jul/16
5	CEAA-005.1	Provide clarification if and how the response to IR 6 regarding the Peterson Creek fishery responds to this request.		1206_KAM_CEAA IR 005.1	13/Dec/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
6	CEAA-006	SSN currently undertake Aboriginal fishing activities in Peterson Creek. There is no estimate of the scale and magnitude of Aboriginal fishing in Peterson Creek that will be lost to mine development. Fish and fish habitat was identified as a valued component based on its importance to the recreational and Aboriginal fisheries.	Provide a quantification of the existing Aboriginal trout fishery in Peterson Creek and an estimation of the economic and social value of this fishery.	Please see supplementary memos 0706_KAM_Aboriginal Fisheries Valuation and 0706_KAM_Peterson Creek Diversion System Update. Since the writing of the Application/EIS was completed, KAM has received additional information through on-going consultation activities, the SSN review process and research conducted as part of the writing of the three Addenda to the Application/EIS. The information received indicates that Jacko Creek, at the inlet to Jacko Lake, as well as the outlet of Jacko Lake at Peterson Creek are SSN's current preferred traditional fishing locations, in addition to the mouth of Peterson Creek at Thompson River. Jacko Lake has been identified as an area of cultural significance for SSN, as it relates to the Trout Children Story, and is an important site for both Aboriginal and non-Aboriginal recreational fisheries. A quantification of the existing Aboriginal trout fishery at the outlet of Jacko Lake at Peterson Creek and the inlet to Jacko Lake at Jacko Creek, as well as an estimation of the economic and social value of this fishery, is described in Memo 0706_KAM_Aboriginal Fisheries Valuation, prepared in response to Information Request DFO-052. The response states:"The SSN has asserted that the spring fishery is of great social and economic importance to the SSN. The rainbow trout harvested as part of the aboriginal fishery are captured using traditional methods. The rainbow trout are funneled into the outflow channel, which is narrow (<1.5 m wide) and shallow (0.5 m deep approximately). This facilitates quick and easy capture of fish. Fishing at the outlet is considered a community food gathering activity, and the fish captured are distributed within the community. The rainbow trout are an important protein source for the aboriginal community (SSN, 2016). The SSN have asserted that before it was stocked, Secwepemc people utilized traditional fishing methods at the inflow and outflow of Jacko Lake for a naturally reproducing food fishery (SSN, 2016). Those fishers would take 'literally hundreds of pounds' of trout in an important food fishery (Ignace, 2015, quoted in Fortems, 2015). The SSN did fish for traditional purposes in 2015 at the outflow of Jacko Lake into Peterson Creek and successfully caught 6 fish. The SSN also fished at the inlet from Jacko Creek to Jacko Lake and were unable to locate any fish. KAM has no record of SSN fishing for traditional purposes in the area in 2016. Taking into consideration the importance of the spring fishery, KAM has changed the project design so impacts to the spring fishery are mitigated and Peterson Creek is preserved over a 150 m section immediately downstream of Jacko Lake (Supplementary Memo 0706_KAM_Peterson Creek Diversion System Update). The dam at the outlet of the lake will be rebuilt immediately downstream of its current location, and below the 200 m of open channel, the creek will flow through a culvert for 2.7 km. While this proposed design would result in some alteration of the fishery, the 200 m section of open channel will still be accessible for fishing, and where practicable, the habitat will be enhanced so that no loss in the total numbers of fish are anticipated. 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As described earlier, the SSN has asserted that the spring fishery is of great social and economic importance to them. The SSN has identified other non-market values associated with the rainbow trout fishery, including but not limited to stewardship, ceremonial, intergenerational transfer of traditional knowledge and family cohesion values. Primary data from SSN will be required in order to monetize such non-market values and develop broadly supported valuations." For additional detail and information please refer to the memo described above.	8/Jul/16
6	CEAA-006.1	Per the original IR, provide an estimate of the social value of the fishing activities in Peterson Creek.		1212_KAM_CEAA IR 006.1	13/Dec/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
7	CEAA-007	The text added to the Whispering Pines/Clinton Indian Band (WP/CIB), Ashcroft Indian Band (AIB), and Lower Nicola Indian Band (LNIB) sections on Aboriginal title speaks generally to the economic benefit aspect of Aboriginal title and potential impacts of the Project on that aspect, but not governance (including decision-making power) or occupancy of the land. The proponent does not indicate why this information is missing for WP/CIB, AIB, and LNIB, yet all three of these topics are addressed in the section on impacts to SSN's asserted title. Also, it is unclear how the proponent's following statement is meant to factor into the assessment of Project impacts on asserted Aboriginal title: "the vast majority of the areas surrounding the Project are private (fee simple) property, therefore [the group's] ability to benefit economically from this land has already been disturbed".	Describe any concerns raised by WP/CIB, AIB, LNIB regarding the impacts of the Project on their potential Aboriginal title. When describing these concerns, also include the specific effect (if any) and a description of how it relates to title. Examples include impacts relating to how lands and resources are managed and impacts related to governance systems and/or practices. For all groups (SSN, WP/CIB, AIB, and LNIB) where an impact on asserted Aboriginal title has been identified, provide an assessment of the seriousness of these impacts and provide a list of any mitigation or accommodation measures that might lessed the effect.Add Aboriginal title, including mitigation/accommodation measures, to the summary tables in Section 16 for SSN, WP/CIB, AIB, LNIB.Also, explain whether, and if so how the statement "that most of the Project land is already private property" and "has already been disturbed" influenced / was factored into the assessment of impacts of the Project on asserted Aboriginal title.	Please see supplemental memo 0708_KAM_Response to CEAA IR 007	8/Jul/16
7	CEAA-007.1	The proponent was directed to add Aboriginal title, including mitigation/accommodation measures, to the summary tables in Section 16 for SSN, WP/CIB, AIB, LNIB. Confirm whether this aspect of the request was completed. Provide an explanation of whether and, if so, how the statement "that most of the Project land is already private property" and "has already been disturbed" influenced / was factored into the assessment of impacts of the Project on asserted Aboriginal title.		1212_KAM_CEAA IR 007.1	13/Dec/16
8	CEAA-008	The EIS describes potential impacts of the Project on asserted Aboriginal fishing rights. The proponent relies heavily on the Inks Lake offsetting plan and continued access to and use of Jacko Lake to mitigate the impacts on fishing rights, resulting in findings of low (SSN) or negligible (AIB, LNIB, WP/CIB, and Metis Nation British Columbia (MNBC)) severity of impacts to asserted fishing rights.DFO and Agency reviewers have expressed concerns regarding the proposed mitigation measures and have requested that the proponent produce an updated offsetting plan that meets DFO requirements (see IR 38 below).	Provide an updated assessment of the severity of the adverse impacts of the Project on asserted fishing rights with and without all proposed mitigation measures for each relevant group. The assessment should include, as appropriate, effects on fish availability, fish quality, access, and the experience of fishing. Fishing in Jacko Lake and Peterson Creek need to be assessed as separate indicators. For the updated assessment of severity with mitigation measures, include all proposed mitigation measures and identify those measures that have been developed consistent with all relevant DFO policies and guidelines.	Please see Supplemental Document 0715_KAM_Response to CEAA IR 008	15/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
9	CEAA-009	The EIS Guidelines set out the requirement to provide a summary of Aboriginal traditional knowledge provided by Aboriginal groups, and to describe where and how traditional knowledge was incorporated into the assessment.In addition, on January 27, 2016, the Minister of Environment and Climate Change announced an interim approach that includes principles for major projects. These principles are the first part of a broader strategy to review and restore confidence in Canada's environmental assessment processes. Principle 2 is: "Decisions will be based on science, traditional knowledge of Indigenous peoples and other relevant evidence"	Provide a summary of the Aboriginal traditional knowledge received from each Aboriginal group on a group-by-group basis or provide a rationale as to why the information was not included in the EIS (e.g. confidentiality agreement, Aboriginal group lack of response to requests). Provide a desciption of where and how Aboriginal traditional knowledge has been incorporated into the assessment of both the severity of the impacts to rights and the significance of the changes to the environment resulting from the Project with respect to Aboriginal peoples, including but not limited to current use of lands and resources for traditional purposes. Provide a description of how the inclusion of Aboriginal traditional knowledge influenced the outcomes of the assessment.	Please see Supplemental Document 0707_KAM_Response to CEAA IR 009	8/Jul/16
10	CEAA-010	The EIS Guidelines require a description of the location of the various components of the explosives facilities, with distances to vulnerable features including but not limited to dwellings, roads, and bodies of water.In section 17.4.15.5 of the EIS, the proponent discusses a preferred location of the explosives manufacturing facility and explosives magazine (or explosives facilities), which is approximately 150 m east of the open pit, and an alternate site for explosives manufacturing and storage which is 4.5 km northwest of the open pit. Due to the fact that the preferred location does not meet the standard for minimum distances to vulnerable infrastructure, as set out in the NRCan's 1995 Quantity Distance Principle Manual, the proponent indicates that a "permit variance may be required". Based on a review of the information available in this certificate application, NRCan would not issue an explosives factory licence with variance from Quantity Distance requirements.	Identify a location for an explosives manufacturing and storage facility that complies with Quantity Distance principles. Provide a corresponding site diagram and associated information, which demonstrates this compliance.	The alternate location for the explosives manufacturing and storage as presented in the Application is now confirmed as the location for this facility. The attached drawing (see 0510_KAM_Explosives Location) illustrates this location and that it satisfies the Quantity/Distance principles based on the separation requirements for a net explosives quantity of 100,000 tonnes. As per these separation requirements there are:• No mine haul roads or public roads with >500 vehicles/day within 375 m;• No pit, stock piles, waste dumps, tailings dam, public power lines > 15kv or public roads with >500, < 5,000 vehicles/day within 690 m;• No residences, mine offices, scale houses, garages, assemble points, critical power lines or public roads with > 5,000 vehicles/day within 1,040 m; and• No vulnerable sites, factories, historic buildings, hospitals, traffic terminals, multi-story buildings or apartment buildings within 2,080 m.	8/Jul/16
10	CEAA-010.1	The proponent's response to item 10 from the March 21 Information Requests states that the storage capacity of the explosives facility is 100,000 tonnes. Natural Resources Canada requests clarification of whether this should state the storage capacity is 100,000 kilograms rather than 100,000 tonnes.		Thank you for asking for clarification on the units referred to in the previous response. In the previous response, including 0510_KAM_Explosives Location.pdf, reference to a storage capacity of 100,000 tonnes is incorrect and should be 100,000 kilograms. 0510_KAM_Explosives Location.pdf will be corrected and reissued as 1025_KAM_Explosives Location.pdf.	30/Nov/16
11	CEAA-011	The EIS Guidelines require a description of project effects on landforms and soil erosion.On page 6.2-15 of the EIS, the proponent states, "Terrain stability refers to the likelihood of a landslide initiating in a terrain polygon following timber harvesting and road construction for mine development." This statement seems incomplete, as terrain stability also refers to the likelihood of a landslide initiating in a terrain polygon following soil disturbance, vegetation disruption, excavation of any kind, material stock piling, deposit loading, increased precipitation, flooding, etc. For a mine development project, the stated interpretation of terrain stability mapping does not seem to be sufficient.	Provide an assessment that also includes the risk of failure of each polygon that may be subjected to one or more of the following processes: soil disturbance, vegetation disruption, excavation, material stock piling, deposit loading, increased precipitation and flooding to support the assessment of effects to geology, landforms and soils.	The statement should be reworded to "Terrain stability refers to the likelihood of a landslide initiating in a terrain polygon following timber harvesting, road construction, and mine development." The RTSM followed industry standards (BC Ministry of Forests 1995a, Howes and Kenk 1996 and Resources Inventory Committee 1996a) to identify unstable or potentially unstable areas over a large region for long-range planning purposes for mine development. 98% of the Project LSA was mapped as stable. Of the 2% of the LSA mapped as potentially unstable little is located in areas of planned mine development, or is located in areas such as the historic open pit which is subject to detailed geotechnical investigations for pit wall slope stability. If a polygon identified as potentially unstable is located in an area of planned mine development a field terrain stability assessment will be conducted to identify the probability of occurrence and the potential effect of a landslide and to recommend mitigate measures. Some of the examples noted in the comment such as 'excavations and material stockpiling' will be engineered designed and based on engineering best practices and detailed geotechnical investigations that are the responsibility of the design engineer as part of detailed design.	8/Jul/16

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Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
12	CEAA-012	The EIS Guidelines require a summary of the baseline information collection program and results for geology, landforms and soils in the Project, including geohazard baseline (seismic activity, karst, etc). On page 6.2-28 (Seismicity), the proponent states, "Engineering design best practices using predicted peak ground acceleration (g) for different return periods obtained from the Natural Resources Canada are incorporated into the design of all structures in accordance with the 2010 National Building Code." It is not clear why the proponent refers to the NRCan peak ground acceleration (PGA) hazard values when a site-specific probabilistic hazard assessment (PSHA) was conducted (Appendix 6.2E). The NRCan hazard values are only valid at the 2% in 50-year probability level, which may not be appropriate for all structures on the site (particularly the tailings storage facility embankments). Furthermore, hazard values at PGA are not appropriate for large structures like tailings dams, which are generally sensitive to longer periods of ground shaking. The EIS indicates the tailings storage facility embankments will be designed and constructed to meet the Canadian Dam Safety Guidelines (Page 3.8-49).	Provide confirmation that the tailings storage facility embankments will be designed considering ground shaking periods and probability levels appropriate for the structures, and specify the applicable ground shaking periods and probability levels.	The Ajax Project tailings dams are designed based on Canadian Dam Association (CDA, 2007) classification using criteria appropriate for an Extreme consequence class. This is the most severe classification requiring the most stringent extreme event criteria (i.e.. most improbable event). Consequently the Earthquake Design Ground Motion (EDGM) is based on a seismic event corresponding to a 1/10,000 year return period (i.e.. annual probability of 0.0001). This is a Magnitude 7.3 event with a Peak Ground Acceleration (PGA) of 0.34 g (Site Class C/D). The seismic stability analysis itself for dam structure is typically carried out in phases (CDA, 2007) beginning with simplified methods and using conservative input assumptions to show that a dam is safe. More detailed analysis is then carried out if safety cannot be readily demonstrated. For the Ajax project, simple pseudo-static methods have been used to demonstrate adequate safety. This is a limit equilibrium method that uses a horizontal static force expressed as a seismic coefficient (scaled to the design earthquake) as a surrogate for earthquake shaking. The design rationale for using this method as a dam safety screening tool is provided in the reference below. • Canadian Dam Association, 2007. Dam Safety Guidelines • Hynes-Griffin, M.E., Franklin, A.G. 1984. Rationalizing the Seismic Coefficient Method, Waterways Experimental Station, US Army Corps of Engineers.	21/Jul/16
13	CEAA-013	In Appendix 6.2E (page 12) of the EIS, the proponent has recognized the potential for large megathrust earthquakes on the Cascadia subduction interface. However, they suggest that as the mine site is more than 400 km from the subduction interface source, the earthquake source can be omitted from the hazard analysis. Even at approximately 400 km, NRCan suggests that the Cascadia subduction interface will have a contribution to the long-period hazard, particularly at the 10,000-year probability level. Long-period hazard values (at 5 s) as calculated by NRCan for the 2015 National Building Code of Canada (NBCC) at the proposed mine site (obtained from the "Earthquakes Canada" Hazard Calculator) are higher at the 2,475-year probability level than the equivalent-period hazard provided by the proponent for their 10,000-year hazard levels (Table 2.7 in Appendix 6.2-E). This is primarily due to the contribution of the probabilistic Cascadia interface source. The NBCC 2015 is not yet available. However, the NRCan hazard values as used in the NBCC 2015 are available at this link: http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index-en.php for the proponent's consideration.	Provide a rationale for excluding the Cascadia subduction interface source from the hazard analysis, taking into account the long-period hazard values at the 10,000-year probability level.	The governing design seismic event for the Ajax Project is the 1/10,000 year event and the corresponding Uniform Hazard Response Spectra are provided in Table 2.13 (not Table 2.7) of Appendix 6.2-E. This table also shows the UHRS for the corresponding 1/2,475 year event that provides a spectral acceleration value of 0.03 g for a 5 second period event which is equivalent to the value determined from the NRCan website at the Ajax Project location. Table 2.13 also shows that the 1/2,475 year PGA event is 0.20 g which compares with a corresponding value of 0.07 g from the NRCan website (i.e.. the design PGA event for 1/2,475 year return period is more conservative). The USGS has produced an estimate of the shaking intensities for a scenario Cascadia subduction zone earthquake measuring M9.0 as part of their ShakeMap series (see link below) for an area bordering the coastlines of southern BC, Washington, Oregon and California. This shows that the BC interior region would witness a shaking intensity of light to moderate with an estimated PGA ranging from .01 g to .09 g. These levels of shaking are well below the design firm ground PGA value of .34 g for the Ajax Project indicating that a Cascadia subduction zone earthquake is not the governing design event for the project. http://earthquake.usgs.gov/earthquakes/shakemap/global/shake/casc9.0_expanded_peak_se/	21/Jul/16
14	CEAA-014	The EIS describes adverse residual effects to water quality at sampling node PC03 (Peterson Creek 03), but they are not carried forward to the significance determination, and no rationale was found as to why.	Provide a characterization of the significance of residual effects to water quality at PC03. Alternatively, provide a rationale as to why this information should not be required.	The surface water quality site PC03 is within the section of Peterson Creek that is proposed to be diverted around the mine site during Construction and Operations. There will be no flow at this site over this time frame and therefore water quality was not modelled. The creek is proposed to be re-established in the Decommissioning and Closure mine phase, however, the creek is assumed to be engineered to be protected from potential runoff and seepage from the mine facilities to the south and to prevent seepage of the creek into the open pit and therefore the water quality is assumed to be very similar to that which leaves Jacko Lake. The PCDP is located a short distance downstream of PC03 and is modeled through all mine phases.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
15	CEAA-015	The EIS Guidelines state that the EIS will quantify potential changes to surface water quality during all project phases.In the EIS, Category 2 parameters are defined as "those that were predicted to exceed an applicable BC water quality guideline in the Base Case at only one node and during a single mine phase, or those that are predicted to exceed a guideline under a sensitivity case but not in the Base Case." Parameters defined as Category 2 are described as having 'low probability and limited extent' in their concentration changes. However, this qualitative categorization does not preclude these parameters from being predicted residual effects, and potentially being relevant to other VCs such as fish habitat.	Provide an updated assessement of water quality for all identified residual effects or provide an acceptable rationale as to why an assessment is not conducted. The rationale provided (see rationale/context column of this table) does not constitute an acceptable rationale. The updated asssessment must include an assesssment of residual effects for Category 2 parameters where there is a change identified relative to the baseline without the project.	The surface water quality effects assessment was updated in response to this information request. This is documented in 0706_KAM_KP Water Quality 2016 Update.	8/Jul/16
16	CEAA-016	The EIS description of residual effects considers the number of modelled scenarios in which a parameter shows a guideline exceedance, but does not discuss the amount by which each guideline is exceeded. From this assessment it is not possible to determine the magnitude of the effects described.	Where exceedances are predicted to occur, quantify the exceedance and describe the magnitude of the effect.	More details have been provided for exceedance factors for the surface water quality predictions in memo 0706_KAM_KP Water Quality 2016 Update; Section 5.3 and Appendix D1.	8/Jul/16
17	CEAA-017	The EIS Guidelines require completion of a Failure Modes Effects Analysis that describes the potential effects, particularly effects on the surrounding ecosystem, and consequences that may result from potential accidents, malfunctions and unplanned events, assuming contingency plans are not fully effective, and the worst case scenarios and the effects of these scenarios.FMEA Risk Profile ID-01 and ID-02 relate to open pit highwall failure during operations and post closure respectively that propagates into Jacko Lake resulting in the transfer of a large volume of water into the pit. The risk profiles identify a number of VCs that may be affected by this potential event, but the description of environmental effects is limited (e.g., loss of fish and wildlife habitat (extending downstream of the lake), potential loss of life (fishermen on the lake, workers in the pit), loss of recreational and cultural value).	Provide a detailed description of environmental effects that may result from this potential open pit highwall failure event, including a description of the temporal and spatial boundaries for loss to fish and wildlife habitat and an estimation of potential mortality. Provide a detailed description of potential losses of recreational and cultural value. Provide a detailed description of effects relating to the other VCs potentially interacting with this potential event.Provide a detailed description of mitigation measures to prevent highwall pit failure, as well as measures to remediate those effects should the accident/malfunction occur. Provide an assessment of all of the criteria considered in determining significance of environmental effects for the resulting environmental effects of such a failure.	Please see supplemental memo 0707_KAM_Accidents and Malfunctions	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
18	CEAA-018	The EIS Guidelines require completion of a Failure Modes Effects Analysis that describes the potential effects, particularly effects on the surrounding ecosystem, and consequences that may result from potential accidents, malfunctions and unplanned events, assuming contingency plans are not fully effective, and the worst case scenarios and the effects of these scenarios.FMEA Risk Profile ID-26 relates to failure of the Kinder Morgan pipeline near Jacko Lake. The risk profiles identify a number of VCs that may be affected by this potential event, but the description of environmental effects is limited (e.g., soil and water contamination).Preventative controls rely on Kinder Morgan quickly informing KAM of any changes in the status of the pipeline, include a release in proximity to Jacko Lake.	Provide a detailed description of environmental effects that may result from this potential Kinder Morgan pipeline failure event, including a description of the temporal and spatial boundaries water and soil contamination, as well as resulting impacts to wildlife and fish. Provide a detailed description of potential losses of recreational and cultural value. Provide a detailed description of effects relating to the other VCs potentially interacting with this potential event.Provide a detailed description of mitigation measures to prevent this failure, as well as measures to remediate those effects should the accident/malfunction occur. Provide an assessment of all of the criteria considered in determining significance of environmental effects for the resulting environmental effects of such a failure.Confirm whether KGHM will be able to detect a spill from the Kinder Morgan pipeline in the proximity of Jacko Lake without notification from Kinder Morgan and if so, describe what systems/technologies KGHM will be put in place to detect such a spill.	Please see supplemental memo 0707_KAM_Accidents and Malfunctions	8/Jul/16
19	CEAA-019	The EIS Guidelines require an assessment of the environmental effects of a catastrophic TSF dam failure, including assessment of potential impacts to relevant Valued Components.Section 17.6.3.5 identifies failure of the south embankment of the TSF at year 20 as a worst-case scenario for further assessment. Section 17.6.4.4 indicates mine infrastructure, including seepage collection ponds and water management ditches would be buried in tailings in the event this failure occurred. The tailings would be contained by topography and prevented from mobilizing to other catchments by surface runoff.Pages 17.6-66 and 17.6-67 refer to appendix 17.6-2, which is not included in the EIS. Please clarifty whether this appendix is missing or should be referred to as appendix 17.6-B.	In relation to the south embankment, provide a description of any non-contact water infrastructure in the inundation area. Clarify whether the inundation area includes any discharges of non-contact water to the receiving environment that could result in a discharge of tailings in the event of a failure of the south embankment. Provide a detailed description of mitigation measures to prevent failure of the south embankment, as well as measures to remediate those effects should the accident/malfunction occur. Provide an assessment of all of the criteria considered in determining significance of environmental effects for the resulting environmental effects of such a failure.	Please see supplemental memo 0707_KAM_Accidents and Malfunctions	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
20	CEAA-020	Hexavalent chromium (Cr(VI)) is the more toxicologically important chromium species from a human health risk perspective. Application of an inappropriate TRV could result in a significant underestimation of the potential health risk from exposure to chromium. Health Canada's recommended TRV for hexavalent chromium is 3ug/kg bw per day in human health risk assessment calculations to estimate potential health risks from exposure to chromium.	Update the human health risk assessment using Health Canada's recommended TRV for hexavalent chromium of 3ug/kg bw per day or provide a rationale for the approach taken.	Human health based TRVs were selected using the BC MoE suggested approach provided in Technical Guidance 7- Supplemental Guidance for Risk Assessment, November, 2015. This guidance indicates that US EPA TRVs have been used to derive the majority of the BC MoE numerical standards and US EPA TRVs are typically subject to higher levels of peer review and scrutiny than Canadian based TRVs. As a result, the US EPA IRIS database was used as the primary source of TRVs. If TRVs were not provided in US EPA IRIS, TRVs were adopted from Health Canada. In the absence of Health Canada TRVs, TRVs were selected using the hierarchy presented in Section 4.2. This hierarchy is in line with the hierarchy supported by the BC MoE. The USEPA has TRVs for Cr(VI) and Cr(III). Review of the USEPA rationale shows that this values is derived from a single rat study, conducted in 1958 in which Cr(VI) was administered in drinking water daily over a 1-year period. It should also be noted that the RfD of 3 µg/kg-day is currently undergoing review by the USEPA and is in the preliminary assessment stage https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=144#fragment-2 . The TRV for Cr(III) of 1.5 mg/kg-day is based on a more recent study conducted in 1978 and the TRV is not currently being reassessed by the USEPA (https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=28), suggesting that at present, the USEPA views the TRV for Cr(III) as being adequate for assessing potential human health risks associated with exposure to Cr(III) and is not aware of changes in the scientific literature that would warrant a reassessment of the CR(III) TRV. The Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors (HC 2010) lists an inhalation slope factor of 320 (µg/kg-day)-1 and an inhalation unit risk of 76 (mg/m3)-1, but does not list ingestion or inhalation TRVs for non-cancer endpoints. The Part II guidance does list a non-cancer TRV for ingestion exposure for Total Cr of 1.0 µg/kg-day. But this value is lower than the one noted in the comment and thus would be more conservative than the TRV suggested in the comment. It is our understanding that the TRV of 3 µg/kg-day for Cr(VI) comes from Health Canada's Food Directorate's Bureau of Chemical Safety and is based on an RfD for Cr(VI) developed by the USEPA in 1998. In 2015, Health Canada released a draft rationale document supporting the derivation of a drinking water quality guideline for chromium in drinking water (available at: http://www.healthycanadians.gc.ca/health-system-systeme-sante/consultations/chromium-chrome/document-eng.php). This document, released for public consultation, lists a Cr(VI) TRV of 0.0044 mg/kg-day (4.4 µg/kg-day) for ingestion /dermal contact exposures based on a non-cancer end-point. This value differs from the 3 µg/kg-day value used by the Health Canada Foods Directorate Bureau of Chemical Safety and would appear to represent a more recent reassessment of the scientific literature by Health Canada. Health Canada 2015 notes that drinking water represents the primary route of exposure to Cr(VI) and derives a Health Based Value (HBV) for Cr in drinking water of 100 µg/L using the TRV of 4.4 µg/kg-day. The HBV is based on the assumption that all Cr in water is present as Cr(VI). This Cr(VI)-specific HBV is 2-fold higher than the Canadian Drinking Water Quality Guideline for Cr(total) of 50 µg/L used in the HHERA for the Ajax Project. The Health Canada 2015 document notes that while Cr(VI) may be the predominant form of Cr in treated drinking water (due to the use of disinfectants), Cr(III) is the predominant form found in soil, sediment, and plant and animal tissue. Lorax provided a report on Cr speciation as part of the EA submission (see Appendix 6.3-E- Chromium Speciation in Mine Dust). The Lorax report notes that Cr is typically present as Cr(III) and that while Cr(VI) bearing minerals are known to exist, they are rare relative to the total Cr(III) proportion of total crustal Cr in rocks. Based on geochemical conditions, Lorax concluded that Cr(III) would be the predominant form of Cr released in mine dusts and that Cr (VI) comprises a very small proportion of the total Cr in rock. Therefore, evaluating potential human health risks associated with Cr exposures on the assumption that all Cr is present as Cr(VI) would greatly over-estimate the potential risks associated with this exposures. Further, such an assumption would not appear to be supported by the information available. Therefore, basing the evaluation of potential exposures and risks on the assumption that all Cr is present as Cr(VI) would greatly over-estimate the potential risks associated with exposure to Cr in these environmental media.The concentrations of Cr(total) measured in the City of Kamloops municipal supply are 0.5 µg/L (which applies to Baseline Case and Future Case concentrations), In Knutsford, the maximum Cr(total) concentrations measured in surface water and groundwater samples was 0.1 µg/L under Baseline conditions and 3.25 µg/L under Future Case conditions. The Cr(total) concentrations under Baseline Case and Future Case conditions are well below the current Canadian Drinking Water Quality Guideline, applicable to Cr(total) and are even lower than the Cr(Vi)-specific HBV of 100 µg/L suggesting that Cr(total) or Cr(VI) in drinking water does not represent an unacceptable human health risk under Baseline Case or Future Case conditions. In Aberdeen and the other community areas in Kamloops that use municipally supplied water, drinking water accounts for approximately 2.8% of the total ingestion exposure to Cr in both the Baseline Case and Future Case. In Knutsford, Baseline Case and Future Case drinking water exposures account for 0.39% and 0.67% of the total ingestion exposures to Cr. Given the small contribution that drinking water makes to the total daily ingestion/dermal contact exposures, evaluating drinking water exposures as part of the overall ingestion/dermal contact exposures rather than assessing this pathway separately as Cr(VI) will not appreciably alter the overall estimates of non-cancer health risks. Therefore the US EPA TRV for Cr(III) is more appropriate for assessing	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
				the potential changes in health risk associated with the changes in exposure to Cr that may occur as a result of Project-related activities.	
21	CEAA-021	The characterization of tailings appears to be base on only one sample (Lorax Composite Sample: Met test KM3889, November 2013). The Geochemical Characterization Study (Table 5-18) appears to identify tailings samples with significantly higher concentrations of several parameters (e.g. chromium at 450 ppm vs. 180 ppm in sample KM3889). Use of the one sample with lower concentrations in the HHRA would underestimate potential future exposure to metals from tailings dustfall and subsequent human health risk. Given the very small sample size, maximum concentrations should be used as an input into the HHRA.	Use the maximum concentrations from the tailings characterization data as input to the air quality dispersion model or use the entire tailings characterization dataset in the development of inputs into the air quality dispersion model. Alternatively, provide a rationale for the approach taken.	SEE RESPONSE MEMO: 0516_KAM_BioaccumulationTable 5-18, Section 5.2.2. of Appendix 3-A. Table 5-18 presents partial metal characterization data for 5 composite tailings samples collected between 2009 and 2014. However, this does not capture all of the metals identified as contaminants of concern in the human health and ecological risk assessment screening process. In March 2015 Lorax noted inconsistencies in the 2014 tailings data and provided metal characterization data for a single composite sample based on the 2013 tailings samples and recommended that this sample be used in the human health and ecological risk assessment and the water quality assessment. A duplicate analysis of the 2013 tailings samples was also provided. In the human health and ecological risk assessment the higher of the two values between the sample and duplicate analyses was selected to represent the concentration of each metal in the tailings dust.	8/Jul/16
21	CEAA-022	In order to accept the alternative approach proposed by KAM, a sensitivity analysis needs to be conducted to understand how changes in the tailings metal concentrations influences the findings of the HHRA. Provide a description of the sensitivity analysis conducted and the findings.		The Lorax analysis of tailings noted some concerns with the 2014 data. However the 2013 and 2014 tailings metal profiles have been combined and a comparison between the tailings profile used in the original submission and the maximum reported value from the combined 2013 and 2014 data sets shows very little difference between the two data sets. Across the study area, tailings dust contributions to total Project-dust deposition range between 0.75% and 2.2% in each of the community areas (Aberdeen, Knutsford, Sahali, West End Downtown, North Shore, Brocklehurst, Kamloops Indian Reserve #1 and the recreational area around the mine site). Using the maximum reported concentration of each metal in tailings dusts, rather than the 2013 composite sample data, increases the predicted accumulation of metals by less than 0.1% in all cases and by less than 0.01% in most cases. As a result, adjusting the metal profile for tailings to use the maximum reported level of each metal from the combines 2013 and 2014 data sets will not measurably alter the HQs presented in the original submission and will not alter the conclusions of the human health risk assessment.	21/Feb/17
22	CEAA-022	Page 3.32 (Appendix 10.4-A) of the EIS states, “To calculate the mass of dust deposited onto the soil, it was assumed that 100 percent of the deposited dust was incorporated into the surface soil layer that had a maximum receiving depth of 10 cm (0.1 m).” This 10 cm soil mixing layer results in an approximately 100,000 times dilution compared to if the dust were deposited at surface. The EIS did not provide scientific justification or references as rationale for an effective dilution of 100,000 times the concentrations of substances from the Project.Deposition of aerial emissions will result in surface deposition and while there is some mixing of surface soil with deeper layers, for soils that are not subject to gardening, tilling, excavation, etc. overestimation of the thickness of the mixing layer would result in an large underestimation of chemical concentrations in the soil to which people are exposed. This would result in subsequent underestimation of human health risk from the following pathways: incidental soil ingestion, inhalation of fugitive dust from soils, dermal adsorption from soils, ingestion of wild game, ingestion of vegetation, and ingestion of local animals raised for meat (e.g. cattle).	Use pathway-specific mixing soil layer thicknesses in the HHRA and provide justification for the soil layer thickness used in each pathway or provide a rationale for the approach taken	The selection of a soil mixing depth of 10 cm was based on professional judgement. This mixing depth was applied to direct contact and country food soil-related pathways. This depth recognizes that the percolation of dust, and the associated metals contained in the dust, will occur as a result of rain and snow melt, but limits the depth to avoid over-dilution of metal concentrations. Section 2.3.2 of the Part 1 Guidance on Preliminary Quantitative Human Health Risk Assessment (PQRA) Version 2 (HC 2010) notes the following:The CCME (2006) defines surface soil from “grade” to 1.5 m below grade. Barring consistent sampling from shallower depths, the CCME definition should be used to define surface versus subsurface soils. However, the surface layer of soil that will contribute to incidental exposure will typically be ≤5 cm, provided that the soils are not subject to gardening, tilling excavation etc. Based on this guidance, the selection of a mixing depth of 10 cm would represent a 2-fold dilution over what would have been predicted had a mixing depth of 5 cm been used to estimate the change in metal concentrations. However, for tilled or gardened areas, where a mixing depth of 30 cm (the depth of a spade) would be more common, the use of a mixing depth of 10 cm represents a 3-fold over estimate of potential metal concentrations available for uptake into backyard garden produce and vegetation and from there into country foods. In addition, the assumptions used in estimating metal accumulation in soil were selected to over-estimate potential changes in metal concentrations over the operational life of the mine. These include:1) Metals deposited on the soil were assumed to remain in the soil. Natural losses of metal due to soil erosion, or percolation to depths greater than 10 cm were assumed not to occur.2) Total dust deposition was based on the maximum annual dust deposition rate over the operational life of the mine and dust deposition was assumed to occur at this rate on an annual basis over the 25 year operational life of the mine. The application of this 10 cm mixing depth across the soil-related exposure pathways, coupled with the conservative assumptions used to estimate metal accumulation provide a reasonable worst-case estimate of the potential changes in exposure and human health risk that could be associated with Project-related dust deposition.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
22	CEAA-022.1	The response provides little rationale to support the assumed 10 cm mixing depth for dust from the site. Overestimation of the mixing depth could underestimate the results of the human health risk assessment, given that mixing would cause estimated concentrations to decrease. The surface layer of soil that will contribute to incidental exposures will typically be ≤ 5 cm, provided that the soils are not subject to gardening, tilling, excavation, etc. (Health Canada 2010. Part V: Guidance on Human Health Detailed Quantitative Risk Assessment for Chemicals). Update the HHRA using a weighted average of <5cm (non-garden) and 15-30 cm (gardens) for soil mixing depth with reasonable estimates for areal extents of gardens.Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		The calculation of weighted average metal concentrations in soil is impractical because the areas of the non-garden soils cannot readily be determined. To address Health Canada's concerns regarding the potential underestimation of soil-related exposures in the HHERA, the hazard quotients (HQs) for soil-related exposures (soil ingestion, dermal contact with soil, and consumption of backyard garden produce, wild meat, vegetation and, cattle) were recalculated assuming a soil mixing depth of 2 cm for all soil types. This approach eliminates the need to estimate differential areas between garden and non-garden soils. It should also be noted that the Future Case metal concentrations predicted using a 2 cm soil horizon were assumed to be present in the full rooting zone depth for produce and vegetation growing in soil.Aberdeen and Knutsford are the areas where mine-related dust deposition is predicted to be the highest and where the predicted changes in metal concentrations and changes in HQs would be the highest. HQs were recalculated for Aberdeen and Knutsford to capture the differences in cattle consumption rate assumptions between the two communities. The HQs calculated using a 2 cm soil horizon are generally less than one percent higher than the HQ calculated using a 10 cm soil horizon. Antimony and molybdenum are the exceptions to this where the increase in HQ ranges between 1.1% (molybdenum in Knutsford) and 3.19% (antimony in Aberdeen). In all cases the HQs predicted using a 2 cm soil horizon are below the HQ benchmark of 1.0. Based on these results, adjusting the soil horizons as suggested by Health Canada would not alter the conclusions of the HHERA. A more detailed discussion of the effect of altering the soil mixing zone form 10cm to 2 cm will be provided in the reassessment of the HHERA based on the new air quality modelling data. 0221_KAM_HHERA_Reassessment	21/Feb/17
23	CEAA-023	Based on the information presented in the EIS, it appears that juvenile fish/smolts were used to estimate baseline concentrations of chemicals in fish in the HHRA. Fish sampled in July 2015 were reported to weigh 10 g – 131 g (Appendix 10.4-A, pg 3.54); however, the typical weight for an adult rainbow trout in BC is 1000 g – 7000 g and brook trout range from 300 g to 3000 g. If juvenile fish were sampled, rather than adult fish, the metals concentrations would be underestimated, which would then result in underestimation of potential health risk. Additional sampling of adult fish from this area may be warranted.	Conduct additional sampling of adult fish in the area for metal concentrations, or provide an estimate of baseline concentrations of chemicals for a fish size typically consumed by humans, using the data collected for juvenile fish and taking into account potential bio-accumulation or bio-magnification of COPCs during the lifetime of the fish. Provide the results of an updated assessment that includes the additional data or the updated estimates. Alternatively, provide a rationale for the approach	The potential for bioaccumulation of metals in fish has been reviewed and the results are provided in the Bioaccumulation and Biomagnification Potential of Metals in Fish Technical Memo (0516_KAM_Bioaccumulation). The assessment plotted reported metals concentrations in fish against fork length (fish size) and body weight. Concentrations of cobalt, copper, manganese, selenium and zinc tended to decrease with greater fish size. Concentrations of arsenic, cadmium, mercury, methylmercury and thallium showed no clear trend with fish size. Concentrations of chromium, lead, molybdenum, nickel and uranium were mostly below the detection limit. Overall, the data do not support the position that metals bioaccumulate with increasing fish size for rainbow trout in Jacko Lake or Peterson Creek.The current scientific understanding of biomagnification in freshwater aquatic food chains suggests that most inorganic forms of metals do not biomagnify in the food chain. For example, Cardwell et al. (2011) concluded that although uptake factors varied for each metal in aquatic environments, cadmium, copper, nickel, lead and zinc generally do not biomagnify in food chains consisting of primary producers, macroinvertebrates and fish. Biomagnification of metals across multiple trophic levels for the most part, do not occur for metals (McGeer et al. 2003). Despite general public perceptions, biomagnification of metals in aquatic organisms is rare with the exception of methylmercury which is often associated with anoxic aquatic conditions associated with deep reservoirs created from hydroelectric dams (Drexler et al. 2003). The current scientific information (which has been presented in the Bioaccumulation and Biomagnification Potential of Meals in Fish Technical Memo and summarized here), does not support the suggested potential for bioaccumulation and biomagnification of metals in fish. It also does not support the suggestion that estimating human exposures to metals in fish using young fish would under-estimate potential exposures or the health risks associated with these exposures. Additional fish tissue sampling would be conducted as part of an on-going environmental effects monitoring program and the information from this program monitor potential on-going human exposures to metals as a result of consuming fish harvested from Jacko Lake and/or Peterson Creek. Cardwell, R.D.; DeForest, D.K.; Brix, K.V.; and Adams, W.J. (2011). Do Cd, Cu, Ni, Pb, and Zn Biomagnify in Aquatic Ecosystems? Reviews of Environmental Contamination and Toxicology. 226:101-122.Drexler, D.; Fisher, N.; Henningsen, G.; Lanno, R.; McGeer, J.; and Sappington, K. (2003). Issue paper on the bioavailability and bioaccumulation of metals. US Environmental Protection Agency. Risk Assessment Forum.McGeer, J.C.; Brix, K.V.; Skeaff, J.M.; DeForest, D.K.; Brigham, S.I.; Adams, W.J.; and Green, A. (2003). Inverse relationship between bioconcentration factor and exposure concentration for metals: implications and hazard assessment of metals in the aquatic environment. Environmental Toxicology and Chemistry. 22(5): 1017-1037.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
23	CEAA-023.1	The site specific data used to assess human health risk and to assess bioaccumulation were not representative of the size of fish caught for human consumption (10 - 131 g sampled in July & September 2014) . The Agency understands Jacko Lake produces catches of rainbow trout in the range of 4 - 7 lbs (1800 g to 3200 g). Jacko Lake is stocked with Rainbow Trout (6000 Rainbow Trout yearlings with an average size of 11.1 g were released to Jacko Lake on June 16, 2014). As such, many of the sampled fish may be more representative of conditions in the hatchery than Jacko Lake due to the lack of exposure in Jacko Lake. Update the HHRA to include an assessment of human health risks that are more reflective of actual site conditions (including bioaccumulation). Conduct additional sampling and analysis of larger fish (i.e. of a size that would typically be consumed by people), as requested in the IR or alternatively, provide an acceptable rationale that demonstrates how the approach taken reflects actual site conditions.Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		Fish sampling conducted in 2015 included fillet and whole body metal concentrations for fish that range between 105 g and 513 g. In total 17 fish were collected between 2014 and 2015 with weights ranging between 62.8g and 513 g. Metal concentrations in whole body and fillet were plotted against body weight to determine whether metal concentrations increased with increasing weight and age. For most of the metals identified as COPCs in the HHERA, metal concentrations in fish (both whole body and fillet) showed no measurable change in metal concentration with increasing fish weight. Aluminum and copper were the exceptions to this. Both aluminum and copper metal concentrations in fish (whole body and fillet) were higher on a mg/kg wet weight basis in the smaller fish than the larger fish. These data suggest that metal concentrations (on a mg/kg wet weight basis) do not increase with increasing fish size (age) and that the use of the younger smaller fish to assess potential human exposures will not under-estimate exposures for Aboriginal and non-aboriginal people who consume fish from Jacko Lake. The trend analysis presenting the results of this assessment will be included in the HHERA reassessment report. 0221_KAM_HHERA_Reassessment	21/Feb/17
24	CEAA-024	In the EIS, the future fish tissue concentrations were estimated using an uptake factor from surface water only; no information was provided as to why the modelling did not also consider potential uptake from metals that may be elevated in sediment associated with the Project. As fish may consume benthic invertebrates, and inadvertently sediment, concentrations of metals in fish tissue in future may be underestimated by considering uptake of metals from surface water only.	Provide an updated assessment that takes into account the uptake of metals from sediment by fish in the modeling of future fish tissue concentrations or provide a rationale for the approach taken.	Scientific data to support the evaluation of separate exposures (i.e., surface water, sediment and ingestion) are generally lacking for fish. Instead, uptake factors, which describe the ratio of biologicaltissue concentration to the environmental media concentration, are used. For fish tissues, the fish tissue concentrations represent the cumulative exposures of the fish in the environment (e.g., surface water and food sources) to the surface water concentrations, which inherently are also related to the other environmental media (for example, sediment) concentrations. As such, through the use of these uptake factors, it is unnecessary for the assessment to consider fish exposure to COPCs in surface water, sediment, and food sources as separate pathways.	8/Jul/16
25	CEAA-025	In a memo dated February 10, 2016 from Stantec to KGHM AJAX, Stantec documents the metals concentrations employed in the KGHM Ajax HHERA to characterize metals emissions from ore deposit dust, waste rock dust, tailings dust, and diesel exhaust. Given that the future concentrations are estimated using a model, it is appropriate to use a more conservative statistic than a mean concentration (or 95%UCLM) for the ore dust and waste rock dust input values, such as a 90th percentile. Health Canada has not yet received any dustfall results for the human receptor areas. Appendix 10.4 (page 3.31) refers to air quality model predicted deposition rates for four types of dust (ore, mine rock, tailing and diesel emissions) at both sensitive receptor locations in Aberdeen, Sahali, West End/Downtown, North Shore, Brocklehurst and Knutsford and for grid points throughout the LSA, but this information could not be found in the EIS. This data is critical to the review of the HHRA as together the characterization data and dustfall data is used to estimate future concentrations of soil and water. Since future concentrations of chemicals in all media (soil, water, fish, sediment, local vegetables, local fruits, traditional plants, wild game, local cattle) are based on the soil and water concentrations, this information is critical to the review.	Provide the geochemical characterization data of each of the following HHRA inputs:- Dustfall data (specific to each sensitive receptor location and each source: ore, waste rock, tailings, diesel) - Tailings characterization- Diesel emissions characterization- Waste rock characterizationConfirm that the geochemical characterization data was incorporated into the HHRA or alternatively provide an updated assessment that includes the data.	SEE RESPONSE MEMO: 0518_KAM_Community-Specific Dustfall Calculations. The concentration profiles for ore, waste rock, tailings and diesel particulate used in the HHERA TDR have been posted online on the BC Environmental Assessment Office webpage: http://a100.gov.bc.ca/appsdata/epic/html/deploy/epic_document_362_39851.htmlThe dustfall characterization information used to estimate metal accumulation at the maximum dust fall location for each of the community areas (Aberdeen, Sahali, West end/Downtown, North Shore, Brocklehurst, Kamloops Indian Reserve #1 and Knutsford) have been provided in the Community-Specific Dustfall Calculations Technical Memo (0518_KAM_Community-Specific Dustfall Calculations).The geochemical data for waste rock, ore, tailings and diesel particulate has been incorporated into the HHERA. The predicted change in metal concentrations in soil at the maximum dustfall location in each of the community areas was calculated by multiplying the mass of waste rock, ore, tailings and diesel particulate dust predicted to accumulate over 25 years of operational mine life, by the metal concentration profiles applicable to each dust type. Examples of these calculations are provided in Appendix F of the HHERA TDR and can be found on pages 928 and 929 of the HHERA TDR PDF.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
25	CEAA-025.1	The air model is used to generate dust deposition estimates, which are partially based on the geochemical characterization data; however, the HHRA has not been updated to reflect the inputs identified in the original IR. Per the original IR, incorporate the geochemical characterization data in the HHRA.Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		The Lorax geochemical analysis of tailings noted some concerns with the 2014 data. However the 2013 and 2014 tailings metal profiles have been combined and a comparison between the tailings profile used I the original submission and the maximum reported value from the combined 2013 and 2014 data sets shows very little difference between the two data sets. Across the study area, tailings dust contributions to total Project-dust deposition range between 0.75% and 2.2%. In each of the community areas (Aberdeen, Knutsford, Sahali, West End Downtown, North Shore, Brocklehurst, Kamloops Indian Reserve #1 and the recreational area around the mine site). Using the maximum reported concentration of each metal in tailings dusts, rather than the 2013 composite sample data, increases the predicted accumulation of metals by less than 0.1% in all cases and by less than 0.01% in most cases. As a result, adjusting the metal profile for tailings to use the maximum reported level of each metal from the combines 2013 and 2014 data sets will not measurably alter the HQs presented in the original submission and will not alter the conclusions of the human health risk assessment.Changes in dust deposition, metal accumulation in soil due to mixing depth, and metal concentrations in fish tissue have been addressed in other responses. The effect that changes in these components of the HHERA model have on the predicted human health risks will be evaluated in the reassessment of the HHERA. 0221_KAM_HHERA_Reassessment	21/Feb/17
26	CEAA-026	The approach to compare “toxicity potentials” for ore dust as a second step in screening, as presented in the EIS, is inconsistent with Health Canada’s guidance which recommends assessment of toxicity of each chemical in the risk assessment on a chemical-by-chemical basis. Consistent with Health Canada guidance, chemicals of potential concern (COPCs) in ore dust should be identified by screening 95%UCLM concentrations in ore dust against applicable guidelines for soil. Had the EIS followed an approach more consistent with that presented in Health Canada guidance, two additional COPCs, tin and vanadium, would have been identified.	Complete the COPC screening for soil using maximum concentrations of each of the 4 sources (ore dust, waste rock, tailing, diesel emissions) or provide a rationale for the approach taken. Screen background media using maximum concentrations.	The use of concentration and toxicity as a method to screen COPCs for risk assessment is a standard industry practice, and has been for over 25 years. The objective of this screening procedure is to “identify the chemicals in a particular medium that -- based on concentration and toxicity -- are most likely to contribute significantly to risks calculated for exposure scenarios involving that medium, so that the risk assessment is focused on the "most significant" chemicals” (USEPA 1989). Relative toxic potential as a screening tool for human health risk assessment for use in EAs remains an accepted practice, and is one of the two methods recognized by Alberta Health and Wellness (2011), the other screening method being persistence and bioaccumulation-based. While the available regulatory guidance is in agreement that relative toxic potential is an appropriate method for removing from the risk assessment those chemicals that have very low risk relative to the other chemicals being considered, there is no consistent regulatory guidance for determining how “very low” is defined. Accepted practice includes those based on a cumulative risk approach, such as including chemicals that contribute to 95 to 99% of the relative risk, and those based on screening out chemicals that contribute less than a specified fraction of the total risk. The latter method is recommended by the USEPA (1989). The USEPA (1989) suggested 1% as an appropriate value for screening, which is what was used for this assessment.Alberta Health and Wellness 2011: http://www.health.alberta.ca/documents/Health-Risk-Enviro-Impact-Guide-2011.pdf USEPA 1989: https://www.epa.gov/sites/production/files/2015-09/documents/rags_a.pdf	8/Jul/16
26	CEAA-026.1	Tin and vanadium would have also been screened in had the screening approach considered maximum concentrations, as per Health Canada guidance. Provide a description of the potential for these contaminants to contribute to the overall risk estimates (while giving consideration to the potential for additive adverse health effects of these chemicals in addition to the other chemicals screened into the risk assessment with similar modes of action and/or target organs), and update the HHRA if these contaminants contribute to the risk estimates. Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		Tin: Based on the 95% UCLM concentration of tin in ore dust, the toxic potential was calculated as 0.0053%. The maximum concentration of tin in 50,084 ore samples was 300 mg/kg – 34-fold higher than the 95%UCLM concentration. Using the maximum tin concentration in the toxic potential calculation would raise tin’s contribution from 0.0053% to 0.180%. This is still below the 1% contribution benchmark. As such using the maximum concentration of tin in ore dust rather than the 95%ULCM would not alter the screening process and tin would not be identified as a COPC for assessment in the HHERA.Vanadium: The 95% UCLM vanadium concentration in ore dust was 8.683 mg/kg calculated for a data set of 50,084 samples. This is well below the BC generic soil quality guideline for agricultural soil of 200 mg/kg. In surface soil, which would make the largest contribution to human exposure, the maximum vanadium concentration was 179 mg/kg – which is also below the BC generic guideline value. Total deposition for ore, waste rock, tailings and diesel emissions would increase vanadium concentrations in the soil by 0.0423 mg/kg in the soil around Knutsford, 0.0342 mg/kg around Jacko Lake and 0.0258 mg/kg in Aberdeen and by lesser amounts in the other community areas. These changes will not increase baseline vanadium concentrations in soil to levels that exceed the BC soil quality guideline for agricultural land. Therefore, vanadium would not be identified as a COPC for assessment in the HHERA.	21/Feb/17

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
27	CEAA-027	It appears that groundwater quality from individual groundwater wells was averaged and compared with applicable guidelines as part of the COPC screening. However, this is not consistent with environmental site investigation practice. It is recommended that groundwater results from individual wells not be combined, especially as groundwater wells may be screened in different aquifers, and receptors would be expected to drink primarily from one well. Also, it appears that dissolved concentrations of substances in groundwater were compared against guidelines but not the Guidelines for Canadian Drinking Water Quality (GCDWQ), and it is recommended that total concentrations at the point of consumption be compared with the GCDWQ.	Complete the COPC screening for groundwater using maximum concentrations at the point of consumption or provide a rationale for use of average groundwater quality results.	The human specific COPC screening for groundwater was completed by comparing the average total concentration in residential wells to the applicable drinking water guidelines. Drinking water guidelines were selected based on the following order of preference:• BC Approved Water Quality Guidelines for Drinking Water (BC MOE 2014b)• BC Working Water Quality Guidelines for Drinking Water (BC MOE, 2006)• Health Canada Guidelines for Canadian Drinking Water Quality (Health Canada, 2014)Preference was given to the provincial quality guidelines because these are the guidelines that would be applicable for drinking water sources in the area. The average total metal concentrations in groundwater from the residential wells were screened against the applicable water quality guidelines to select COPCs. Average concentrations of manganese exceeded the applicable water quality guideline and this metal was carried forward as a COPC. The use of a statistic other than the maximum concentration (in this case the average concentration) in the identification of COPCs is consistent with Health Canada guidance which notes the following:Where, in the opinion of the risk assessor, the data are sufficiently numerous and rigorous to warrant an alternate statistical treatment of on-site contamination data (such as the use of an upper confidence limit on the mean) the risk assessor or site proponent is advised to contact Health Canada and discuss the use of a DQRAchem at the site: (Part 1: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA) Version 2 (Section 2.5.1 Health Canada 2010))The average concentration is considered a reasonable representation of the baseline groundwater quality from wells in the area.If maximum total metal concentrations were used for screening, then manganese, selenium and uranium would be identified as COPCs. Selenium and uranium were already included as COPCs as a result of the Toxic Potential Screening step of the COPC selection process. Therefore the use of the maximum concentrations from the residential wells would not have changed the list of COPCs.	8/Jul/16
27	CEAA-027.1	KGHM Ajax Mining Inc.'s response to item 27 from the March 21 Information Request uses an areal average of drinking water quality well data. Please note that due to exposure patterns (residents would not be expected to drink equally from their well and their neighbours' wells), taking an areal average of drinking water well quality data is inappropriate for Human Health Risk Assessment purposes. Please reflect these differences in exposure patterns in the future when screening COPCs for groundwater.		An aerial average was used to set the drinking water baseline conditions which provides lower baseline metal concentrations and thus maximizes the predicted project effects. Future Case conditions were based on Res-2 the well that is closest to the Project and is predicted to have the highest degree of impacts and it also used the surface water quality data at that location. Because the Future Case exposures are based on a conservative assessment of a single location, a reassessment to reflect improved water quality conditions at other receptor locations down-gradient of the location selected for the assessment is not warranted.	28/Jul/16
28	CEAA-028	Annual average surface water quality results were used to screen for metals in surface water. Health Canada guidance recommends use of the maximum observed concentrations to account for seasonally elevated concentrations.	Complete the COPC screening for surface water using maximum observed concentrations or provide a rationale for use of average surface water quality results.	As discussed in Section 3.3.2.4 of Appendix 10.4, COPCs were selected by comparing maximum Baseline Case annual weighted average surface water concentrations (Total) from Peterson Creek and Jacko Lake to applicable guidelines for protection of aquatic life and agriculture. Weighted averages were estimated for three locations, two in Peterson Creek (PC02 and PC02.3) and one in Jacko Lake (JACL). These locations were selected because they are accessible to human and ecological receptors and represent either sensitive locations (i.e., Jacko Lake) or are expected to undergo the greatest changes in water quality (e.g., PC02). The annual weighted average of surface water samples from PC02, PC02.3 and JACL collected between 2012 and 2014 were used to estimate the exposure point concentrations for the Baseline Case and for COPC screening. The annual weighted average concentration was calculated by adjusting the concentration of each individual sample by the number of days (out of a total of 365) between that sample and the subsequent sampling event. This approach was used in order to avoid bias that could result from seasonal variation coupled with inconsistent sampling frequency. The use of a statistic other than the maximum concentration (in this case the annual weighted average concentration) in the identification of COPCs is consistent with Health Canada guidance which notes the following:Where, in the opinion of the risk assessor, the data are sufficiently numerous and rigorous to warrant an alternate statistical treatment of on-site contamination data (such as the use of an upper confidence limit on the mean) the risk assessor or site proponent is advised to contact Health Canada and discuss the use of a DQRAchem at the site: (Part 1: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA) Version 2 (Section 2.5.1 Health Canada 2010))The annual weighted average concentration is considered a reasonable representation of the baseline surface water quality.Maximum baseline surface water concentrations from PC02, PC02.3 or JACL were also below the applicable guidelines for aquatic life and agriculture. Therefore the use of the maximum concentration for COPC screening would not have changed the list of COPCs, nor would it have changed the determination of significance of the residual effects of the Project.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
28	CEAA-028.1	Given the potential differences in exposure from each surface water source described in the response provided (i.e. Jacko Lake and Peterson Creek), use maximum observed concentrations, as requested in the original IR, from each individual surface water source for the purpose of screening COPCs or establishing a baseline for the HHRA. Alternatively, provide an acceptable rationale for why the average results were used rather than the maximum observed results. Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		Average concentrations from Jacko Lake and Peterson Creek were used to represent potential year-round water quality in surface water bodies that would contribute to a future drinking water source that could be affected by Project-related activities. Maximum concentrations provide a snapshot of worst-case water quality conditions and do not properly reflect the exposures that would be experienced on a year—round basis. Water quality in Jacko Lake and Peterson Creek is interrelated and thus, yearly-averaged concentrations better reflect the water quality conditions that could contribute to human exposure on a daily year-round basis. In addition, considering surface water bodies on an individual basis does not properly reflect the exposures that could occur through drinking water. Jacko Lake is not and will not be used as an exclusive source of drinking water on a regular daily basis and thus, assessing water from Jacko Lake for regular domestic water consumption would be inappropriate. Water quality in Jacko Lake meets the drinking water guidelines and thus, occasional consumption of surface water from Jacko Lake would not be expected to result in unacceptable exposures to metals. Because domestic water could be sourced from Peterson Creek, the HHERA used water quality predictions from the locations in Peterson Creek where water could be taken, to include in the estimation of potential exposures to metals through the consumption of drinking water.	21/Feb/17
29	CEAA-029	Less than one sample from each site sensitive receptor location - Aberdeen, Sahali, West End/Downtown, North Shore, Brocklehurst and Knutsford - was used to represent background soil concentrations in each of these areas (5 samples collected). These results may not be representative due to the limited sampling.	Complete additional sampling at each site to provide a representative sample size for incorporation in the HHRA or provide a rationale for the approach taken.	Paired soil and vegetation samples were collected from community gardens in areas where the community gardens were present. In addition, soil samples from parks and schools were collected to represent metal concentrations in areas where children would be expected to play. The object of the sampling program was to develop a general understanding of baseline metal concentrations in soil and backyard garden produce in community areas across the City of Kamloops in order to evaluate potential Project-related changes in human health risk across the city. A multiple community area approach was taken because it was recognized that the Project would be unlikely to affect all areas of Kamloops equally. The use of multiple community areas prevent the potential dilution of Project-effects that would occur were the results to be averaged across the entire city. The sampling program completed for the HHERA provides an understanding of baseline metal concentrations in soil and backyard garden produce that, in turn, provides baseline exposure and human health risk estimates associated with direct soil contact and backyard garden produce consumption in the various community areas across the City of Kamloops. Paired soil and vegetation samples were collected from the community gardens in each of the community areas where community gardens are present. Additional sampling at the same locations would add additional samples to the baseline dataset, but would not be expected to substantively alter the understanding of baseline conditions and thus would not be expected to alter the predicted changes in Project-related exposures or associated human health risks. As a result, additional sampling would not alter the determination of the significance of Project-related residual effects on human health. Additional sampling of soil in parks and schools and paired soil and vegetation samples in community gardens could be incorporated into the effects monitoring program for the Project.	8/Jul/16
29	CEAA-029.1	The limited sampling of background community soils is not sufficient to estimate baseline soil conditions, given the expected variability in metal concentrations. It could be difficult to monitor effects given this limited baseline dataset. Additional samples will reduce uncertainty associated with the potential variability of metals concentrations in soil within each community area. Per the information request, complete additional sampling at each site to provide a representative sample size for incorporation in the HHRA. Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		Additional soil sampling has been undertaken and the results will be used to update the data set for garden and residential/community park/school soils. This information are included in the HHERA reassessment report. 0221_KAM_HHERA_Reassessment	21/Feb/17
30	CEAA-030	It appears that only one browse sample was used to represent the base case for browse. It appears that this sample did not reflect the maximum concentrations for all parameters. Use of an exposure point concentration other than the maximum could underestimate risk when fewer than 10 samples are collected .	Complete additional sampling for browse and use maximum concentrations for all parameters for inclusion in the HHRA or provide a rationale for the approach taken.	A total of 13 browse samples were used in the derivation of the 95% UCLM values used to represent metal concentrations in browse material. The data used in the assessment are presented in Appendix B of the Human Health and Ecological Risk Assessment Technical Data Report (Appendix 10.4-A) (pp 488 through 493 of the PDF document).	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
31	CEAA-031	It appears that only one forage sample was used to represent the base case for forage. It appears that this sample did not reflect the maximum concentrations for all parameters. Use of an exposure point concentration other than the maximum could underestimate risk when fewer than 10 samples are collected .	Complete additional sampling for forage and use maximum concentrations for all parameters for inclusion in the HHRA or provide a rationale for the approach taken.	SEE Response Memo 0516_KAM HHERA Sample Calcs: A total of 12 forage samples (including 2 duplicates) samples were used in the derivation of the 95% UCLM values used to represent metal concentrations in forage material. The data used in the assessment are presented in Appendix B of the Human Health and Ecological Risk Assessment Technical Data Report (Appendix 10.4-A) (pp 488 through 493 of the PDF document). Please also see 0516_KAM HHERA Sample Calcs.	8/Jul/16
32	CEAA-032	Parameter-specific uptake factors were used to estimate future concentrations for many media types (e.g. water-fish, water-sediment, soil-plant, soil-berries, soil-wild game, soil-browse, soil-forage, soil-traditional plants, soil/water-browse/forage/berries-wild game). The uptake factors for some of the COPCs were not available in the referenced papers (e.g. Sheppard, 2010, aluminum, antimony, mercury); Health Canada requests clarification on how this data gap was addressed.	Provide an explanation of how uptake factors were selected and applied in the HHRA for future media concentrations, especially if substituting a reference rate of one metal for another.	When baseline concentrations data were not available for a given metal in an specific environmental medium (e.g. plants, animals fish) an uptake factor from the literature was used to estimate the concentration of the metal in that environmental medium. A list of the uptake factors used in the assessment and the reference source for each is provided in the Human Health and Ecological Risk Assessment Sample Calculations Technical Memo (0516_KAM_HHERA Sample Calculations). Thallium was the only metal for which metal-specific uptake factors could not be identified in the literature. To address this data gap, lead was used as a surrogate for thallium since lead is similar in atomic weight to thallium and, like thallium, is a post-transition metal. Uptake factors for lead were used to estimate thallium uptake into environmental media.	8/Jul/16
33	CEAA-033	Additional details should be provided (including worked examples) on how literature-based uptake factors were applied (or not) for other media types (e.g. soil to garden produce, soil to vegetation, soil to traditional plants, soil to soil invertebrates, soil and soil invertebrates to small mammals, soil to terrestrial invertebrates, soil and vegetation and water to cattle, soil and vegetation and water to wild meat, water to sediment, sediment to benthic invertebrates) and compare these to site-specific uptake factors to ensure they are appropriate. It is not clear how literature or site-specific uptake factors have been applied. Exposures may be underestimated if appropriate uptake factors have not been applied	Clarify how literature-based or site-specific uptake factors have been applied in the HHRA	SEE Response Memo 0516_KAM HHERA Sample Calcs: The literature and site-specific uptake factors that have been used to model metal movement through the food chain are summarized in the Sample Calculations Tech Memo (0516_KAM HHERA Sample Calcs).A full set of worked example calculations used to model metal uptake and movement through environmental media and to estimate Baseline Case and Future Case exposures to metals, to determine the human health risks associated with these exposures and the change in health risks predicted to occur between Baseline Case and Future Case conditions, is provided in the Sample Calculations Tech Memo (0516_KAM HHERA Sample Calcs).	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
34	CEAA-034	According to Section 3.3.3.13 of the HHRA, future sediment concentrations were modelled from dissolved surface water concentrations using a water-to-sediment uptake factor from Sheppard et al., 2010. However, this does not appear to be consistent with a review of the literature. In the literature cited in the report, the only water to sediment uptake factors in Sheppard et al. are Kd. As described in Sheppard et al., "sediment solid/liquid partition coefficients, Kd were computed as the ratio of the concentration on the dry solids divided by the concentration in the corresponding pore water." Pore water (interstitial water located between sediment grains) concentrations can be orders of magnitude higher than surface water concentrations (Carling et al., 2013); due to their close contact with sediment, these values correlate much more closely with sediments than surface water. Substitution of these ratios to describe a ratio between surface water and sediment could significantly underestimate future sediment concentrations and, therefore the potential risks from the incidental ingestion of sediment and dermal contact with sediment pathways.Assessing the future sediment load by adding total dust accumulation on each of the receiving water bodies would appear to be a conservative approach. Kd = Csediment/Cporewater Csediment = Kd * Cporewatersubstituting surface water... Csurface_water = 0.0001 CporewaterCsediment = Kd * 0.0001 porewater (underestimation of sediment concentrations)	Assess future sediment quality through an alternate approach than was used in the HHRA, as the referenced uptake factor is not applicable to surface water and may lead to a significant underestimation of sediment concentrations. Alternatively, provide a rationale for the approach taken.	Stantec has communicated with Dr. Sheppard and confirmed the following information regarding the Kd values.Dr. Sheppard's original report to the Nuclear Waste Management Organization (EcoMatters 2009) from which the Journal paper (Sheppard et al. 2010) was extracted provides further details of sediment sampling and processing: "Sediments were collected using either of two methods. Sampling the hypolimnion of lakes where depth was <25 m usually resulted in the capture of soft sediments in the Kemmerer sampler. These sediments were either poured off directly into collection bags and used as a final, discrete sample, or alternatively, poured into collection pails to form composite samples, depending on the quantity of sediment captured. Clearly, profundal sediment samples of deeper lakes (e.g. Quirke Lake) were not possible using this method, and could not be sampled. In other cases, sediments were not soft and could not be obtained using the Kemmerer sampler. Often, in these latter cases, we collected littoral (shallow water) sediment samples using a graduated telescoping pole to which was attached a scoop". The sediment samples were not centrifuged to recover pore water. Rather, when the sediments were collected, they were collected along with overlying water (specifically, water from near the bottom of the lake as captured by the Kemmerer water sampling bottle, or overlying water captured from near-bottom in shallow water using the scoop device). The sediment was allowed to settle and separate from the overlying water which was filtered and analyzed for 55 analytes including trace elements. The corresponding sediments were dried and also analyzed for trace elements. The Kd values (more properly referred to as concentration ratios or CR) were calculated from the trace element concentrations in the water and sediment. Specifically, Dr. Sheppard stated to Stantec as a personal communication "In most cases, it was possible to collect drainage water from the sediment samples [i.e., lake bottom water] as representative of the sediment pore water. In other cases, the water sample from the overlying water [i.e., water from the hypolimnion or metalimnion] was used". As clarified by Dr. Sheppard, although presented as Kd values in the 2010 paper, they are not Kd values in the strict sense of representing water and sediment that are fully in equilibrium with each other. Rather, they should more properly be called concentration ratios, representing the concentrations of trace elements in sediment as compared to concentrations in overlying near-bottom or mid-depth lake water (not the sediment pore water). The data collected and analyses performed by Ecomatters (2009) as published by Sheppard et al. (2010) were intended specifically for the purpose that Stantec has used them for (i.e., as part of a risk assessment process to predict likely future environmental conditions and potential human and/or ecological health risks that could arise as a result of those future conditions) . The correction in terminology (i.e., Kd vs. CR) does not detract from Stantec's use of the data. In fact, combined with the clarification provided by Dr. Sheppard it strengthens and supports Stantec's use of the data.The approach followed by Stantec in the present instance is robust, and the use of the data from Sheppard et al. (2010) is fully appropriate. Reference: EcoMatters. 2009. Field measurements of the transfer factors for iodine and other trace elements. NWMO TR-2009-35, December 2009.	8/Jul/16
35	CEAA-035	The HHRA is based on dustfall estimates from the air model to estimate future concentrations in soil and water which are used directly in the risk assessment (incidental ingestion of soil, dust inhalation) and modelled up into other media (fish, sediment, wild game, cattle) for assessment of country foods consumption. The dustfall estimates were based on a 90% control efficiency for dust from unpaved roads. This value is: (i) unreasonably high for the method proposed; and, (ii) unrealistic to be applied to all days of operation for entire life cycle of Project (construction and operations cases). The Environment Canada calculator tool for unpaved industrial road dust lists a CE value of 55% for watering twice a day and 70% for watering more than twice a day, with an upper limit of 80% for application of chemical treatments. It is important to consider control efficiencies lower than the maximum control efficiency (90%) to show the sensitivity of the HHRA to changes in control efficiencies that have not been proven at site.	Run the air dispersion model for control efficiencies lower than the maximum control efficiency (e.g. 0% to demonstrate worst case scenario, 50%, 70%), and apply these new dustfall values in the HHRA.	Following engagement with the technical working group, KAM submitted an addendum modelling plan (see supplemental memo: 0525_KAM_ Air Quality Modelling Addendum EAO004), which was subsequently reviewed by the working group, and signed off by MOE. The addendum modelling included the requested sensitivity analysis for road and TSF mitigation. Please see the results of this work, as presented in: 0721_KAM_Model Sensitivity_EAO004	21/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
35	CEAA-035.1	Stantec states that mostly due to the change in location and size of the planned tailings beach, the new annual emissions from the tailings are approximately four times the original constant emission rate. Apply the associated new estimated dustfall values in the HHRA. The result of the sensitivity analysis for mitigation for road dust sources shows, "Results for the 80% mitigation efficiency are double those of the 90% mitigation efficiency, and the results for the 70% mitigation efficiency are triple those of the 90% control mitigation efficiency." Per the original IR, apply these dustfall values for the respective mitigation efficiencies in the HHRA to show the sensitivity of the HHRA to road dust mitigation. Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		The potential contribution that the adjusted tailings dust emission rates make to the overall accumulation of metals in soils has been considered in the HHERA calculations. Increases in HQs between Baseline Case and Future Case conditions in Aberdeen range between 0.02% for aluminum to 2.3% for antimony. The increases reflect changes in dust deposition rates for tailings, diesel and road dust (waste rock). All of the recalculated are well below the benchmark of 1.0. The information are included in the HHERA reassessment report. 0221_KAM_HHERA_Reassessment	21/Feb/17
36	CEAA-036	The EIS Guidelines require information about reliance on country foods for each identified Aboriginal group (in Part C). The EIS states that information on traditional harvesting of country foods from these Aboriginal Groups was included in the country foods effects assessment, which was used to inform the selection of plant and animal species to assess; however, consumption levels or reliance on country foods for each Aboriginal group is not discussed. In addition, country foods consumption patterns of non-Aboriginal communities, identified as potentially impacted by the Project, could not be located in the EIS. Failure to incorporate local dietary consumption information on country foods may result in an underestimation of the potential health risk associated with the Project. Health Canada suggests that a tiered risk assessment methodology be applied, incorporating site-specific local and First Nations traditional knowledge, baseline data on contaminant levels in appropriate country foods (e.g. country foods most frequently consumed by Aboriginal groups and non-Aboriginal groups), and dietary consumptions levels, to the extent possible.	Provide baseline information about the reliance on country foods, including but not limited to local fish, cattle, wild meat, root vegetables and fruit, for each Aboriginal group identified in Part C of the EIS Guidelines. Reflect new information in the HHRA relating to consumption rates.	Information on the types of country foods typically harvested from the Jacko Lake area (the area where Project effects are expected to be greatest) by the Aboriginal groups identified in Part C of the EIS submission is provided in Section 12 of the EIS submission (Background and Aboriginal Group Setting). Aboriginal group-specific country food consumption patterns and rates were not available. In the absence of group-specific information, country food consumption rates for First Nations peoples recommended by Health Canada and additional First Nations country food consumption rates specific to the region were selected from the First Nations Food, Nutrition and Environment Study (Chan 2011) for assessing potential country food exposures for Aboriginal receptors under Baseline Case and Future Case conditions. With the exception of fish, country foods were considered to be harvested within the area around Jacko Lake. The information provided in Section 12, suggests that country food harvesting by local Aboriginal groups is not restricted to the Jacko Lake area but occurs across a wide area that extend well beyond the area that could potentially be affected by Project activities. Information provided in Part C indicates that country food harvesting occurs over a much wider area than the area around Jacko Lake. Thus, assuming that all country foods are harvested from within the immediate vicinity of Jacko Lake maximizes the estimate of potential Project effects on country foods and represents a conservative estimate of both Baseline Case and Future Case exposures and maximizes the potential change in exposure and risk that could result from Project activities. The inclusion of group-specific country food consumption rates and patterns would likely serve to lower Project-related country food exposures by reducing the proportion of the country food diet that is harvested from within the area surrounding Jacko Lake. Fish consumption from Jacko Lake was limited to 10% of the total fish yearly fish intake for the Aboriginal and general populations due to the size of Jacko Lake. In addition, information suggests that local Aboriginal peoples have a greater reliance on salmon from the Thompson River system than trout from Jacko Lake and that salmon represents the bulk of the fish consumed on a yearly basis.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
36	CEAA-036.1	Describe why Aboriginal group-specific country food consumption patterns and rates were not available, and any attempts to obtain this information. Provide full reference for Chan (2011) study on First Nations Food, Nutrition and Environment and a rationale for why it was the best alternative for determining country food consumption rates specific to the region. The 10% local food consumption rate proposed (CCME for produce from generic residential land use) may not be protective for local foods consumption in the affected area, especially during high season. Kamloops (especially Knutsford) may be subject to higher agricultural use than the Canadian average. Further, Health Canada 2007 provides fish consumption rates of 20 g/day for toddlers and 40 g/day for subsistence or recreational fishers (Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption. Bureau of Chemical Safety. Last update: Oct 15, 2012). Application of these consumption rates, which are higher than those currently proposed in the EIS, would represent 2 servings of fish every 7.5 days. Per the original information request, reflect local high season consumption rates in the HHRA. Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		Base Case and Application Case metal concentrations in soil will be below the agricultural soil quality guidelines meaning that food would be safe for human consumption in any quantity at any time of the year. In addition, high season consumption occurs for short periods of the year and as such does not reflect a chronic exposure scenario. Rather, high season consumption rates better reflect acute or subacute exposures. As a result the comparison of high season consumption rates to chronic toxicity values to predict potential human health risks inappropriate because these consumption patterns do not reflect the daily continuous exposures that are assumed to occur in the derivation of the chronic TRVs. The high season consumption rates can only be compared to the chronic TRVs if they are converted into yearly-averaged daily consumption rates. Assessing potential human health risks associated with high season consumption rates should more properly be based on a comparison of predicted exposures with acute or subchronic exposure limits. Where acute and subchronic exposure limits are available, these are generally significantly higher than then chronic TRVs and using this approach would not alter the conclusions of the HHRA.	21/Feb/17

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
37	CEAA-037	The EIS states that the analysis of trace metals in rainbow trout was based on whole body analysis (i.e. including bones, scales, skin, and other organs) with the assumption that this would provide a result that over-estimates trace metal concentrations in the consumed portion of the fish. However, this approach does not take into consideration differing consumption patterns and food preparation methods between Aboriginal communities, which may use all parts of the fish, and non-Aboriginal sport fishers, who typically consume only the skinless boneless fillet, as described in section 6.3 of Health Canada's Supplemental Guidance on Human Health Risk Assessment for Country Foods (2010) and may therefore underestimate potential health risks. A similar underestimation of potential exposure to COPCs may result from the methodology described in the EIS whereby trace metal concentrations in the tissues of domestic cattle and wild meat at baseline were modelled by applying chemical-specific uptake factors.	Provide an assessment that considers potential variability in consumption patterns and food preparation methods between different consumers in order to arrive at a conservative estimate of potential exposure to COPCs through consumption of country foods or provide a rationale for the approach taken.	The discussion of fish data provided in Chapter 10.3 notes that whole body data from fish collected in 2014 were used in the assessment but should correctly state that whole body data was used in the ecological risk assessment. Table 10.3-3 which presents the baseline and future case metals concentrations in fish consumed as country foods, lists the baseline and future case metal concentrations present in fillet data. These data agree with the fillet data presented in Table 3.3-25 of the Human Health and Ecological Risk Assessment Technical Data Report (Appendix 10.4-A). It is these data that were used in the assessment of Baseline Case and Future Case exposures and risks associated with fish consumption.The assessment recognized the potential for variation in country food consumption patterns and addressed this through the use of three receptor groups (Kamloops Residents, Ranchers and Aboriginal Receptors) in the assessment of Baseline Case and Future Case exposures and associated health risks. With respect to fish consumption, the assessment focused on fillet consumption and did not directly investigate potential human exposures associated with whole-fish consumption. The potential effect that using fish whole-body metal concentrations could have on metal ingestion exposure and risk estimates has been reviewed. Review of the HQ data for Aboriginal receptors, shows that the highest HQs are predicted for the toddler receptor (pp 1000 – 1023 and pp 1125 – 1129 in the Human Health and Ecological Risk Assessment Technical Data Report – HHERA TDR)). These data show that, based on fish fillet, the contribution of fish consumption to the total ingestion HQ ranges from a minimum of 7.4E-05 for Chromium to a maximum of 4.3E-01 for Lead. A comparison of metal concentrations in fillet and whole body (Tables 3.3-35 and 3.3-26 in HHERA TDR) shows that for some metals, the concentrations in fillets are lower than the concentrations in whole body (Aluminum, Arsenic, Copper, Manganese, Mercury, Selenium, Thallium and Uranium) and for other metals, concentrations are lower in whole body than in the fillet (Chromium, Cobalt, Lead, Molybdenum and Nickel). The data also show that antimony concentrations do not change between fillet and whole body samples. For metals where the whole body concentrations are lower than the fillet concentrations, (Chromium, Cobalt, Lead, Molybdenum and Nickel), the use of the fillet concentrations will over-estimate both exposure and risk and thus, represents a conservative approach for evaluating the change in health risks that could be associated with Project—related activities. For those metals where the whole body concentrations are higher than the fillet concentrations, (Aluminum, Arsenic, Copper, Manganese, Mercury, Selenium, Thallium and Uranium)the use of fillet data will under-estimate the contribution that fish consumption could make to the estimated total exposure. For these metals, using whole body metal concentration data would change the predicted total ingestion HQs as follows: Aluminum 9.39E-02 to 1.31E-01, Arsenic 2.26E-01 to 3.23E-01, Copper 1.74E-01 to 1.87E-01, Manganese 1.10E-01 to 1.17E-01, Mercury 2.01E-01 to 3.07E-01, Selenium 2.21E-01 to 2.59E-01, Thallium 3.52E-01 to 3.90E-01 and Uranium 3.40E-03 to 5.16E-03. Although the total ingestion HQs increase for each of these metals, none of the increases result in predicted HQs that exceed the acceptability benchmark of 1.0, Thus, using metal concentrations in whole body fish rather than fish fillet would not alter the conclusions of the human health risk assessment and would not alter the determination of significance of Project-residual effects on human health. Therefore, the use of fillet data in assessing potential human exposures to metals in fish is a reasonable approach for assessing the potential changes in exposure and risk associated with the change in metal concentrations in fish tissue that could be associated with Project-related activities.	8/Jul/16
37	CEAA-037.1	Information request #23 provided a rationale for conducting further fish sampling to ensure results are representative of fish populations in Jacko Lake. In addition, evidence suggests that Aboriginal communities may use all parts of the fish (HC Supplementary Guidance on HHRA for Country Foods, 2010). This information (i.e. potential variability in consumption patterns and food preparation methods, as per the original IR) needs to be integrated into the HHRA. Conduct the HHRA assessment using a larger fish of a size that would typically be consumed by people (items 23 & 24), and include analysis of consumption of whole fish in order to account for variable uptake of metals into different parts of the fish. Consider all comments relating to inputs to the HHRA (e.g., comments relating to changes to future fish concentrations based on new fish data, changes to tailings quality data, changes to soil mixing depth, etc.) and then recalculate risk estimates.		Additional fish sampling was conducted in 2015 included fillet and whole body metal concentrations for fish that range between 105 g and 513 g. In total 17 fish were collected between 2014 and 2015 with weights ranging between 62.8g and 513 g. Metal concentrations in whole body and fillet were plotted against body weight to determine whether metal concentrations increased with increasing weight and age. For most of the metals identified as COPCs in the HHERA, metal concentrations in fish (both whole body and fillet) showed no measurable change in metal concentration with increasing fish weight. Aluminum and copper were the exceptions to this. For both aluminum and copper metal concentrations in fish (whole body and fillet) were higher on a mg/kg wet weight basis in the smaller fish than the larger fish. These data suggest that metal concentrations (on a mg/kg wet weight basis) do not increase with increasing fish size (age) and that the use of the younger smaller fish to assess potential human exposures will not under-estimate exposures for Aboriginal and non-aboriginal people who consume fish from Jacko Lake. The trend analysis presenting the results of this assessment are included in the HHERA reassessment report. 0221_KAM_HHERA_Reassessment	21/Feb/17

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
38	CEAA-038	DFO's Fisheries Protections Policy Statement establishes the requirement for proponents to take measures to avoid and mitigate impacts to the extent possible. The Policy specifies that proponents should demonstrate that measures and standards have been fully applied before considering measures to minimize (mitigate) impacts in question.The current assessment of alternative open pit designs does not demonstrate whether alternatives are available or have been considered, which may include a combination of open pit relocation farther away from Jacko Lake and the application of both open pit and underground mining technology.In addition, the current assessment of Peterson Creek diversion alternatives does not appear to consider the redesign of infrastructure to avoid the necessity to relocate Peterson Creek.	To support the proponent's assertion that avoidance of impacts to Jacko Lake is not possible, provide an assessment of alternative open pit development options, including other mining methods, that demonstrate that avoidance of impacts to Jacko Lake is not possibleTo support of the proponent's assertion that relocation of Peterson Creek is necessary, provide an assessment of alternatives to demonstrate that avoidance of impacts to fish habitat in Peterson Creek is not possible.	Please refer to supplemental memo: 0706_KAM_CEAA 038 IR Response Memo	8/Jul/16
38	CEAA-038.1		The alternatives assessment does not include consideration of the originally proposed preferred design option presented in 2011. The original design involved only a partial loss of the Mine Bay Arm (North East Arm) of Jacko Lake. When the project was revised in 2014, this option was replaced with the loss of the entire Mine Bay Arm of Jacko Lake. To support the proponent's assertion that avoidance of impacts to Jacko Lake is not possible, conduct an alternatives assessment and provide the results that include consideration of this original design with only a partial loss to the Mine Bay Arm of Jacko Lake.	Please refer to supplemental memo: 1120_KAM_Open Pit Alternatives to Avoid Jacko Lake	30/Nov/16
39	CEAA-039	The EIS indicates that the northeast arm of Jacko Lake represents 4.2% of the total Jacko Lake area and 9.4% of the total littoral area shallower than 3 m. Further information is needed to assess the individual contributions of each of the four bays. This information will allow for considerations of magnitude and significance of the loss of the northeast bay and relocation of the Peterson Creek outlet.Additional information is needed to quantify the exisiting littoral habitat, specifically the four bays that provide littoral habitat and the shoreline that may also provide littoral habitat. The quantification should outline the threshold depths used for this determination, and assess the changes to the existing littoral habitats and raising of the water level, changes in flow patterns resulting from relocation of the Peterson Creek outlet, changes to productivity to the current outlet, and changes in productivity to the littoral zone resulting from annual manipulations of Jacko Lake water levels to address needs of downstream water license holders.	Provide maps and quantification of existing littoral habitats in Jacko Lake, specifically the four bays that provide littoral habitat and the shoreline thay may provide littoral habitat.	Please see supplementary memos 0706_KAM_Fish Habitat and Fisheries Offsetting Plan and 0706_KAM_Peterson Creek Diversion System Update.The revised Conceptual Fish Habitat Offsetting Plan includes a figure and quantification of littoral habitat in Jacko Lake. Please see Section 2.3 of 0706_KAM_Fish Habitat and Fisheries Offsetting Plan for details. Jacko Lake includes five distinct arms that make up most of the littoral area in the lake. The size of each arm was determined by calculating the surface area shallower than 3 m (at the normal full pool lake level of 892 masl) as shown on Figure 2-8 of the revised offsetting plan. The area of each arm and its relative proportion to the total littoral area of Jacko Lake is presented in Table 2-2 of the offsetting plan. This information is provided in response to this Information Request (IR) and DFO-041 to provide detailed mapping and quantification of the existing littoral habitats within Jacko Lake. In addition KAM has updated the Peterson Creek Diversion System design in response to feedback to comments and concerns raised by the working group. The design no longer includes pumping flows north of the open pit. The design includes retaining water flow through the southeast arm so that impacts to this area of Jacko Lake will be avoided. Please see supplementary memo 0706_KAM_Peterson Creek Diversion System Update for details of the design changes to avoid and minimize impacts to fish habitat, wildlife habitat and the Aboriginal and recreational fisheries on Jacko Lake and Peterson Creek.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
39	CEAA-039.1		Clarify how the amount and quality of littoral habitat at the various depth ranges provided in the conceptual offsetting plan will change with annual lake level changes and manipulations to address downstream users needs and water balance losses. Provide a description of how lake levels will change relative to the baseline on a daily and monthly time step with consideration of daily seepage losses to the pit, reductions in watershed contributing area and proposed increased storage in the lake from the creation of an additional arm. Provide an assessment of the changes in lake level on a fine time step, including how any changes will impact the amount and quality of littoral habitat, and the timing, magnitude and number of spilling days into the outlet of Peterson Creek, with emphasis on the spillway and the critical timing windows for rainbow trout spawning in the area.	KAM has conducted additional assessment of predicted changes to littoral habitat in Jacko Lake that may result from proposed offsetting measures including expansion of the West Arm of Jacko Lake. Please see supplemental memo 1130_KAM_Littoral Habitat Information for details.	30/Nov/16
40	CEAA-040	A clear quantification of impacts to the entire length of Peterson Creek up to the Peterson Creek diversion pond dam, particularly how they relate to the Aboriginal fishery in Peterson Creek, is required to assess the magnitude and significance of the loss of Peterson Creek.The quanitfication should outline existing habitat types within the affected areas of Peterson Creek and the area represented by each habitat type. The quantification should identify those stream segments that may support adult rainbow trout spawning and holding during spring freshet periods.	Provide a quantitative assessment of direct impacts to Peterson Creek that considers the impact extending to the Peterson Creek diversion pond dam.	Please see supplementary memos 0706_KAM_Peterson Creek Diversion System Update and 0706_KAM_Fish Habitat and Fisheries Offsetting Plan.The Peterson Creek Diversion System design has been revised to account for working group comments and concerns related to impacts to the Aboriginal fishery in Peterson Creek, fish habitat losses in Peterson Creek, water rights on Peterson Creek and fish habitat in Jacko Lake related to changes in flow through the southeast arm of the lake. The revised design includes retaining an open section of Peterson Creek downstream of the replacement dam and diverting flows into a 2.7 km buried culvert that will discharge to Peterson Creek east of the mine site. The revised design no longer includes the intake and pumphouse in and on Jacko Lake, the 3.6 km pipeline north of the Open Pit, or the Peterson Creek Downstream Pond. Please see details of the revised PCDS design described in 0706_KAM_Peterson Creek Diversion System Update and the Fish Habitat and Fisheries Offsetting Plan (0706_KAM_Fish Habitat and Fisheries Offsetting Plan). The revised offsetting plan includes measures proposed to offset the expected impacts for the design changes to the PCDS. The revised offsetting plan also includes a clear quantification of impacted habitat types and how they relate to the Aboriginal fishery for the portion of Peterson Creek that will be impacted.	8/Jul/16
40	CEAA-040.1		The Fish Habitat and Fisheries Offsetting Plan provides information on current habitat types in Peterson Creek; however, information quantifying the amount (typically in habitat units) and types of fish habitat and riparian areas to be destroyed or permanently altered as a result of the Project (including the dam, channelization, and 2.7 km culvert) is not presented. Per the original IR, provide a quantitative assessment of direct impacts to Peterson Creek that considers the impact extending to the equivalent location of the formerly proposed Peterson Creek diversion pond dam or the end of the 2.7 km pipeline, whichever is further downstream.	The revised Fish Habitat and Fisheries Offsetting Plan quantifies the amount and types of fish habitat and riparian areas to be destroyed or permanently altered as a result of the Project (including the dam, channelization, and 2.7 km culvert) in habitat units. Please see Table 3-10 on page 72 entitled "Habitat Units for the Impacted Portion of Peterson Creek Below Jacko Lake". In addition, Table 6-1 on page 138 presents a summary of Fish Habitat losses and gains in habitat units and surface area. The net balance of fish habitat losses and gains/offsets is presented in Table 6-7. Based on habitat units, the total losses are 10,591 for Peterson Creek (stream), 26,606 for the northeast and southeast arms of Jacko Lake (lake), and 13,853 for riparian (stream and lake combined). The habitat unit gains from proposed offsets are 3,144 for Peterson Creek (stream), 38,784 for the West Arm (lake), and 25,223 for riparian (stream and lake combined). The offsetting ratio achieved for stream is 0.3, lake is 1.5, and riparian is 1.8. The combined offsetting ratio based on habitat units is 1.3. Habitat unit gains/offsets of 67,151 are 16,100 greater than the losses of 51,051. For comparison the surface areas for fish habitat losses and gains/offsets are also provided.	30/Nov/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
41	CEAA-041	The EIS does not present enough information to understand the effects to fish and fish habitat in Kamloops Lake and downstream Thompson River habitats resulting from the Kamloops Lake water intake.This assessment should focus on salmonid migration (juvenile and adult), salmonid and mountain whitefish shoreline rearing, and lake rearing by juvenile sockeye salmon. The assessment should include quantification of impacts of the proposed water intake construction and water withdrawals on the assessed habitats and fish communities and the expected life cycle stages, and consider the aerial extent of the predicted worst case scenario change in Thompson River hydraulic parameters, specifically during lowest lake level periods.	Provide fish habitat and fish utilization assessments for the proposed Kamloops Lake intake location and Thompson River downstream habitats that may be affected by flow reductions.	KAM considers the aboriginal, recreational and commercial salmon fishery on the Thompson River a critically important resource to the people of British Columbia. We recognize the importance of the aboriginal fishery to the citizens of SSN. As part of the Application/EIS, KAM considered potential effects of the Project on salmon that support a critically important aboriginal, recreational and commercial fishery in the Thompson River including Kamloops Lake. There will be no impacts on rearing or spawning habitat or migration corridors for salmonid species in Kamloops Lake. KAM is intending to restore the closed water intake infrastructure previously operated by Teck to provide freshwater for the Ajax Project. Upgrades to this existing intake and pump house will be required to provide freshwater for mineral processing at the Project plant. These improvements include modifications and replacement of the existing pumps, piping and electrical systems – in order to complete the work around the intake line pipe near the pumphouse approximately 300 m2 will require excavation, of which approximately 60 m2 will be below the historic annual average water level of the lake. A coffer dam will be required around the edge of the excavation and a plug in the intake pipe will likely be required for this portion of the excavation to keep water out if this work is conducted at high lake levels - no disturbance to wetted areas will be necessary if the work is completed during early spring when lake levels are low. The existing intake structure below the design low water level will be fitted with two new intake screens and a concrete base. Installation will be completed by commercial divers - no additional footprint area is associated with the intake in the lake. Since there will be no increased footprint of the intake within the lake there will be no effect on salmon migration or habitat. An assessment of reduced flows associated with the Project is presented in detail starting on page 6.7-46. The flow assessment focussed on the widest and shallowest transects (cross sections) at the Kamloops Lake outlet and predicted that wetted widths during an extreme low flow event (lowest recorded 7-day low flow in the 41 years of record) would range from approximately 56 m to 127 m - factoring in reduced Project operation flows, wetted widths were predicted to decrease by 6 cm to 21 cm. Maximum depths at the lake outlet transects ranged from 1.09 m (at the widest transect) to 5.30 m. The width of Kamloops Lake at the intake location is approximately 1500 m and the maximum depth in the thalweg at this cross section is estimated as 120 m. It is therefore reasonable to expect that any changes in wetted width and depth at the intake location would not be measureable. Because no measureable changes in water quantity, water quality, or habitat are expected to occur in the North or South Thompson rivers or in Kamloops Lake after consideration of Project design and mitigation measures, no residual effects to fish (including salmon) are anticipated. Therefore fish habitat and utilization assessments for the intake location and downstream habitats are unnecessary.	8/Jul/16
41	CEAA-041.1		The proponent has not provided fish habitat and fish utilization assessments for the proposed Kamloops Lake intake location and Thompson River downstream habitats that may be affected by flow reductions. Per the original IR, conduct fish habitat and fish utilization assessments in the area of the proposed intake and Thompson River downstream habitats to support an understanding of potential impacts to fish habitat and of potential risks of entrainment into the pipe and whether end of pipe screens are adequately sized. As part of this assessment, clarify whether any groundwater inflow locations are present in the footprint of the area to be disturbed by the intake.	Please see supplementary memo 1117_KAM_Kamloops Lake Intake Upgrades, Fish Presence and Habitat Utilization for response to this Information Request.	30/Nov/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
42	CEAA-042	The EIS identifies a 4.5 ha area of Kamloops Lake wetted area that will be affected by the proposed water intake, but there is no description of the habitat types or quantification of those habitat types.	Provide an assessment of the foreshore and lake habitats, including quantification of those habitats, that will be affected by construction and operation of the freshwater supply intake.	Please see supplementary memo 0706_KAM_Fish Habitat and Fisheries Offsetting Plan.The 4.5 ha disturbance area for the intake site in Kamloops Lake reported in the Application/EIS was based on an outdated design and presented in error. There will be no impacts on rearing or spawning habitat or migration corridors for salmonid species in Kamloops Lake. No fish sampling was conducted in Kamloops Lake at the proposed intake site during baseline sampling as stated on page 6.7-23. A Fish habitat survey (snorkel survey) was completed in April 2016 at the intake site. The same observations on fish habitat were made in 2016 as was presented in the EA: "Kamloops Lake near the proposed intake site, approximately 10 km west of Kamloops, has a steep rip-rap embankment and an un-vegetated mixed boulder and cobble shoreline with no aquatic macrophytes. Due to the large size of substrates along the shoreline the area provides poor quality spawning habitat for most species of fish"KAM proposes to restore the closed water intake infrastructure previously operated by Teck to provide freshwater for the Ajax Project. Upgrades to this existing intake and pump house will be required to provide freshwater for mineral processing at the Project plant. These improvements include modifications and replacement of the existing pumps, piping and electrical systems – in order to complete the work around the intake line pipe near the pumphouse approximately 0.03 ha will require excavation, of which approximately 0.006 ha will be below the historic annual average water level of the lake. A coffer dam will be required around the edge of the excavation and a plug in the intake pipe will likely be required for this portion of the excavation to keep water out if this work is conducted at high lake levels - no disturbance to wetted areas will be necessary if the work is completed during early spring when lake levels are low. The existing intake structure below the design low water level will be fitted with two new intake screens and a concrete base. Installation will be completed by commercial divers - no additional footprint area is associated with the intake in the lake. Please see Section 3.4.3 of the Revised Fish Habitat and Fishery Offsetting Plan for further details. Since there will be no increased footprint of the intake within the lake there will be no effect on salmon migration or habitat.	8/Jul/16
42	CEAA-042.1		Provide an assessment of foreshore and lake habitats that considers possible mortality from fish entrainment. DFO advises the proponent first consider avoidance and then mitigation of risks of fish mortality resulting from entrainment into the pipe. The proponent's response references impacts below the historic annual average water level of the lake. Provide a definition of "historic annual average water level". Confirm whether this is different from mean annual water level, and if so provide the area to be impacted which is below the mean annual water level, consistent with standard practice.	Please see supplementary memo 1117_KAM_Kamloops Lake Intake Upgrades, Fish Presence and Habitat Utilization for response to this Information Request.	30/Nov/16
43	CEAA-043	The EIS Guidelines state that potential effects to be assessed include "loss of fish habitat and altered fish distribution and abundance in Peterson Creek downstream of the area resulting from reduced flow." Appendix 6.7-D notes that wetted width and flows will be reduced but does not provide a quantification of habitats and types that would be affected.	Provide a quantification (by habitat type and stream reach) of Peterson Creek fish habitats that will be permanently altered as a result of permanent instream flow reductions, including flow reduction impacts from the Peterson Creek Diversion Pond to the confluence with the Thompson River.	Please see supplementary memos 0706_KAM_Fish Habitat and Fisheries Offsetting Plan and 0706_KAM_Peterson Creek Instream Flow Requirements. Thank you for the comment and information request. The Conceptual Fish Habitat Offsetting Plan submitted with the Application/EIS has been revised to account for this comment and others from the working group. Please see Section 3.3.1 of 0706_KAM_Fish Habitat and Fisheries Offsetting Plan for a quantification of fish habitats that will be altered by reduced instream flow in Peterson Creek. In addition Knight Piésold Ltd. (KP) was retained to provide an assessment of instream flow requirements to maintain fish and fish habitat in Peterson Creek due to the proposed Ajax Mine Project. The previous assessment submitted with the Application / EIS has been updated for changes to the Peterson Creek Diversion System design and updated water balance model. Please see supplementary memo 0706_KAM_Peterson Creek Instream Flow Requirements for details. Flow thresholds were calculated to identify whether the predicted flow reductions are expected to result in risk to fish, fish habitat, and productive capacity in Peterson Creek. This analysis indicates there is minimal risk to fish habitat during April to September but that more detailed studies may be undertaken to assess conditions and potential impacts during October to March during permitting. Instream habitat data (mesohabitat and microhabitat scales) were collected in Peterson Creek and show relatively small change in habitat at low flow conditions, but data were not collected at conditions as low as the predicted winter conditions during Project Construction, Operation And Post-Closure. KAM will work with DFO as part of the Fisheries Act Authorization Application to develop a modeling plan to analyze impacts to fish habitat during low flow periods if the habitat biologist believes necessary.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
43	CEAA-043.1		Thresholds for flow needs were calculated using Hatfield et al. (2003) BC instream flow guidelines. These guidelines were developed for hydro projects to recommend flow thresholds of the minimum water levels that were required in streams with seasonal adjustments to meet seasonal instream flow needs. Peterson Creek streamflow is already heavily altered and not indicative of the natural streamflow. Using current stream flows, which are altered and manipulated, as input for the model as opposed to more natural stream flow (e.g., Hatfield) may result in an underestimation of flow requirements during the sensitive low flow periods and may not be protective of instream flow needs for Peterson Creek. Provide an appropriate quantification of altered habitat within Peterson Creek, or provide a rationale for the approach taken. Since the rainbow trout population is expected to be affected during the low flow periods, provide an assessment of these effects to both the rainbow trout habitat and populations. According to the response, HSI modelling was done using rainbow trout fry. Clarify how the HSI model results would change if adult rainbow trout were used rather than fry. Overwintering habitat is assumed to be very limited in middle Peterson Creek above the falls and is essential to maintaining the resident rainbow trout population in middle Peterson Creek. Clarify how this habitat will be affected by the Project and the anticipated effects to the resident rainbow trout population. Modelling results presented in relation to flow reductions indicated that resident and overwintering fish may be at risk during the low flow winter months. Further characterisation of this risk is required with special consideration to potential winter kills. If winter kills are anticipated of resident or overwintering fish, include this in the serious harm description and offsetting plan. In the summary section on the Instream Flow Requirements Memo, it is stated that potential effects to Peterson Creek during very low flow conditions could be mitigated by releasing flows from Jacko Lake to augment winter low flows. Clarify whether there is enough water storage in Jacko Lake to apply this mitigation given the needs of downstream users later in the year. Clarify what monitoring plans are proposed to verify the effects assessment prediction of no-to-minimal effects to the resident rainbow trout population above bridal falls and to the salmonid populations overwintering below the falls to the mouth of the Thompson.	Thank you for the comments and recommendations. Please refer to supplemental memo 1124_KAM_Middle Peterson Creek Fish Habitat Impacts for response.	30/Nov/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
44	CEAA-044	Fish and fish habitat was identified as a valued component based on its importance to the recreational and Aboriginal fisheries. The EIS has numerous references to fishing activities of the SSN and recreational fishing in Jacko Lake. There is no estimate of the scale and magnitude of fishing.	Provide a quantification of the existing recreational trout fisheries in Jacko Lake and an estimation of the economic and social value of these fisheries.	The following text is excerpted from Section 5.6.2.1 of the revised Fish Habitat and Fisheries Offsetting Plan (see supplementary memo 706_KAM_Fish Habitat and Fisheries Offsetting Plan) which was drafted to respond to this comment. The existing rainbow trout fishery, measured as the number of angler days, has been highly variable over the years. The number of angler days on Jacko Lake was reported as 6,285 in 1986 (R. Bison, 1989. Jacko Lake Creel Census 1986). Estimates from FLNRO (pers. comm.) for the 1986 - 1991 period averaged 3,166 angler days. The average angler days increased in the 2000 - 2004 period to 4,245 and decreased in the 2008 - 2010 period to 4,094.Estimates of the existing rainbow trout fishery and social value of Jacko Lake are presented in Section 8.6 (Outdoor Recreation). Section 8.6 notes that the presence of the Project will remove certain areas and landscape features from public use and restrict access to other areas; these changes may affect the ability of individuals to access certain sites and engage in outdoor recreational activities. The Social Value of residual effects of the Project, including reduced opportunities for fishing (page 8.6-42) was rated as low, since the region offers many similar recreational opportunities to fish. Within the Thompson sub-region there are 1,100 sports fish lakes and 12 major large lakes, as well as 15 major anadromous / inland river systems that support 1 million angler days (presentation by the FLNRO small lakes biologist to the TWG in April 2015). The Freshwater Fisheries Society of BC, 2013 BC Freshwater Sport Fishing Economic Impact Report analyzes economic expenditures of freshwater fishing in BC. The total number of angling days in BC in 2010 (latest available data) was 3.8 million and total angling expenditures were $172.9 million. Based on this, the expenditure per angling day in 2010 was approximately $33 for BC residents, $108 for other Canadian anglers, and $238 for international anglers. The estimated angling days on Jacko Lake in 2010 was 3,167: if the BC/Can/Int distribution of anglers is the same as for the Thompson-Nicola region then total 2010 Jacko Lake estimated expenditures would be $138,485. This value assumes that anglers fish solely on Jacko Lake - many people fish the lake in the early spring and late fall, and move to other lakes in the summer. Using the Bank of Canada Inflation Calculator, if the expenditures per angling day have remained the same since 2010, Jacko Lake would contribute $153,359 to the provincial economy.The loss of fishing activity on Jacko Lake would not remove this expenditure or economic activity from the provincial economy. BC Resident anglers could be expected to replace these expenditures with expenditures elsewhere in the provincial economy. Even Non-BC residents (Canada/International) could elect to continue fishing within BC but at other locations. As stated in the 2013 BC Freshwater Sport Fishing Economic Impact Report “Economists separate residents and non-residents because if a BC resident spends money fishing, it’s money that most likely would have been spent in the province anyway.” (Freshwater Fisheries Society of BC, 2013) It also assumes that anglers fish solely on Jacko Lake - FLNRO and others have noted that many people use the lake in the early spring and late fall, and move to other lakes in the summer.	8/Jul/16
45		Numbering error. There is no IR #45.			

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
46	CEAA-045	The EIS Guidelines require that "a description of how the existing water supply facilities used by the old Afton Mine will be upgraded to supply fresh water from Kamloops Lake." The EIS Guidelines state "the Project components that will be considered in the effects analysis for fish and fish habitat ... include …water withdrawal from Kamloops Lake". The EIS notes that "upgrades to this existing water intake and pumphouse will be required." There is no description of what these upgrades will be, and no effects analysis for fish and fish habitat.	Provide details regarding the upgrades to the water intake system in Kamloops Lake, with particular reference to design for fish values (e.g., screen design, method of installation, screen maintenance and cleaning). Provide an assessment of fish presence (species and fish size) in the vicinity of the water intake structure(s).	KAM is intending to restore the closed water intake infrastructure previously operated by Teck to provide freshwater for the Ajax Project. Upgrades to this existing intake and pump house will be required to provide freshwater for mineral processing at the Project plant. These improvements include modifications and replacement of the existing pumps, piping and electrical systems – in order to complete the work around the intake line pipe near the pumphouse approximately 300 m2 will require excavation, of which approximately 60 m2 will be below the historic annual average water level of the lake. A coffer dam will be required around the edge of the excavation and a plug in the intake pipe will likely be required for this portion of the excavation to keep water out if this work is conducted at high lake levels - no disturbance to wetted areas will be necessary if the work is completed during early spring when lake levels are low. The existing intake structure below the design low water level will be fitted with two new intake screens and a concrete base. Installation will be completed by commercial divers - no additional footprint area is associated with the intake in the lake. Since there will be no increased footprint of the intake within the lake there will be no effect on salmon migration or habitat. The intake screen has been designed by Urban Systems in consideration of the Freshwater Intake End-of-Pipe Fish Screen Guideline published by DFO. Although this guideline is intended for water extractions up to 0.125 m3/s, there are no published guidelines for flows higher than this. The guideline was developed to provide protection of freshwater fish with a minimum fork length of 25 mm. Approach velocities of approximately 0.11 m/s are recommended for fish with subcarangiform swimming modes (e.g. trout, salmon) and 0.038 m/s are recommended for fish with anguilliform swimming modes (e.g., lamprey). The screen has been designed to meet the more conservative approach velocity of 0.038 m/s and will have an area of 11 m2.Noted in Section 6.7.2.3 of the Application/EIS, northern pikeminnow, sculpins, and lamprey were captured during electrofishing in 2011 during monitoring for the New Afton intake, located immediately adjacent to the Ajax intake. Juvenile salmonids may be present in the vicinity of the intake during outmigration to the ocean. Juvenile chinook and coho salmon migrating downstream from the Shuswap River system are typically found in back eddies and slack water areas near tributary streams and overhanging vegetation (Distribution of Juvenile Chinook, Coho and Sockeye Salmon in Shuswap Lake – 1978-1979. Russell et al. 1980). Yearling Coho smolts range in size from 70-120 mm while 2 year old smolts are typically 100-150 mm; sockeye salmon smolt yearlings are 60-90 mm and 2 year old smolts are 100 – 120 mm; chinook smolt sizes have been reported as 70-82 mm and 90-170 mm (McPhail, J.D. 2007. The Freshwater Fishes of British Columbia)	8/Jul/16
47	ECCC-098	The EIS Guidelines require that effects of seepage from the Tailings Storage Facility and WRSFs be assessed.The Edith Lake Fault Zone (ELFZ) has been identified in the Application as a 50 - 60 m wide, nearly vertical, high permeability zone, trending northwest from Edith Lake, running underneath the area of proposed waste rock and tailings storage facilities and intersecting the southwest arm of Jacko Lake. The ELFZ could potentially act as a local groundwater flow conduit along strike in the vicinity of Jacko Lake.	Determine whether the ELFZ could become a preferential groundwater seepage pathway between the proposed waste rock and tailing storage facilities and Jacko Lake. Provide the results from an assessment of effects on VCs that are influenced by water quality and quantity, depending on the preferential direction of flow, that takes into account this seepage pathway between the waste rock and tailings storage facility and Jacko Lake .	The ELFZ was considered using sensitivity studies with the numerical groundwater flow model for the EA (i.e., see Appendix 6.6-A and Appendix 6.6-D). Additional sensitivity simulations were performed to address information requests during the EA review period (see supplementary response memo 0706_KAM_ELFZ_Model_BGC-002).	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
47	ECCC-098.1		Edith Lake Fault Zone Conductivity:See complete comment in Memo; 2016.12.05 Agency Letter Re Ajax Response Adequacy & Technical CommentsTo allow the Agent to determine whether additional information and /or investigation relating to the conductivity of the ELFZ is required, provide the following information:- Cross-sections, similar to Figure 2 from memo 0706_KAM_ELFZ_Model_BGC-002, showing particle paths for each of the scenarios depicted in Figures 8 to 11 from the memo; - Conservative estimates of the proportion of particles entering Jacko Lake (top of the lake bed) versus all particles leaving the mining facility; and - An assessment of the impacts of the ELFZ on Jacko Lake water quality by using these proportions as proxies, as well as the travel time through the lake bed, to conservatively estimate the impact on water quality (including a discussion on the limitations of the approach and on the possible need for a more complex transport model and /or investigation).Monitoring and Management:- A detailed monitoring/management plan that allows early detection of the chemistry and flow rate of all seepage, including in the ELFZ (Natural Resources Canada recommends KGHM consider hydraulic head measurements to help understand and detect changes to flow rates of seepage);and - A description of the corrective actions that would be taken in the event that measured chemistry and flow rates differ from those predicted and present a risk to Jacko Lake water quality.	Please refer to response memo 0123_KAM_BGC-026_ECCC_098-1	24/Jan/17

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
48	ECCC-099	The EIS Guidelines require assessment of potential project effects on “a listed wildlife species … defined in subsection 2(1) of the Species at Risk Act.” The EIS Guidelines require that mitigation measures be identified “that are technically and economically feasible that would avoid or mitigate the environmental effects …” Rare plant surveys were conducted during flowering and fruiting season; however, surveys did not capture the entire waterline and powerline, although construction and operation activities will be conducted there. An occurence of Alkaline Wing-nerved Moss (SARA-threatened) was found during surveys. Section 6.8.4.2 states that an Alkaline Wing-nerved Moss (SARA-threatened) occurrence may be lost as a result of the project. Where a project is planned in habitat that would possess the attributes of Alkaline Wing-nerved Moss critical habitat, and loss of those critical habitat attributes is predicted, this loss would have an adverse effect on the species that could be significant if not fully mitigated because it would be likely to jeaopardize the survival and recovery of the species.	Conduct additional Alkaline Wing-nerved Moss surveys following RISC standards to capture the entire waterline and powerline where project work will be undertaken. Survey stations should include the same locations as previous years as well as additional ones to account for un-surveyed features. Provide an updated effects assessment that incorporates any additional survey work conducted.Provide maps showing draft critical habitat for Alkaline Wing-nerved Moss with a 50 m buffer in relation to Project components. As these maps would contain sensitive information, provide maps solely to Agathe.Lebeau@canada.ca with the Canadian Wildlife Service.Provide information on how impacts to occurrences of Alkaline Wing-nerved Moss, including with a 50m buffer around each occurrence, would be avoided. Information should consider all technically and economically feasible measures and alternatives, including but not limited to re-routing of linear features and footprint minimization.Alternatively, provide a rationale for why additional Alkaline Wing-nerved Moss surveys are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.	Please refer to supplementary memo: 0708_KAM_Critical HabitatMapping will be provided to CWS directly, as requested.Please also refer to 0707_KAM_EphemeralWetlands	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
49	ECCC-100	The EIS Guidelines require field surveys be used to: - Confirm presence of target species, - Confirm habitat associations of target species, and - Confirm habitat characteristics and accuracy of the typed polygons within mapped areas.Populations of Monarch (SARA-special concern) can vary from year to year, and according to RISC (1998) “Because the phenology of species are very variable, even within a single taxon, sampling must be carried out for an extended period, usually over the whole active season”. From the information provided, the level of replication of surveys within one season (one year) and among years is unclear. Sufficient sampling effort should be made to account for seasonal and inter-annual variation in occurrence of Monarch.The effect of habitat loss for Monarch cannot be quantified as part of this EA because no targeted butterfly foodplant surveys were conducted. The federal Management Plan for the Monarch identifies an objective to “mitigate threats to Monarch and ensure that there is sufficient breeding, nectaring and staging habitat in Canada to maintain the current Canadian contribution to the overall North American Monarch population” for managing Monarch populations. One of the main threats to Monarch is the loss of breeding habitat.	Conduct additional Monarch surveys following RISC standards to ensure that breeding and nectaring habitat have been surveyed for more than one year. Survey stations should include the same locations as previous years as well as additional ones to account for un-surveyed features. Provide an updated effects assessment that incorporates any additional survey work conducted.Alternatively, provide a rationale for why additional Monarch surveys are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.	No additional surveys for monarchs are planned at this time due to a substantial invertebrate survey effort previously and a greater association of monarchs with the bunchgrass biogeoclimatic zone which will be negligibly affected by the Project. Butterflies in general and monarchs specifically are not mentioned in the SSN Cultural Heritage Study (Ignace et al. 2014) nor in the Trout Children's Story Addenda or in other relevant chapters of the environmental assessment application. Surveys for monarch and other invertebrate species were conducted in the Local Study Area (LSA) following BC Resources Information Standards Committee (RISC) standards (RIC, 1998). Invertebrate surveys were carried out over a three year period (2010, 2011, and 2014). Targeted species included monarch butterfly (blue-listed in BC, and federally-listed as Special Concern on Schedule 1 of the Species at Risk Act), Nevada skipper (provincially blue-listed), common sootywing (provincially blue-listed), California hairstreak (provincially blue-listed), and olive clubtail (provincially red-listed and designated as Endangered by COSEWIC). Surveys were scheduled to target times of the year when indicator species were most likely to be present. Invertebrate surveys were carried out from June 19 to 23, 2010, June 25 to 26, 2011, July 25 to 28, 2011, June 18-20, 2014, and August 7-10, 2014 and totaled over 142 hours of survey effort (Section 6.11.3.4, page 6.11-18). These surveys targeted areas where host plants and appropriate habitat was present. Surveys were also carried out during the Nevada skipper flight period from May 26 to 28 in 2015 (Section 6.1.3.4, page 6.11-18). Figure 6.11-5 (page 6.11-19) demonstrates survey sampling locations within the LSA by year. Species accumulation curves generated from invertebrate observations during baseline studies indicate that 72% of dragonfly species and 82% of butterfly species were observed during invertebrate surveys and highlights that an appropriate amount of survey effort was conducted within the LSA. None of the listed indicator species were observed during baseline studies, despite being known to occur in the region (B.C. Conservation Data Center, 2014) and having previously been observed in and near Kamloops (Appendix 6.8-A). However, all of the previously documented locations for indicator species were in the bunchgrass biogeoclimatic zone which only comprises a small portion (18%) of the LSA. No proposed infrastructure for the Project are anticipated to occur in areas where bunchgrass is present within the LSA, with the exception of the currently existing water intake pipeline corridor, and the proposed powerline corridor. Currently a proposed Management Plan for monarch exists in Canada (Environment Canada 2014) but no recovery strategy. The objectives of the management plan in Canada include mitigating the threats to monarch and to ensure that there is sufficient breeding, nectaring, and staging habitat in Canada to maintain current Canadian contribution to the overall North American monarch population (Environment Canada 2014). Mitigation measures for the project include the enhancement of grassland habitat on KAM owned lands which will also protect and enhance potential habitat for monarch. As a result of the large survey effort for targeted invertebrate species, lack of detection within the LSA, minimal amount of suitable habitat within the LSA, and proposed mitigation to enhance grassland habitat on KAM owned lands, the effects of the Project on targeted invertebrate species were assessed as negligible.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
50	ECCC-101	Preliminary analyses indicate that the Project is predicted to result in the loss of critical habitat for Great Basin Spadefoot (SARA-threatened). This loss of critical habitat would have an adverse effect on the species that could potentially jeopardize the survival and recovery of the species if not fully mitigated. The EIS Guidelines require assessment of "habitat alteration and loss associated with … removal of vegetation" that would affect target amphibian species.It appears that terrestrial habitats (for summering and wintering) for amphibians were not included in the effects assessment. Establishing a good understanding of amphibian movements and use of terrestrial habitats is necessary to inform the development of effective mitigation and monitoring measures. Terrestrial habitats are important habitats for feeding and overwintering and the biological interdependence between terrestrial and aquatic habitats is essential for the persistence of populations.	Conduct additional amphibian surveys following RISC standards to ensure that Great Basin Spadefoot breeding sites (larvae), movement corridors (road) and auditory response (wetlands) have been surveyed for more than one year. Survey stations should include the same locations as previous years as well as additional ones to account for un-surveyed features. Provide an updated effects assessment that incorporates any additional survey work conducted.Provide maps showing draft critical habitat for Great Basin Spadefoot in relation to Project components. As these maps would contain sensitive information, provide maps solely to Agathe.Lebeau@canada.ca with the Canadian Wildlife Service.Provide an assessment of which biophysical attributes of critical habitat would be impacted and how (quantitatively where applicable).Provide information on how impacts to Great Basin Spadefoot and its critical habitat could be avoided. Information should consider all technically and economically feasible measures and alternatives, including, but not limited to, re-routing of linear features and footprint minimization. Alternatively, provide a rationale for why additional amphibian surveys are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.	Please refer to supplementary memo: 0708_KAM_Critical HabitatMapping will be provided to CWS directly, as requested.Please also refer to 0707_KAM_EphemeralWetlands	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
51	ECCC-102	The EIS Guidelines require assessment of potential project effects associated with “disruption of daily or seasonal movements” and “mortality resulting from collisions with vehicles or construction equipment. Where project activities/disturbances associated with construction and operations are likely to cause a negative impact on a focal species, mitigation strategies will be identified.”Under Section 79(2) of the Species at Risk Act (SARA), a responsible authority must “identify the adverse effects of a project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans.”Species that are listed as Special Concern, Threatened or Endangered under Schedule 1 of the SARA, and that have the potential to be present in the project area should be considered as indicators in the effects assessment. It appears that suitable snake habitat for the Great Basin Gopher Snake (SARA-threatened), North American Racer (SARA-special concern) and the Rubber Boa (SARA-special concern) was identified in the project LSA; a Management Recovery Strategy is in place for all three snake species. The EIS states that “…snakes have been observed using areas of unsuitable habitat, such as roads, for thermoregulating […]” (Section 6.13.4.2). Although the density of snakes in the project area is very low, there is potential for direct mortalities. Measures to mitigate road mortality have been proposed. Identification of movement corridors would inform the need for crossing structures.	Identify potential movement corridors for snakes in the LSA.Alternatively, provide a rationale for why additional surveys of movement corridors are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.Provide information on how impacts to SARA-listed snakes could be avoided. Information should consider all technically and economically feasible measures and alternatives, including, but not limited to, measures to mitigate barriers to movemen, and measures to mitigate direct mortality from road crossings beyond traffic signage (e.g. crossing structures at known movement/crossing corridors) to be implemented prior to project construction and operation.Provide measures to monitor the effectiveness of mitigation measures (for inclusion in the follow-up program).Alternatively, provide an explanation of how the currently listed mitigation measures for alternative reptile species would be effective for these three SARA-listed species or, provide a rationale for why the request is not relevant, taking into account the type of habitat at the project site.	The only snake species detected within the Local Study Area (LSA) from surveys of 33 transects and a total search effort of 40.5 hours conducted in 2008, 2010 and 2014 were the common and western terrestrial gartersnake which are provincially yellow-listed in BC. Observations of snakes associated with the five confirmed dens within the LSA were also of these species. Field surveys targeted potential hibernaculum habitat areas (Figure 6.13-5) as recommended by RIC (1998) "3.1.6 Finding Snakes - Den Sites" since these are the "most productive locations for finding large numbers of snakes" and "aggregations of snakes may be made up of several species". Crossing structures/culverts installed for amphibian movement will also benefit snakes. No snake specific monitoring is planned for the species of garter snake due to their provincial status as secure and not at risk of extinction.Please see also supplemental memo: 0707_KAM_Reptiles	8/Jul/16
52	ECCC-103	The EIS states that “Based on the moderate loss of low suitability habitat and the few observation of woodpeckers in the LSA, the potential effect of loss of woodpecker habitat is anticipated to be low”.Where a project is planned in habitat that possesses the attributes of Lewis’ Woodpecker (threatened) critical habitat, and loss of those critical habitat attributes is predicted, this loss would have an adverse effect on the species if not fully mitigated.	Provide an assessment of impacts to Lewis’ Woodpecker that considers predicted changes to biophysical attributes of critical habitat, using quantitative methods where applicable, and;If impacts are predicted, propose technically and economically feasible mitigation measures to avoid these impacts, including a description of their predicted effectiveness.	Please refer to supplementary memos: 0708_KAM_Critical Habitat and 0707_KAM_Migratory Birds and RaptorsMapping will be provided to CWS directly, as requested.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
53	ECCC-104	Under Section 79(2) of the Species at Risk Act (SARA), a responsible authority must “identify the adverse effects of a project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans”.Species that are listed as Special Concern, Threatened or Endangered under Schedule 1 of the SARA, and that have the potential to be present in the project area should be considered as indicators in the effects assessment.Relevant federal recovery planning documents (posted and/or provided in draft to the proponent) should be used to guide the environmental assessment for the following species:• Management Plan for Rusty Blackbird (posted)• Recovery Strategy for Sage Thrasher (posted)• Management Plan for Band-tailed Pigeon (draft)• Critical Habitat for the Western Screech-owl subspecies macfarlanei (draft)	For those SARA-listed migratory bird species (Rusty Blackbird, Sage Thrasher, Band-tailed Pigeon, and Western Screech Owl subspecies macfarlanei) and their critical habitat, which have the potential to be present in the project area, provide an updated assessment of the Project's effects using quantitative methods where applicable.Provide maps showing draft critical habitat for Western Screech Owl subspecies macfarlanei in relation to Project components. As these maps would contain sensitive information, provide maps solely to Agathe.Lebeau@canada.ca with the Canadian Wildlife Service.If effects are predicted, propose technically and economically feasible mitigation measures to avoid these impacts, including a description of their predicted effectiveness.Alternatively, provide an explanation of how the currently presented effects assessment and mitigation measures would be effective for SARA-listed, migratory bird species and their critical habitat. Or, provide a rationale for why the request is not relevant for habitat at the project site.	Please refer to supplementary memos: 0708_KAM_Critical Habitat and 0707_KAM_Migratory Birds and RaptorsMapping will be provided to CWS directly, as requested.	8/Jul/16
54	ECCC-105	Bird surveys should be conducted over multiple years throughout the LSA to account for natural inter-annual variation and maximize detectability within the LSA. In addition, specific, targeted surveys are best able to maximize the detection of bird species.Breeding bird surveys for forest and grassland songbirds, as well as waterfowl surveys, were conducted over multiple years but only in some sections of the LSA. Migration surveys for forest and grassland songbirds, as well as Common Nighthawk and American Bittern surveys were conducted only in 2014. In addition, surveys were incompletely conducted in the powerline and waterline LSA, despite construction and operation activities being proposed in these areas.Long-billed Curlew was identified as an indicator species for Migratory Birds but no targeted surveys for Long-billed Curlew were conducted during the breeding season. While waterfowl surveys following Inventory Methods for Waterfowl and Allied Species can detect shorebirds, these methods are not specific to these species and may not provide valid results.Barn Swallow and Bank Swallows were observed in the project area, but surveys targeting swallows and swifts were not conducted. While breeding bird surveys following Inventory Methods for Forest and Grassland Songbirds (Resources Inventory Committee 1999) can detect swallows and swifts, these methods are not specific to these species and may not provide valid results.	Conduct additional bird surveys to ensure all areas of the LSA have been sampled for multiple years, and specific targeted surveys have been conducted where possible to maximize detection of target bird species and adequately characterize location and timing of habitat use within the LSA. Update relevant effects assessments and compensation plans to include any additional survey work conducted.Alternatively, provide a rationale for why additional surveys of each migratory bird are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.	Please refer to supplementary memos: 0708_KAM_Critical Habitat and 0707_KAM_Migratory Birds and RaptorsMapping will be provided to CWS directly, as requested.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
55	ECCC-106	Raptor surveys should be conducted over multiple years for each transect, and at different times of year (e.g. breeding, migration, etc.).Raptor encounter transects (roadside surveys) and Flammulated Owl call-playback surveys were conducted. The Resource Information Standards Committee Inventory Methods for Owl Surveys standard indicates that call playback surveys are the most appropriate survey for the Western Screech-owl subspecies macfarlanei. The RISC Inventory Methods for Raptors standard indicates that aerial surveys are the most appropriate survey type for the Peregrine Falcon. Raptor survey transects appear to have been surveyed only once during the period between 2007 and 2014. RISC standards indicate that the Western Screech-owl subspecies macfarlanei should be surveyed at least 3 times annually and the Peregrine Falcon should be surveyed twice annually.Call-playback surveys for Flammulated Owls were conducted in June and/or July in 2007, 2008, 2010, and 2014; however, it appears that many survey locations were surveyed only in one year during the period between 2007 and 2014. The RISC standard indicates that surveys for Flammulated Owls must be repeated seasonally over multiple years.	Conduct additional surveys following the appropriate RISC standard for Burrowing Owl, Flammulated Owl, Short-eared Owl, and Peregrine Falcon to ensure all areas of the LSA have been sampled for multiple years, and specific targeted surveys have been conducted where required to maximize detection of target bird species and adequately characterize location and timing of habitat use within the LSA. Update relevant effects assessments and compensation plans to include any additional survey work conducted.Alternatively, provide a rationale for why additional surveys of each raptor are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.	Please refer to supplementary memos: 0708_KAM_Critical Habitat and 0707_KAM_Migratory Birds and RaptorsMapping will be provided to CWS directly, as requested.	8/Jul/16
56	ECCC-107	The federal Recovery Strategy for Little Brown Myotis (endangered) indicates that maternity roosts and hibernacula clearly contribute to the survival and recovery of Little Brown Myotis.Acoustic bat surveys alone are insufficient in determining the presence and location of hibernacula and roosting sites for bats. It is unclear if all potential roosts and hibernacula have been identified in the project area prior to identifying survey locations. Typically, an inventory of wildlife trees, buildings, mines and cliff/cave features in the Project area, as appropriate for the potentially impacted species, should be conducted to identify potential maternity roosts and hibernacula where survey stations should be located. A combination of methodologies, such as radio telemetry, mist netting, and acoustic monitoring with bat detectors, should be used as appropriate to acquire the necessary baseline information (Refer to the North American Bat Monitoring Program for more information:https://www.fort.usgs.gov/science-tasks/2457).	Locate and confirm the presence of maternity roosts and hibernacula within the LSA, including the waterline and powerline LSAs by conducting additional acoustic surveys to ensure that each potential maternity roost and hibernacula has been surveyed for more than one year. Survey stations should include the same locations as previous years as well as additional ones to account for un-surveyed features. Identify which species are using each maternity roost or hibernaculum and identify measures to mitigate the potential loss of roost or hibernacula features. Update relevant effects assessments and compensation plans to include any additional survey work conducted.Alternatively, provide a rationale for why additional surveys are not warranted.Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.	Please refer to supplementary memo: 0708_KAM_Critical HabitatMapping will be provided to CWS directly, as requested.	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
57	ECCC-108	Environment and Climate Change Canada has advised that the Project is likely to overlap with draft critical habitat for American badger subspecies jeffersonii.Where a project is planned in habitat that would possess the attributes of American badger, subspecies jeffersonii, critical habitat, and loss of those critical habitat attributes is predicted, an adverse effect on the species would occur if not fully mitigated. When impacts to critical habitat are considered in combination with other information on the status, threats, and life history of the species, this adverse effect would be likely to jeopardize the survival and recovery of the species.	Provide maps showing draft critical habitat for Americal badger subspecies jeffersonii in relation to Project components. As these maps would contain sensitive information, provide maps solely to Agathe.Lebeau@canada.ca with the Canadian Wildlife Service.Provide an assessment of impacts to American badger subspecies jeffersonii and its critical habitat, using quantitative methods where applicable. If impacts are predicted, propose technically and economically feasible mitigation measures to avoid these impacts, including a description of their predicted effectiveness.Alternatively, provide an explanation of how the currently presented effects assessment and mitigation measures for mammals would be effective for American badger subspecies jeffersonii and its critical habitat. Or, provide a rationale for why the request is not relevant, taking into account the types of habitat that are likely to be impacted by the Project.	Please refer to supplementary memo: 0708_KAM_Critical HabitatMapping will be provided to CWS directly, as requested.	8/Jul/16
58	ECCC-109	Applying water to haul roads can be an effective method of dust control for haul roads. However as the roads dry, the dust control efficiency quickly decreases. In Section 4.6.1 the proponent states the "Based on the guidance outlined in US EPA AP-42 (Chapter 13.2.2 Figure 13.2.2-2), the control mitigation is assumed to be a minimum of 90% dust suppression through unpaved road surface dust management (US EPA 2006)". The AP-42 Figure 13.2.2-2 present a relationship between fugitive dust control efficiency and Moisture Ratio (M) of the road surface. Moisture Ratio (M) found by dividing surface moisture content of the watered road by the moisture content of the uncontrolled road. The maximum dust control efficiency is 90% for Moisture Ratio M=5. M=5 means that the moisture content of the watered road 5 times the moisture content of uncontrolled road. As the watered road surface dries, both ratio M and predicted control efficiencies decrease. At M=2 the control efficiency decreases to 75%, when M=1 control efficiency is zero.	Provide a description of each mitigation measure, including the timing and frequency of the mitigation measure (if any), that would be applied to each emission source in order to meet the proposed dust control efficiency of 90%.Provide examples of other operating mines similar in geological and climatic zones and circumstances that have applied similar mitigation and the dust control efficiency reached in applying those mitigation measures.Develop a follow-up program for air quality that includes an approach to monitoring results and verifying againste the predictions in the EIS, and a conceptual contingency plan that outlines the approach that KGHM would take in the event that the expected results are not achieved.Provide the results, including from sensitivity analysis of the updated air dispersion model that take into account the direction provided by BC EAO.	These issues are comprehensively addressed in three memorandums that have been prepared in response to the April 28, 2016 letter from the BC EAO (0428_Air Quality Information Request_EAO-001-006.pdf). Please see responses to EAO 001, EAO 002, and EAO 003 (0725_KAM_Combined Stantec Responses to EAO 001-006).	8/Jul/16
58	ECCC-109.1	See Column G & H of spreadsheet:2016.10.14 Adequacy for Response to Item 58Lacated in the following Folder:https://docs.hyperoffice.com/groups/KGHM Ajax Mining/Gov't, SSN & Round2 Comments/Federal Round 2_Posted		Issues noted in this comment have been addressed in response to the November 2016 joint information request from EAO/CEAA. Please refer to the following response memoranda:1207_KAM-AQ Covering Letter Summary1207_AQ Mitigation Effectiveness1207_KAM_Fugitive Dust Management Plan	14/Dec/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
59	CEAA-046	RE: SSN-097 (Screening Comment) Environment - Fish and Aquatics; SEE Memo: 0520_CEAA_SSN Related IRs for background contextSections 8.5.2.3 and 13.6.1.2 of the EIS note that Jacko Lake, Jacko Creek and Peterson Creek are valued trout fishery areas for the SSN; however, no information on fishing methods, timing, or fish take are provided in the EIS. Section 13.6.4.1 of the EIS states that no effects on the Aboriginal trout fishery in Jacko Lake are anticipated. Further, the EIS states that "it is unlikely that SSN obtain a substantial portion of their fish intake from Jacko Lake or Peterson Creek." (Section 13.6.4.1, page 13-59). This statement is based on the presence of an SSN fishwheel in the Thompson River used to catch coho, The proponent uses this as evidence that the SSN are likely to obtain only 10% of their total fish intake from Jacko Lake. Conclusions about SSN Fishing opportunities are based on limited information (e.g. record from an NEB Enbridge hearing) and have not been verified by the SSN in the context of this project or through baseline data collection (Section 8.5.2.3, Current Use, page 8.5-25). Under the former Act a follow-up program is used to verify the accuracy of the environmental assessment (in this case, the statement in Section 13.6.4.1 that no effects on the Aboriginal trout fishery are anticipated), and determine the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.	Describe the efforts that were taken to collect baseline information on the frequency, timing and duration of fishing activity at Jacko Lake, Jacko Creek, and Peterson Creek, including but not limited to specific requests to Fisheries and Oceans Canada and SSN that are known to fish in these areas. Provide updated baseline data that includes a quantification (e.g, the species caught, the numbers caught and timing of catch) of the existing trout fisheries that are carried out for traditional purposes, in Jacko Lake, Jacko Creek and Peterson Creek. Or, provide a defensible rationale supporting the current approach taken in the EIS. Describe the alternative opportunities available to the SSN for fishing, including a comparison of the type of fish species available, the catch obtained, the time of use, and any cultural values associated with the alternative locations. Identify mitigation measures that reduce the environmental effects to the trout fishery (i.e., identify what offset measures proposed to address fish habitat impacts also allow for the continued opportunity to fish trout within the traditional territory of the SSN), taking into account the availability of the resource, the quality of resources, and the quality of the experience, and access. Describe the effectiveness of the mitigation measures in reducing the adverse environmental effects.Provide the results of an updated assessment of the effects of the project on existing trout fisheries that takes into account the updated baseline data, the opportunity to fish trout elsewhere, and the proposed mitigation measures and their effectiveness. Or, provide a defensible rationale for the current conclusions reached in the EIS that the SSN are likely to pursue trout fishing opportunities elsewhere.Describe a follow-up program, should one be required, to address uncertainties associated with the ability of the mitigation measures to address effects to Aboriginal Fisheries and describe how the SSN will be consulted in the development and conduct of the follow-up program.	Please see Supplemental Document 0712_KAM_Response to CEAA IR 046	21/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
59	CEAA-046.1	In addition to the low/moderate/high ranking for the effectiveness of mitigation measures, provide a description and where possible quantification of the effectiveness for each mitigation measure on reducing impacts to activities associated with CULRTP rather than a discussion of the effectiveness of the overall Environmental Management Plan.Confirm that mitigation measures are based on the current design and layout of the Project.Provide an assessment of the effects of the Project on existing trout fisheries that takes into account updated baseline data in relation to the fisheries and the opportunity to fish trout elsewhere. For changes to effects identified in the response based on the new offsetting plan, provide the specific effects used in the comparison rather than identifying that an effect has decreased. For the effects to the trout fisheries, provide an assessment of significance of the effect.Describe how SSN will be consulted in relation to the development and conduct of the follow-up program. The response does not clarify whether mitigation measures apply to the Aboriginal fishery or the recreational fishery. Specify which mitigation measures would apply to the Aboriginal fishery.		1212_KAM_CEAA IR 046.1	13/Dec/16
60	CEAA-047	RE: SSN-309and SSN-312 Jacko Lake and Peterson Creek (Jacko Lake water level regime) SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe present Jacko Lake outlet consists of a spillway with a crest elevation of 892 metres above sea level (masl) and a low level outlet which maintains Jacko Lake levels during spring freshet to a little above the spillway crest (i.e., just below 892 masl). As part of the water management system, the existing dam at Jacko Lake will be replaced with a four dam system with a higher crest height (given as 894.5 masl in Section 11.7.3.3 and 895.5 masl in Appendices 3-F and 17.4-D). The purpose of raising the Jacko Lake dam is to fully contain the Inflow Design Flood, which is defined as the runoff associated with a 24-hour Probable Maximum Precipitation (PMP) event. Appendix 17.4-D, Appendix A (Table 3, page 5) notes that the spring 24-hour PMP with snowmelt (PMP of 221 mm plus 108 mm of snowmelt) produces a flood volume of 9.65 million m3; to fully contain this flood volume, crest elevation would need to be 902.3 masl. A pumping system is also being built to divert flow to the Peterson Creek Diversion System (PCDS) to maintain water in lower Peterson Creek; however, the PCDS is not designed to carry flood event volumes. Due to the raised elevation of the four dam system, Jacko Lake could increase several metres over its current flood elevation. Such a change in water level regime could have effects on Jacko Lake aquatic and terrestrial valued components.	Describe the design of the Jacko Lake dams, including final elevation (i.e., reconcile the difference in final crest elevation for the Jacko Lake dams noted in Section 11.7.3.3 and Appendices 3-F and 17.4-D), and the normal operating level of Jacko Lake and describe how water levels will be managed. Describe the water management strategy for a 24-hour flood event, taking into account the limited outflow capacity to the Peterson Creek Diversion System (pump discharge of 0.08 m3/s). Provide an assessment of the environmental effects to Jacko Lake and any associated valued components (e.g. wetlands, vegetation, migratory birds, etc.) resulting from raising the elevation of Jacko Lake dams that takes into account the magnitude, extent, and timing of the flood event inflows.	Please see supplementary response memorandum 0706_KAM_BGC-017	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
60	CEAA-047.1	Include an assessment of inundation of Jacko Lake shoreline, including erosion, effects on grasslands and waterfowl nesting habitat as part of the assessment of environmental effects to Jacko Lake resulting from raising the elevation of Jacko Lake.		As indicated in 0706_KAM_BGC-17, the elevation of Jacko Lake will be maintained at 892.0 masl. During normal operating conditions the level of the lake will remain at 892.0 masl however the dams have been designed to contain a large precipitation event to prevent flooding of the open pit and other mine infrastructure for the protection of employees. The proposed Jacko Lake dams are designed with a dam crest elevation of 895.5 masl, which enables a storage capacity greater than twice the estimated Probable Maximum Flood (PMF). During a flood event the lake outlet would be managed in order to limit an increase in lake elevation and impacts to shoreline and riparian habitats. In addition, the dam on the southeast arm of Jacko Lake includes a spillway with an invert elevation of 892.0 masl which will allow for the controlled release of water into Peterson Creek during large rain events. These controlled releases will mitigate the potential erosion effects of a rapid drawdown. Combined with densely vegetated shorelines, erosion is not expected for the majority of the lake shoreline in a flooded scenario that raises the lake level and inundates shoreline above the mean water level. Regarding potential effects to waterfowl nesting habitat, during a temporary inundation of the shoreline above 892.0 masl during high spring run-off (May and early June), waterfowl species known to build their nests in marshy areas of Jacko Lake may be affected. Nesting species that have been confirmed at Jacko Lake that begin nesting in May include the pied-billed grebe and red-necked grebe. Other species also nest in similar habitat, e.g. American coot, but nesting is later in June and would likely not be impacted by the peak flows into the lake. If the onset of spring run-off occurs early in May, the primary affect would be on nest construction, which would resume after the water level has gone down. However, if it occurs later in May then eggs that have been laid may be affected. However, waterfowl reproductive success should not be adversely affected as both species are known to lay a second set of eggs (brood) if the first is lost.	24/Jan/17
61	CEAA-048	RE: SSN-501 SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe EIS Guidelines require a summary description of baseline conditions in relation to … commercial activities (e.g., fishing, trapping, hunting, forestry, outfitting and any other use of lands and resources such as metals or minerals that may have economic considerations). Source information will include use assessments, historical data, and traditional ecological or community knowledge where publicly available or provided by Aboriginal groups.At pages 8.5-35 to 36, the proponent describes some current activity, but no baseline information to gauge the impact of the Project on commercial uses (trade/commerce) with respect to fishing, hunting and trapping; no information has been provided on non-registered traplines and only a brief reference has been made to a historical trade in minerals and the economic consideration of those activities.	Provide additional/updated baseline information and assess the potential impacts of the Project on SSN's commercial activities related to fishing, hunting and trapping (including non-registered traplines) activities and historical trade in minerals.Or, describe the efforts that were taken to collect baseline information in the EIS.	Please see supplementary memo 0708_KAM_Response to CEAA IR 048	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
62	CEAA-049	RE: SSN-696 SEE Memo: 0520_CEAA_SSN Related IRs for background context The EIS Guidelines require that the EIS "will present a conceptual fish habitat offsetting plan". The former Act requires that the proponent shall include a consideration of "any change that the project may cause in the environment". Construction and operation of the fish habitat offsetting plan constitutes a change in the environment that must be taken into consideration. Appendix 6.7-C provides the proponent's Conceptual Fish Habitat Offsetting Plan. This plan notes that factors that will be considered in the offsetting plan include: "compliance of offsetting plans with recovery planning for species listed under the Species at Risk Act (SARA) … [and] intrinsic value of habitat to be enhanced compared with the productive capacity gained through habitat enhancement …" Table 5.5 of the Fish Habitat Offsetting Plan and the discussion that follows it, provide limited consideration of effects of construction and operation activities on other valued components (VC) and SARA species. Although fish habitat offsetting is still under discussion between the proponent and Fisheries and Oceans Canada, the assessments must include effects of offsetting on valued components in greater detail than what is provided on pages 61 through 64.	Provide baseline information and an assessment of effects to other VCs (e.g. SARA-listed species, migratory birds) that may be affected by the fish habitat offsetting plan (e.g., Inks Lake, if that is the location of the fish offset, and Peterson Creek).	Please see supplementary memos 0706_KAM_Fish Habitat and Fisheries Offsetting Plan and 0706_KAM_Peterson Creek Diversion System Update.The Conceptual Fish Habitat Offsetting Plan submitted with the Application/EIS has been revised to account for this information request and feedback received to date from the Working Group. This revised plan includes a revised assessment of effects on valued components including an assessment of effects on SARA listed species. Please see 0706_KAM_Fish Habitat and Fisheries Offsetting Plan for the revised Conceptual Fish Habitat Offsetting Plan. Section 8.1 of the revised plan provides a Valued Components Effects Assessment of the proposed concepts described as offsetting measures. Furthermore, Project design changes have reduced potential impacts to wildlife and wildlife habitat. The Application/EIS includes the proposal to divert approximately 3.6 km of Peterson Creek. This section would be dewatered during Project operation, as Jacko Lake flows will be diverted around the north edge of the Open Pit through the Peterson Creek diversion - this is described in Section 6.7.4.3 (page 6.7-40) and in Appendix 6.7-D. However due to multiple concerns raised through the Environmental Assessment process, KAM has updated the design of the Peterson Creek Diversion System. The updated design no longer includes an intake, pumphouse, diversion pipeline north of the Open Pit or the Peterson Creek Downstream Pond. The updated design includes a gravity fed buried culvert approximately 2.7 km downstream of Jacko Lake to protect water quality during mine operations. The culvert intake will be approximately 200 meters downstream of the proposed replacement dam on Jacko Lake leaving a section of Peterson Creek open. The culvert outlet will be 2.7 km downstream and discharge directly to Peterson Creek east of the mine site. The Peterson Creek Downstream Pond (PCDP) is no longer part of the Project design which results in reduced impacts of this previously planned facility. The original diversion was adjacent to roads so there will be no reduction in direct wildlife impacts from the PCDS design change, however removal of the PCDP from the design will reduce wetland/amphibian/migratory bird impacts by 6.3 ha. The PCDS design change will result in a reduction of 3.2 ha of wetland habitat impacts along Peterson Creek than previously presented in the Application/EIS. Please see Supplementary Memo 0706_KAM_Peterson Creek Diversion System Update for additional details on this design change.	8/Jul/16
63	CEAA-050	RE: SSN comments 077, 089, 091, and 092 (Screening Comments) SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe characterization of the significance of effects for SSN fishing (p. 13-62), hunting (p. 13-65), and plant gathering (p. 13-68), describes the duration of effects to these practices as occurring until the post-closure phase and being either partially or completely reversible. Elsewhere in Section 13, the EIS describes "restoring the land to an acceptable long-term use" during the post-closure phase (p. 13-57), how some areas will not be restored, and how some project components will remain permanent elements of the landscape.The proponent is relying on post-closure measures to mitigate effects to fishing, hunting, and plant gathering; however, it is unclear what "an acceptable long-term use" means, and how this will be achieved in terms of the practice of fishing, hunting, and plant gathering.	State what project components will remain permanent elements of the landscape in those areas that are currently used for fishing, hunting, and plant gathering by the SSN.Describe what the goal of "restoring the land to an acceptable long-term use" means in relation to the practice of fishing, hunting, and plant gathering by the SSN.Describe what restoration efforts (e.g., mitigation measures) will be made to achieve the goal of "acceptable long-term use", and the effectiveness of those efforts, taking into account permanent project components.	Please see supplementary memo 0707_KAM_Response to CEAA IR 050.	8/Jul/16
63	CEAA-050.1	Per the original IR, describe what the goal of "restoring the land to an acceptable long-term use" means in relation to the practice of fishing, hunting, and plant gathering by the SSN.Also, describe the effectiveness of restoration efforts to achieve the goal of "acceptable long-term use", taking into account permanent project components.		1206_KAM_CEAA IR 050.1	13/Dec/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
64	CEAA-051	RE: SSN comments 126, 129, and 130 (Screening Comments) SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe factors used to inform the assessment of "cultural and ceremonial interests" focus on specific locations (i.e., the hunting blind complex, Jacko Lake, Jacko Creek, Peterson Creek, and Goose Lake) without describing the use of those areas or what makes them culturally and/or spiritually important to the SSN. The SSN has advised the Agency that information on these topics was made available to the proponent for use in the EIS (SSN comment 130).	For each location included in the assessment of cultural and ceremonial interests, describe the specific uses and/or cultural practices that occur at that particular site and what makes the site and/or the cultural practices at that site culturally and/or spiritually significant. Provide the results of an updated assessment of SSN's cultural and ceremonial interests that includes the above additional information.If this type of information was unavailable to the proponent, explain why it was unavailable and describe the efforts that were made to gather this information.	Please see Supplemental Document 0715_KAM_Response to CEAA IR 051	15/Jul/16
65	CEAA-052	SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe Agency's letter of August 4, 2015, requested that the proponent conduct an assessment of effects of changes to the environment on:• SSN's cultural heritage in relation to the Trout Children Story; and• any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story. The August 4, 2015 letter also requested that the proponent engage SSN in a discussion regarding the Trout Children Story and how related potential effects will be assessed.The EIS guidelines require that the proponent, as part of their EIS, (1) describe the rationale, justification, methodology and criteria used to identify VCs, (2) include the criteria for determining the spatial and temporal boundaries for each VC, and (3) provide a definition for each factor used when assessing the significance of any adverse environmental effect.The Trout Children Story Addendum does not provide a rationale for the methodology applied for assessing the effects of changes to the environment nor does the addendum describe the efforts made to engage the SSN regarding how the effects would be assessed.	Provide a rationale for the methodology used (including for component selection, significance factors, spatial and temporal boundaries) for assessing effects of changes to the environment on (1) SSN's cultural heritage and (2) any structure site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story.Describe the efforts made to engage the SSN in the development of the methodology for these two assessments, provide a description of any comments received from the SSN, and the efforts taken to address the comments received.	Please see Supplemental Document 0715_KAM_Response to CEAA IR 052	15/Jul/16
66	CEAA-053	SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe mitigation measures proposed by the proponent in the Trout Children Story address the biophysical effects of the Project (e.g. fish). No description is provided to explain how the mitigation measures are effective at addressing the SSN's cultural heritage or any structure, site, or thing of historical, archaeological, paleontological, or architectural significance (e.g. cultural knowledge transmission site). The AIR/EIS Guidelines and the Agency's "Reference Guide on Physical and Cultural Heritage Resources" direct the proponent to provide mitigation measures that address both direct and indirect effects to physical and cultural heritage/interests of Aboriginal peoples.	Provide a description of any specific mitigation or accommodation measures, including the effectiveness of those measures in reducing, avoiding or compensating for adverse effects from changes to the environment on SSN's cultural heritage and on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story.	Please see supplementary memo 0708_KAM_Response to CEAA IR 053	8/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
66	CEAA-053.1	Per the original IR, provide a description of any specific mitigation or accommodation measures, including the effectiveness of those measures in reducing, avoiding or compensating for adverse effects from changes to the environment on SSN's cultural heritage and on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story.		1212_KAM_CEAA IR 053.1	13/Dec/16
67	CEAA-054	SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe Agency's letter of August 4, 2015, stated that the outcomes of the assessment of effects from changes to the environment on SSN's cultural heritage and on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story should also be considered in developing an understanding of impacts to asserted rights, including title, as required by Section 13 of the amended AIR/EIS Guidelines. The Trout Children Story addendum does not provide a description of how considering the Trout Children Story influenced the understanding of impacts to asserted rights, including title.	Explain how the proponent's understanding of the potential adverse impacts to SSN's asserted rights, including title, was informed by the assessment of effects from changes to the environment on the SSN's cultural heritage and on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story.	Please see response in supplemental memo: 0715_KAM_Response to CEAA IR 054	21/Jul/16
67	CEAA-054.1	The response memo (0715_KAM_Response to CEAA IR 054) discusses potential impacts of the project on certain SSN cultural practices, but does not identify whether effects of changes to the environment on SSN's cultural heritage and on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story results in potential adverse impacts to SSN's asserted rights, including title. Per the original IR, explain how the proponent's understanding of the potential adverse impacts to SSN's asserted rights, including title, was informed by the assessment of effects from changes to the environment on the SSN's cultural heritage and on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance in relation to the Trout Children Story.		1209_KAM_CEAA IR 054.1	13/Dec/16
68	CEAA-055	SEE Memo: 0520_CEAA_SSN Related IRs for background contextThe August 4th, 2015 Letter requested that the proponent "engage SSN in a discussion regarding the Trout Children Story and how related potential effects will be assessed in the EIS".The Trout Children Story Addendum does not provide a description of the efforts taken by the proponent to engage the SSN in a discussion regarding the Trout Children Story and how related potential effects will be assessed in the EIS. Nor does it provide a description of the issues raised or any efforts taken by the proponent to address these concerns.The Trout Children Story Addendum also does not include a description of how the related potential effects assessed in the EIS, were modified as a result of taking the Trout Children Story into account.	Describe the efforts made to engage the SSN in discussion regarding the Trout Children Story and how related potential effects will be assessed in the EIS. Provide a description of any comments received from the SSN through these efforts and any further efforts taken to address the comments received. Describe how any assessments of potential effects, as described in the EIS were updated to reflect the consideration of the Trout Children Story and the results of those updated assessments.	Please see response in supplemental memo: 0715_KAM_Response to CEAA IR 055	21/Jul/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
68	CEAA-055.1	Per the original IR, describe how any assessments of potential effects, as described in the EIS, were updated to reflect the consideration of the Trout Children Story. Describe the outcomes of any assessments that were updated to reflect consideration of the Trout Children Story.		1212_KAM_CEAA IR 055.1	13/Dec/16
69	CEAA-056	In order to understand the proposed habitat enhancements in lower Peterson Creek for EA purposes, an understanding of the current habitat in lower Peterson Creek is needed. DFO needs this information to understand whether the proposed offsetting plan could work at the conceptual level. DFO notes that fish density data of the various fish species and life stages throughout the year would be required in a detailed offsetting plan at the regulatory stage.See section 6.6 of the supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Provide a baseline assessment of current fish habitat usage (for all species and life stages present, not only for resident rainbow trout) of lower Peterson Creek, in particular, the area to be enhanced as per section 6.6 of the offsetting plan. Provide data on current known fish utilization and fish densities in these reaches and how they are expected to be increased through the proposed enhancement measures. See section 6.6 of the supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	KAM has conducted additional baseline fish sampling and fish habitat surveys in the reach of lower Peterson Creek proposed for enhancement. Please see supplemental memo 1128_KAM_Lower Peterson Creek Fish Habitat and Fish Baseline Data that provides the supplemental data and how the offsetting measures proposed may be expected to increase existing fish usage and density in the reach.	30/Nov/16
70	CEAA-057	Flows in middle Peterson Creek are predicted to be reduced as a result of changes in the contributing area footprint and water management associated with the proposed project. Fall and winter low flow periods have been reported as having the most risk to fish and fish habitat as a result of these reductions. See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Clarify whether existing fish habitat within lower Peterson Creek will potentially be impacted by a reduction in flow. If there is a reduction in flow, clarify how the proposed offset habitat in lower Peterson Creek may be impacted by this reduction, and how these impacts would be mitigated.See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Spring and early summer flows are not predicted to be impacted by the Project. During the late summer through winter period flows downstream of the Project are predicted to be reduced by 2 to 5 m3/h – this equates to 0.55 to 1.4 litre/s. Wetted widths and depths in pools will decrease with reduced flows, resulting in a loss of some overwintering habitat however it is not anticipated that this change will be measureable due to the negligible reduction in flow. Juvenile rainbow trout also overwinter within the substrate and have been found in substrate overlain by up to 15 cm of anchor ice (Habitat Suitability Information: Rainbow Trout, R.F. Raleigh et al. 1984). Regardless, KAM is working to identify mitigation measures that will completely mitigate flow reductions to protect water rights and fish habitat. Under the BC Water Sustainability Act, KAM is required to ensure no impacts to water rights held by other parties on Peterson Creek will occur as a result of the Project. Supplementary memo 0629_KAM_Peterson Creek Streamflow Mitigation BGC 014 describes potential mitigation measures under consideration by BC Ministry of Forest Lands and Natural Resource Operations. Discussions are ongoing and although the specific mitigation measure or measures has not been selected, KAM is confident that one or multiple measures are feasible to mitigate streamflow reductions in Peterson Creek which will result in no change to available habitat to fish in lower Peterson Creek.	30/Nov/16
71	CEAA-058	To understand the value of the proposed offsets and enhancements, all Habitat Evaluation Procedure (HEP) scaling factors must be applied consistently to both the impacted habitats and the enhanced and created habitat offsets. DFO needs to understand how the scaling factors have been determined and applied so that they can determine whether they are appropriate and accurate. DFO needs to know at a broad level there will be no net loss of habitat and that offsetting will be sufficient to balance any loss in habitat, and whether the habitat being proposed has been accurately quantified. This information will support DFO's understanding of the offsetting plan at the conceptual level.See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Provide tables for the various channel, riparian and lake habitat HEP scaling factors that clearly describe the habitat characteristics that would warrant the assignment of a given scaling factor. Confirm that all HEP scaling factors have appropriately and consistently been assigned to existing habitat, habitat potentially impacted by the Project, and offset and enhanced habitat. See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Please refer to supplementary memo 1122_KAM_Habitat Evaluation Procedure Methodology that includes rationale for the HEP scaling factors applied.	30/Nov/16

		Federal Review Team		Proponent	
Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
72	CEAA-059	In areas where habitat enhancements are proposed (as opposed to habitat creation), it is unclear if the habitat units assigned to the offsets reflect the weighted gains to the habitat or if the entire proposed enhancement area is considered a gain. If fish habitat already exists in an area where offsets/enhancements are proposed, habitat gains can only be claimed for the enhanced area rather than the existing habitat plus the enhanced area. This request is to clarify whether existing habitat is considered offset habitat so DFO can understand the offsetting plan at the conceptual level. See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Provide the difference in HEP scaling factor units between the existing and enhanced habitat with emphasis on Lower Peterson Creek. Clarify the offset area being claimed for Lower Peterson Creek, given that it is existing functional fish habitat. See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	The offsetting concept for lower Peterson Creek proposes to rehabilitate physical habitat conditions over the lowermost section of the creek before it meets the floodplain of the South Thompson River. This includes the addition of a pond as off channel rearing habitat. The length of channel to be enhanced/rehabilitated is 158 m with a wetted channel width of 3-4 m. The proposed off channel pond is 27 m by 13 m with an area of 350 m2. The total surface area of the enhancements is approximately 1,400 m2 based on bankfull channel width. The functional portion (wetted on an average basis) as fish habitat is approximately 950 m2, and was assumed to be equivalent to 950 habitat units. The habitat gain used in the habitat balance calculations for lower Peterson Creek is 950 habitat units recognizing there is some existing fish use of the creek. HEP scaling factors were not used to quantify existing habitat in lower Peterson Creek because of marginal fish habitat conditions and assumed low fish use. It is assumed there is no benefit to implementing offsetting measures in lower Peterson Creek if the existing fish habitat is functioning normally and supporting a beneficial level of fish use. If the approach was revised to apply a HEP Scaling Factor to existing habitat proposed for offsetting measures an appropriate index would be low (e.g., 0-0.2) and would have minimal impact on the overall analysis.	30/Nov/16
73	CEAA-060	Figure 6.1 regarding the proposed Jacko Lake West Arm expansion indicates that large woody debris will be added in several locations, but key details are missing.See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	With respect to the proposed Jacko Lake West Arm expansion, provide further details on the type, quantity, size, and placement location of the fish habitat features (e.g. habitat complexing) and aquatic and riparian plantings that will be built into the design of the expanded West Arm.See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	The design will incorporate LWD placement along the West Arm shoreline to mimic conditions of forested small lake shorelines in the region (e.g. McConnell Lake). Typically LWD in regional small lakes originates from riparian windfall. KAM will salvage mature trees cleared for mine development for this purpose. The shoreline perimeter of the West Arm is approximately 1.0 km and the intent is to place at least one mature tree horizontal to the lake shoreline every 25 m (40 large trees total). Riparian planting is planned to establish a continuous treed riparian buffer on the shoreline of the West Arm by planting native tree species (e.g. ponderosa pine, water birch, and Douglas fir) in open areas immediately adjacent to the lake shoreline. Native sedges will planted in shallow areas along the West Arm shoreline using stock salvaged from Jacko Lake or sourced from nurseries. The total area identified for riparian planting is approximately 1.0 ha. KAM will engage a vegetation reclamation specialist to develop a detailed soil and vegetation prescription for all aspects of the offsetting plan, and include this information in the application for Authorization under Paragraph 35(2)(b) of the Fisheries Act.	30/Nov/16
74	CEAA-061	In order to avoid fish kills as a result of the proposed Jacko Lake West Arm Expansion, adequate water circulation with the rest of Jacko Lake must be maintained throughout the year in order to ensure temperatures and dissolved oxygen levels are adequate to support the fish population. The connector channel should be designed to maximize water circulation and to ensure that overwintering fish within the West Arm Expansion can readily move to the main body of Jacko Lake if conditions deteriorate. This information is required for the proponent to demonstrate to DFO that this part of the proposed offset is viable at a conceptual level.See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	Provide information to demonstrate that adequate temperatures and dissolved oxygen levels in Jacko Lake will be maintained throughout the year as a result of the proposed West Arm expansion (e.g. via flow circulation modelling), and that overwintering fish would be able to move freely throughout Jacko Lake. See supplementary memo 0706_KAM_Fish Habitat and Fishery Offsetting Plan	The West Arm connector channel will be designed and constructed to establish an open water connection between Jacko Lake and the West Arm expansion area. The connector channel depth will be equivalent to the deepest part of the West Arm expansion area, to prevent basin formation and the potential to trap depleted oxygen levels at depth. The West dam will be fitted with a low level outlet as a contingency to promote subsurface circulation if necessary. KAM will monitor water temperature and dissolved oxygen in the west arm expansion area. In the event dissolved oxygen concentrations fall below levels required by fish (i.e. < 3 mg/l) and winter kill is observed, KAM will explore mitigation measures. Measures may include dredging to increase the depth of the arm or connector channel to reduce aquatic macrophyte growth or installation of an aeration system to increase the dissolved oxygen concentrations in the west arm expansion area.. However, it is anticipated that rainbow trout will respond to reduced oxygen and increased temperature by moving to other areas of the lake where temperature and dissolved oxygen is favorable. KAM believes flow circulation modelling is unwarranted considering that the West Arm expansion presents a low risk to the Jacko Lake fish population in terms of potential fish kills, there are mitigation measures that are proven to be successful that KAM commits to implementing if necessary and there are many potential challenges modelling lake circulation that may fail to produce accurate predictions.	30/Nov/16
75	CEAA-062	The air dispersion pattern appears to show a steep decline in pollutant concentrations (CO, PM2.5, PM10, TSP, SO2) based on isopleths just southwest of the community of Aberdeen (approximate UTM coordinates 5612500m N, 686000m E). For example, in Figure I-2 of Appendix 10.1-A, TSP concentrations drop from 120 to 50 µg/m-3 in less than 200 meters. The dispersion pattern in other directions away from the mine site show a more gradual drop in concentrations, and it is not clear from the information provided if there is a topographic feature that is responsible for this behaviour. "See Supplementary memo (Additional Information Required to Support an Examination of the Air DispersionModel Behaviour, dated July 25th or 0721_KAM_Model Sensitivity_EAO004)"	Provide an explanation for the dispersion pattern that results in the steep pollutant concentration declines observed to the south of Aberdeen. This information is important in verifying the overall dispersion model behaviour when considering the predicted air quality impacts. "See Supplementary memo (Additional Information Required to Support an Examination of the Air DispersionModel Behaviour, dated July 25th or 0721_KAM_Model Sensitivity_EAO004)"	"Yes, there is a topographic feature that is responsible for this behaviour. In Section 2.1 of Appendix 10.1-A the effect of topography on dispersion to the south west of Aberdeen is described thus:""Physically separating the built-up urban landscape in Kamloops from the Project site is a height of land marked by (from east to west) Coal Hill (1,092 masl), Ironmask Hill (995 masl), and Sugarloaf Mountain (1,130 masl). This feature forms a natural barrier between the Project and the City that will help confine some of the emissions to the Project site (e.g., dustfall), but will have a less pronounced confining effect on others (e.g., PM2.5 and gaseous emissions).""The isopleth patterns noted in this Comment are consistent with the steep topography in this area - which averages approximately 120 to 180 m decrease in elevation over a distance of 800 m from the height of land to the nearest residences in Aberdeen."	14/Dec/16

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Agency IR #	**FRT Tracking ID #**	**Rationale for Information Request**	**Information Request**	**Proponent Response**	**Response Date**
76	CEAA-063	The EIS (6.1-32 of Section 6.1.4.2) stated that Appendix 6.1-B was prepared to summarize the work to quantify Scope 1 Direct Emissions from the Project. Section 6.1.4.2 of the EIS stated that values for Scope 1 Direct Emissions were quoted from Appendix 6.1-B. However, the values for Scope 1 Direct Emissions included in tables in Appendix 6.1-B do not seem to match the values included in the tables in Section 6.1.4.2 of the EIS. Appendix 6.1-B stated that the values were "preliminary" and would be revised, but ECCC is not aware of revisions to these values."Environmental Impact StatementSection 6.1.4.2 Effects on Greenhouse Gas Management[page 6.1-32]Table 6.1-6Table 6.1-7Appendix 6.1-B Greenhouse Gas Emission Inventory Summary"	Provide an updated appendix 6.1-B that supports the values declared for Scope 1 Direct GHG Emissions outlined in the EIS (6.1-32). Alternately, update Section 6.1.4.2 of the EIS if Appendix 6.1-B includes the correct values. Include in the updated Appendix a detailed explanation about the particular sources (such as the quantity of each type of equipment to be used on site, their load factors, annual utilization, etc.) from the Emissions Inventory referenced in this Appendix (Appendix 6.1-B) that were used to estimate GHG emissions because it is not clear which sources contributed to these estimates. "Environmental Impact StatementSection 6.1.4.2 Effects on Greenhouse Gas Management[page 6.1-32]Table 6.1-6Table 6.1-7Appendix 6.1-B Greenhouse Gas Emission Inventory Summary"	A superceded version of the Stantec memo was incorrectly included as Appendix 6.1-B. The superceded version did not include the GHG emissions for heating during the Construction and Operation phase that were included in Section 6.1.4.2 of the Application / EIS - please see the updated memo from April 10, 2015, which includes this information.0324_KAM_GHG Emission Inventory Summary	30/Nov/16