Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

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June 29, 2018

Mark Svenson
Alberta Transportation
3rd Floor Twin Atria Building
4999 98 Avenue
Edmonton, Alberta T6B 2X3

SUBJECT: Technical Review of the Environmental Impact Statement for the Springbank Off-Stream Reservoir Project – Information Request Package 1

Dear Mr. Svenson:

The Canadian Environmental Assessment Agency (the Agency) and federal authorities have conducted a technical review of the Environmental Impact Statement (EIS) for Springbank Off-Stream Reservoir Project received from Alberta Transportation on March 29, 2018. The federal authorities participating in the review are Environment and Climate Change Canada, Fisheries and Oceans Canada, Health Canada, Natural Resources Canada, Infrastructure Canada, and Transport Canada. Indigenous groups and the technical advisory group also reviewed the EIS and contributed technical expertise and Indigenous knowledge.

The EIS Guidelines issued on August 10, 2016 describe the information required to support the assessment of effects described in the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and section 79 of the *Species at Risk Act*, and for Canada to fulfil its Crown consultation obligations to the extent possible during the environmental assessment (EA).

While the EIS Guidelines subject areas are covered in the EIS, the Agency and federal authorities have identified gaps in the information provided. This information is necessary to determine whether the Project is likely to cause significant adverse environmental effects and to inform the Agency's preparation of the EA Report under CEAA 2012.

The attached Information Request Package 1 includes sixteen items with context and rationale for the required information. The Agency has prepared this initial package to allow Alberta Transportation to continue the gathering of essential information in a timely manner. A second information request package will be developed in collaboration with the technical advisory group and consultation with Indigenous groups, to address the remaining requirements.

Canada

Federal authority technical review comments that informed specific requests are identified in the document. Written comments received from Indigenous groups, the technical advisory group, and the public were also taken into account by the Agency in developing the Information Request. All submissions regarding the technical review of the EIS will be made publicly available through the Canadian Environmental Assessment Registry (Reference #80123).

In accordance with CEAA 2012, time taken by Alberta Transportation to provide the required information is not included in the legal timeframe within which the Minister of the Environment must make her EA decision. Although issuance of this Information Request Package pauses the timeline at day 110 of 365, the Agency and federal authorities will continue to work on the Project EA, with a focus on Indigenous consultation and technical advisory group meetings to improve the Agency's understanding of the environmental effects of the Project. The Agency recognizes the importance of timely decision making based in science and Indigenous knowledge.

Upon request, the Agency would be happy to arrange a meeting to discuss and answer questions regarding the information requirements and to understand and resolve issues as needed. If you have any questions regarding this letter, please contact me.

Sincerely,

<Original signed by>

Jennifer Howe
Project Manager, Prairie and Northern Region

Enclosures:
1. Information Request Package 1 – Springbank Off-Stream Reservoir Project 06-29-2018

cc:
Seamas Skelly, Alberta Transportation
Syed Abbas, Alberta Transportation
Meghan Jurijew, Alberta Environment and Parks
Graham Irvine, Health Canada
Gayle Hatchard, Environment and Climate Change Canada
Veronica Mossop, Natural Resources Canada
Kyle Antonchuk, Fisheries and Oceans Canada
Jackie Barker, Transport Canada
Eli Arkin, Infrastructure Canada

Information Request Package 1

Springbank Off-Stream Reservoir Project

IR#: IR1-01

Topic: Accidents and Malfunctions – Worst Case Scenarios

Sources:

EIS Guidelines Part 2, Section 6.6.1

EIS Volume 3D

CEAA Annex 2: A) Early Technical Issues, December 19, 2017

Alberta Transportation Responses to CEAA Annex 2: A) Early Technical Issues, May 11, 2018

Context and Rationale:

Part 2, Section 6.6.1 of the EIS Guidelines states that the proponent will identify the probability of potential accidents and malfunctions related to the project, including an explanation of how those events were identified, potential consequences (including the environmental effects as defined in section 5 of CEAA 2012, and the significance of these effects), the plausible worst case scenarios, alternative accident scenarios, and the effects of these scenarios.

In the EIS, the proponent does not describe in sufficient detail the potential environmental effects of accidents and malfunctions for worst case scenarios such as off-stream dam failure or breach, and diversion structure failure or breach. The proponent discusses the valued components that may be affected by an off-stream dam or diversion structure accident or malfunction, but does not explain how the valued components would be affected by the worst case scenarios, in particular the geographical and temporal extent of such effects.

CEAA Annex 2: A) Early Technical Issues Question 22(b) asks the proponent to provide further details on the worst case scenarios for a hazardous materials spill and pipeline rupture, such as how or when the events would occur, environmental consequences, and temporal and geographical extent.

Although the proponent's response includes a description of the potential worst case scenario for both a hazardous material spill and a pipeline rupture, the details such as location, volume, and type of material spilled are lacking. For the hazardous material spill, stating that "the extent of potential adverse effects would be a function of the volume, location, and type of material spilled" does not provide a clear picture of the potential environmental consequences. Quantitative predictions (e.g. volumes) for all worst case scenarios should be estimated.

The EIS states: “Spills would have limited potential to affect groundwater, as they would be confined to the soils within the timeframe of a cleanup response and be appropriately contained and excavated before migrating to the groundwater table.” Further information on plans to avoid and respond to spills, based on environmental severity (e.g. volume, location and type of spill), is required in order to understand potential effects to groundwater from a hazardous material spill.

Information Request:

a) For an off-stream dam failure or breach and diversion structure failure or breach, provide details on how the valued components would be affected by the worst case scenarios, the associated environmental consequences (such as potential species affected), and the temporal and geographical extents of the effects.
b) For a hazardous material spill and a pipeline rupture, provide details, such as volumes and locations, of the estimated worst case scenario.
c) Identify and describe contingency and response planning for hazardous material spills, including on-site response capacity and times, and spill notification procedures.
d) Considering the estimated worse case scenarios and response plans, update the assessment of potential effects to groundwater from a hazardous material spill or pipeline rupture.

IR#: IR1-02

Topic: Surface Water Quality

Sources:

EIS Guidelines Part 2, Section 6.2.2, Section 6.3.1, Section 8

EIS Volume 1, Attachment A: Water Management Plan, Section A5

EIS Volume 3C, Section 2.6

CEAA Annex 2: A) Early Technical Issues, December 19, 2017

Alberta Transportation Responses to CEAA Annex 2: A) Early Technical Issues, May 11, 2018

Environment and Climate Change Canada (ECCC) Technical Review, June 18, 2018

Context and Rationale:

Section A.5.1 of the Water Management Plan describes the proposed criteria that will determine when reservoir water will be released to the Elbow River, as follows:

1. Flows in the Elbow River are below 20 m^3/second,
2. Criteria relating to the length of time required to drain the reservoir.

The proponent provides different messaging in relation to its plans for water quality sampling. Volume 3C, Section 2.6 of the EIS states that, "prior to discharge from the reservoir, water samples will be collected at the low-level outlet channel and analyzed", while the Water Management Plan indicates that "water samples will be collected from the outlet channel at the confluence between the outlet channel and the Elbow River." Additionally, in the response to CEAA Annex 2, Question 5 the proponent states, "The follow-up and monitoring program for surface water quality (…) indicates that water sampling, including TSS, will be undertaken at the low-level outlet during water release from the off-stream reservoir." These three statements vary about how and where water sampling will occur (e.g. prior to discharge to the Elbow River, at the confluence of the low level outlet channel with the Elbow River, or during discharge).

Information Request:

a) Explain how water quality sampling during post-flood operations will occur, including the timing and location of any sampling.
b) ECCC indicated that the best option is to sample from the reservoir prior to discharge, above the control structure, i.e. at the inlet to the low level outlet. If sampling plans differ from ECCC's proposed approach, provide a rationale as to why.

IR#: IR1-03

Topic: Surface Water Quality

Sources:

EIS Guidelines Part 2, Section 6.6.2 and 6.3.1

EIS Volume 3B, Section 7

ECCC Technical Review, June 18, 2018

Context and Rationale:

Part 2, Sections 6.2.2 and 6.3.1 of the EIS Guidelines require that any changes to total suspended solids, turbidity, water temperature, pH, dissolved oxygen, ice regime, water quality including metals, methyl mercury, nutrients, dissolved/total organic carbon, biological oxygen demand, and carbonaceous biochemical oxygen demand, pesticides, aquatic indicators, and sediment quality that are predicted to occur as a result of the project be included in the EIS.

Water quality modelling predictions within the reservoir prior to discharge to the Elbow River have not been completed for all parameters listed in the EIS Guidelines. Only suspended sediment, temperature, dissolved oxygen, and methyl mercury are either qualitatively or quantitatively assessed to predict the concentrations that may be discharged back to the Elbow River post-flood.

The rationale provided for the exclusion of predicted concentrations include the lack of analogous measurements or surrogate parameters (temperature and dissolved oxygen) and that sediment associated parameters (metals) will behave like the modelled suspended sediments. It is still unclear what the water quality in the reservoir will be at the time of discharge in comparison to the Elbow River.

While the EIS concludes that the discharge is not anticipated to cause effects to the aquatic environment, it does not provide discharge limits for relevant water quality sampling parameters, prior to being discharged to the Elbow River, along with an explanation for why these would mitigate adverse effects to the aquatic environment.

Information Request:

a) Provide proposed discharge limits for relevant water quality sampling parameters in the off-stream reservoir, prior to being discharged to the Elbow River.
b) Provide flood/post-flood contingency monitoring and mitigation options to be employed in the event that water quality within the reservoir is not suitable for discharge.

IR#: IR1-04

Topic: Hydrology – Reservoir Retention, Draw Down, and Suspended Sediments

Sources:

EIS Guidelines Part 2, Section 6.3.1

EIS Volume 3B, Section 7.4.4

EIS Volume 3B, Section 6.4.3.3

EIS Volume 1, Section 3.2.4 Table 3-3

DFO ANNEX 2 Technical Review, June 19, 2018

Context and Rationale:

In Volume 3B Section 6.5.2, the EIS states, "Water would be in the reservoir from the start of diversion to the end of emptying for the following durations:

- 62 days (design flood)
- 84 days (1:100 year flood)
- 74 days (1:10 year flood)"

The time it takes to draw down the reservoir post flood is shorter for the design flood volume of 77,800 dam^3 than it is for the 1:100 year flood volume of 30,100 dam^3 and only 8 days longer than the 1:10 volume of 500 dam^3. The proponent states, "… release rates may be increased if two back-to-back floods are forecast, or decreased to reduce potential effects on mobilization of sediment in the low-level outlet and remobilization of sediment in Elbow River downstream." Clarity and rationale for draw down times for each flood scenario is needed in order to determine potential effects to fish, and inform minimum residence time in the reservoir which could be used to potentially mitigate serious harm to fish.

Information Request:

a) Clarify and provide a rationale for the residence time and draw down time for each flood scenario.
b) Provide the minimum draw down time for each flood scenario (mobilization of sediment aside).

Context and Rationale:

Volume 3B, Section 6.4.3.3 of the EIS states, "There would be a much higher output of suspended sediment mass from the reservoir, compared to the design flood, despite a lower discharge rate from the reservoir. For the 1:100 year flood, there is very little change in

suspended sediment mass as a result of erosion within the low-level outlet. The high sediment yield released from the reservoir is likely due to remobilization and suspension of material deposited at the low-level outlet. Because there is a large amount of sediment deposited in this area, sediment supply is not limited. The modelled peak and average concentrations are higher for the 1:100 year flood than for the design flood (Table 6-7 and Table 6-8)."

The proponent provides different messaging in relation to whether suspended sediment offsets the material remaining in the reservoir or if it is a negligible amount. The proponent states "Up to 0.2 kt of suspended sediment material may be mobilized and transported from the low-level outlet, which would increase the suspended sediment yield from 89.5 kt to 89.7 kt before the confluence with the Elbow River. Flow and storage effects in Elbow River dilutes this suspended sediment input to 68.6 kt, a 25% decrease, by approximately 1.0 km downstream of the confluence with the low-level outlet. This addition of new suspended sediment partially offsets the material remaining in the reservoir that would have been transferred downstream in the absence of active diversion. This addition effectively reduces the sediment yield loss for the design flood by a negligible amount."

Given that section 6.4.3 of the EIS states, the "longer the residence time, the greater the deposition", clarity is needed on the concentrations of suspended sediment for each flood scenario to assist in determining potential effects to fish habitat downstream of the low-level outlet channel.

Information Request:

c) Clarify why the modelled peak and average suspended sediment concentrations are higher for the 1:100 year flood than for the design flood, despite a lower discharge rate from the reservoir, and more than twice the residence time in the reservoir.

IR#: IR1-05

Topic: Surface Water Quality – Suspended Sediment

Sources:

EIS Guidelines Part 2, Section 6.2.2; Section 6.3.1; and Section 6.4.4

EIS Volume 3B, Section 7

CEAA Annex 2: A) Early Technical Issues, December 19, 2017

Alberta Transportation Responses to CEAA Annex 2: A) Early Technical Issues, May 11, 2018

ECCC Technical Review, June 18, 2018

Context and Rationale:

Volume 3B, Section 7.4.2 indicates that peak total suspended sediment (TSS) concentrations exiting the low level outlet at the Elbow River confluence are estimated as 1,798 mg/L (1:10 year flood), 20,692 mg/L (1:100 year flood), and 17,955 (design flood). Using these pre-mitigation concentrations of TSS, the proponent has concluded that the "effect of the Project on water quality is not significant because the change in water quality is not anticipated to cause acute or chronic toxicity or change the trophic status of the Elbow River." With respect to suspended sediments specifically, no rationale or evidence is provided to support the statement that the modelled concentrations are not acutely or chronically toxic to fish.

Toxicity of TSS in the water column is related to both concentration and duration of exposure. The proposed upper limit TSS concentrations during discharge could contribute to acute toxicity of larval life stages via smothering or chronic toxicity by clogging of the gills. In addition, since the reservoir will not be discharged until the flood event has sufficiently subsided, the aquatic biota in the Elbow River will undergo prolonged TSS related stress due this additional discharge period as compared to a flood event alone.

In response to CEAA Annex 2 Question 5, the proponent states that "given that significant effects are not predicted, the use of sediment control measures are not anticipated to be necessary" and "should TSS levels be significantly greater than predicted, adaptive management measures would be implemented." While the proponent maintains that the increase in suspended sediment concentrations can be mitigated with the operation of the low level outlet and with physical sediment barriers, the EIS does not indicate what the expected concentrations post-mitigation may be.

Concentrations of TSS that are "significantly greater" than the modelled discharge concentrations would result in further impacts to aquatic life, not the beginning of impacts to aquatic life (as implied in response to CEAA Annex 2 Question 5). The proponent has not

sufficiently described an approach for addressing the potential adverse environmental effects associated with increased concentrations of TSS in the receiving environment that may affect fish or fish habitat.

ECCC noted that subsection 36(3) of the *Fisheries Act* prohibits the discharge of deleterious substances to waters frequented by fish, or to a place where those substances might enter such waters.

Information Request:

a) Identify measures to mitigate the predicted high levels of TSS concentrations in the discharge and demonstrate that these measures would mitigate potential adverse effects to water quality.
b) Assess residual effects to water quality, after the application of mitigation measures. Describe the uncertainty of the effectiveness of these mitigation measures and identify a monitoring and follow-up program for water quality.

IR#: IR1-06

Topic: Surface Water Quality – Methylmercury

Sources:

EIS Guidelines Part 2, Section 6.2.2; Section 6.3.1; and Section 6.4.4

EIS Volume 3B, Section 7

CEAA Annex 2: A) Early Technical Issues, December 19, 2017

Alberta Transportation Responses to CEAA Annex 2: A) Early Technical Issues, May 11, 2018

ECCC Technical Review, June 18, 2018

Context and Rationale:

In section 6.3.1, the EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, including the potential risk of production, increase, interaction, and accumulation of contaminants, including methylmercury.

The proponent has not provided adequate information on the potential for methylmercury to be released downstream after a flood event or on the potential accumulation of methylmercury in the food web of the reservoir or downstream environment. The proponent states that after release of water into the Elbow River, the reservoir area would not contribute methylmercury; however ECCC is of the view that the proponent has not demonstrated this with the data presented.

The study "Future Impacts of Hydroelectric Power Development on Methylmercury Exposures of Canadian Indigenous Communities" does not appear to be used in the proponent's analyses (Calder et al. 2016). This study sheds light on the relationship between methylmercury production and the organic carbon content of flooded soils in new reservoirs. This study includes analyses of the Experimental Lakes Area studies cited by the proponent, and thus should be included in the proponent's assessment.

It is well documented that regions with organic soil carbon content, and especially wetlands, produce methylmercury at greater rates and/or for longer durations post-flooding than low organic carbon landscapes. It is therefore important that the full range of landscape types in the potentially flooded area is captured by total mercury, methylmercury, and organic carbon sampling to predict the potential impacts on methylmercury production.

Methylmercury bioaccumulates through food webs to levels that may be harmful to top predatory fishes, wildlife, and human consumers. A relatively small increase in methylmercury concentrations in the water of an aquatic ecosystem can result in increased methylmercury in the top predatory organisms of an aquatic food web. The proponent's projected water methylmercury concentrations in the reservoir of 0.00028 to 0.002 µg/L are higher than those

recently reported in a multitude of lakes across Canada (0.00007 ± 0.0001 µg/L) and approximately double or triple those in unimpacted Canadian freshwater systems, which are typically <0.0001 µg/L (ECCC, 2016). ECCC is of the view that comparison of projected methylmercury levels in the Springbank reservoir to the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guideline for the Protection of Aquatic Life is not a sufficient method to determine if effects on aquatic life can be expected from the Project.

The proponent states that after release of water into the Elbow River, the reservoir area would not contribute methylmercury because microbial decomposition processes would cease in the reservoir. ECCC notes that it is well documented that in addition to increased methylmercury production following the initial flooding of reservoirs, ongoing wetting and drying cycles and reservoir draw down can continue to stimulate methylmercury production (Orem et al. 2011; Eckley et al. 2015; Hsu-Kim et al. 2018). Reservoir water-level fluctuations have also been shown to increase sediment erosion and resuspension of mercury in the water column, which may make it more available for methylation (Mucci et al. 1995).

The proponent states that mercury methylation currently occurs during floods on the Elbow River without the presence of the Project and that this is supported by "the higher methylmercury concentrations in the Elbow River sediment and Glenmore Reservoir sediment compared to the existing condition of soils in the off-stream reservoir." No baseline total and methylmercury monitoring information for the Elbow River and Glenmore Reservoir is provided in the EIS Volume 3B. Data is required to support the above statement, including the number of samples and sampling locations. Baseline methylmercury data in water of the Elbow River and Glenmore Reservoir are needed to predict effects of the Project.

Information Request:

a) Incorporate results of the study "Future Impacts of Hydroelectric Power Development on Methylmercury Exposures of Canadian Indigenous Communities" (Calder et al. 2016), in relation to organic carbon content of flooded soils in new reservoirs, into the assessment of methyl mercury production.
b) Provide information on the sampling of total and methylmercury, including data on the number of samples, location of sampling sites, and if the sampling sites span the full geographical extent and all soil/terrain types of the proposed reservoir.
c) Estimate potential increases in methylmercury in the food web of the reservoir area and downstream ecosystems.
d) Describe the potential impact of drying of the reservoir area between flood events on methylmercury production and export downstream over the long-term (i.e. 5-40 years) to assess potential impacts of methylmercury releases.
e) Provide data that supports the statement that mercury methylation currently occurs during floods on the Elbow River; include number of samples and sampling locations.
f) Provide baseline methylmercury data in water of the Elbow River or describe a plan to collect such data prior to proceeding with the Project.

IR#: IR1-07

Topic: Migratory Birds and Species at Risk – Risks During Operations

Sources:

EIS Guideline Part 2, Section 6.3.2; Section 6.3.3; Section 6.4

EIS Volume 3B, Section 11.3.4.1; Section 11.3.4.2

ECCC Technical Review, June 18, 2018

Context and Rationale:

In section 6.3.2, the EIS Guidelines require the proponent to identify any potential direct and indirect adverse effects to migratory birds or their habitat, including staging and nesting areas, foraging grounds, and landing sites.

The proponent notes that the Project is predicted to increase bird and wildlife mortality risk in the project development area during a flood. Most of the flooded area would encompass wetlands and reclaimed vegetation that might be suitable breeding habitat for amphibians and ground-nesting migratory birds, respectively. Rising flood waters in the off-stream reservoir would remove migratory bird residences (e.g. nests) and young (e.g. eggs, nestlings, or fledglings), change the conditions required for amphibian larvae to develop, and introduce predatory fish that can prey on amphibians (e.g. eggs, larvae, or adults).

The *Migratory Birds Convention Act* protects migratory birds and their nests from destruction. In most years, the off-stream reservoir will provide habitat for nesting birds. Flood events can occur during the spring and summer, as evidenced by the 2013 flood which occurred in late June through early July. The Project will purposefully divert water into areas where migratory birds are likely to be nesting, resulting in potential incidental take, contrary to the provisions of the *Migratory Birds Convention Act*. The proponent has acknowledged that there may be mortality associated with a flood event, but has not put forward any mitigation measures to avoid incidental take on nesting birds. When there is advanced notice of a pending flood, there may be opportunity to undertake mitigation measures.

Several *Species at Risk Act* (SARA) listed amphibian species such as the northern leopard frog, western tiger salamander, and western toad may occur within the project area. The proponent has not identified any surveys undertaken to confirm the presence or absence of these species within the off-stream reservoir. Any wetlands within the perimeter of the off-stream reservoir could be entirely flooded during a flood event. SARA listed amphibian species occupying these wetlands would have their habitat inundated and individuals could be swept away into open water where they would be vulnerable to mortality by drowning.

Information Request:

a) Identify and describe mitigation measures that would be undertaken during operation (flooding of the reservoir) to address the increase in mortality risk to birds listed under the *Migratory Birds Convention Act*. Provide a plan to avoid incidental take of nesting migratory birds in the offsite reservoir, given there is sufficient advanced notice of an impending flood. This could include, but not be limited to, deterrents, salvage of nestlings, etc. Include advanced surveys to identify important areas for nesting.

b) Identify and describe mitigation measures that will be undertaken during operation (flooding of the reservoir) to address the increase in mortality risk to species listed under the *Species at Risk Act*. Provide a mitigation plan to avoid the potential mortality to northern leopard frog, western tiger salamander and western toad within the off-stream reservoir as a result of flooding. Include surveys for the potential presence of amphibian species at risk to be completed in advance of flooding and describe plans for amphibian salvage of individuals, given there is sufficient advanced notice of an impending flood.

IR#: IR1-08

Topic: Species at Risk – Mitigation Measures

Sources:

EIS Guidelines Part 2, Section 6.3.3; Section 6.4; Section 7; Sections 8.0, 8.1, 8.2

EIS Volume 3A Section 11

EIS Volume 3B Section 11

EIS Volume 4 Appendix H

CEAA Annex 2: A) Early Technical Issues, December 19, 2017

Alberta Transportation Responses to CEAA Annex 2: A) Early Technical Issues, May 11, 2018

Context and Rationale:

Part 2, Section 6.3.3 of the EIS Guidelines requires the proponent to identify the potential effects of the Project on federally listed species at risk and those species classified by the Committee on the Status of Endangered Wildlife in Canada as extirpated, endangered, threatened or of special concern (flora and fauna) and their critical habitat; and to identify any potential direct or indirect effects on those identified species at risk.

Species at risk with use or potential to occur in the project development area may be affected by Project components and activities that are located at closer than recommended distances to nesting/breeding areas or important habitat features, or that are scheduled to occur during periods of greater risk (breeding seasons). CEAA Annex 2: A) Early Technical Issues (CEAA Annex 2), Question 8, asks the proponent to provide additional site specific mitigation, follow-up and monitoring commitments for those construction activities anticipated to be located within provided setback distances for known locations associated with species at risk (e.g., colonial nest sites for bank swallow, barn swallow).

In response to CEAA Annex 2, Alberta Transportation references site and species-specific mitigation measures that will be developed in the future to address effects to species at risk as a result of project activities, where compliance is not possible with timing or setback distance advice of federal and provincial regulators. Further elaboration of these yet to be planned mitigation measures is required to support the identification of key mitigation measures to avoid adverse effects to species at risk, as outlined in Section 7 of the EIS Guidelines.

Information Request:

a) Where proponent commitments are to the future development of site-specific and species-specific mitigation measures (e.g. as noted for barn swallow, bank swallow, horned grebe, rusty blackbird, western tiger salamander, western toad, little brown myotis), describe the plan including schedule/timing for development of acceptable mitigation measures in consultation with regulators (ECCC and Alberta Environment and Parks, as identified by the proponent).
b) Confirm proponent commitments to additional actions and mitigation measures that would be triggered if the presence of a wildlife feature (e.g. nests, breeding wetlands) or individual is identified and reported.
c) Where mitigation commitments for species at risk include reference to pre-construction surveys, describe how pre-construction surveys will be scheduled with each project component and activity and/or included in the Environmental Construction Operations plans directing construction contractors.

IR#: IR1-09

Topic: Follow-up and Monitoring

Sources:

EIS Guidelines Part 2, Sections 8.0, 8.1, 8.2

EIS Volume 3C: Effects Assessment (Cumulative Effects, Follow-up and Monitoring), Section 2.0 Preliminary Follow up and Monitoring Programs

Context and Rationale:

In the EIS, the proponent presents information related to its Preliminary Follow-up and Monitoring Program, noting that "Final follow-up and monitoring plans will rely on approval conditions (both provincial and federal), future refinement of Project planning and design, and the results of ongoing consultation with Indigenous groups and public stakeholders. Final follow-up and monitoring plans will include further details and guidelines for preparing monitoring reports (e.g., number, content, frequency and format)." However, migratory birds and species at risk are not included in the Preliminary Follow-up and Monitoring Programs described by the proponent in the EIS.

Throughout the EIS and in the response to CEAA Annex 2, the proponent includes commitments for the future development of site- and species-specific mitigation measures to address project effects to birds protected under the *Migratory Birds Convention Act* and to species at risk in those places and times of year where planned construction and operation activities may be non-compliant with standard avoidance best practices. Given the uncertainty in proposed mitigation measures, particularly in the case of modifications from standard mitigation measures, follow-up and monitoring is required to verify the effectiveness of the measures.

Information Request:

a) Provide information, including site- and species-specific mitigation measures, purpose, objectives, and actions, for the Project follow-up and monitoring programs for the following valued components of the environment, and describe how the effectiveness of these mitigation measures will be monitored and evaluated:
   i. birds listed under the *Migratory Birds Convention Act*
   ii. birds listed under the *Species at Risk Act*
   iii. amphibian species at risk
   iv. wildlife species at risk

IR#: IR1-10

Topic: Alternative Means

Sources:

EIS Guideline Part 2, Section 2.2

EIS Volume 1, Section 2.2.6

CEAA Annex 2: A) Early Technical Issues, December 19, 2017

Alberta Transportation Responses to CEAA Annex 2: A) Early Technical Issues, May 11, 2018

Context and Rationale:

The EIS Guidelines require the proponent to complete the assessment of alternative means according to the Agency's Operational Policy Statement entitled *Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012.*

The responses to CEAA Annex 2: A) Early Technical Issues Question 1, describe the environmental constraints considered for the alternative road realignments, such as wetland and riparian areas, native prairie and rare plants, wildlife constraints, and sections of historical interest. However, the proponent did not include an assessment of potential effects to each valued component in its determination of preferred alternatives for Realignments and Modifications to Public Roads.

Information Request

a) Update the assessment of alternative means for Realignments and Modifications of Public Roads to include consideration of the potential effects of the alternatives considered on valued components.

IR#: IR1-11

Topic: Cumulative Effects

Sources:

EIS Guidelines Part 2, Section 6.6.3

EIS Volume 2, Section 7.2

EIS Volume 3C, Section 1

Context and Rationale:

The EIS separates the assessment of cumulative effects of the Project into two scenarios: construction and dry operations, and flood and post-flood. In combination, the two scenarios constitute the total project phases and physical activities associated with the Project. By separating the assessment, the proponent may have underestimated the cumulative effects of the Project. For example, some residual effects from construction may not be restored to baseline conditions (e.g. re-vegetation of cleared areas, implementation of fish habitat offsetting) prior to the flood and post-flood scenario beginning.

The EIS Guidelines, the Agency's Operational Policy Statement on *Assessing Cumulative Environmental Effects under CEAA 2012* and the Agency's Technical Guidance on *Assessing Cumulative Environmental Effects under CEAA 2012* all require a scoping step to identify temporal boundaries for the cumulative effects assessment. This should include clear, well supported documentation of the chosen temporal boundaries for each valued component for the consideration of cumulative effects. Although the proponent has described past, present and future projects, temporal boundaries were not identified or described in sufficient detail to understand both the past and future temporal boundaries of the cumulative effects assessment.

Information Request

a) Update the cumulative effects assessment for each valued component to include an analysis of the cumulative effects of the Project as a whole.
b) Describe how temporal boundaries were scoped and how the chosen temporal boundaries will adequately capture the expected cumulative effect.
c) As necessary, update the cumulative effects assessment to address any changes to the temporal boundaries or list of past, present and future physical activities.

IR#: IR1-12

Topic: Human Health Risk Assessment

Sources:

EIS Guidelines Part 2, Section 6.3.4 Aboriginal Peoples

EIS Volume 4, Appendix O, Section 3.4, Figure 3-2, pp. 3.13

Context and Rationale:

In section 6.3.4, the EIS Guidelines require the proponent to provide a description and analysis of how changes to the environment caused by the project will affect each Indigenous group's human health. When risks to human health are anticipated, a complete Human Health Risk Assessment (HHRA) is to be completed.

Dustfall poses a risk to Indigenous health through the gathering and consumption of traditional plants. The conceptual site model under the post-flood operation phase contains the exposure pathway *Dustfall -> Garden Produce and Traditional Plants* by Dispersion and Settling of Dust on Plants. However, this pathway is not included in the construction phase of the conceptual site model.

The conceptual site model does not include exposure to indoor settled dust. The exclusion of this route of exposure may underestimate risk to residents nearby the project site during the construction phase of the assessment. Health Canada has published guidance on this topic: Supplemental Guidance On Human Health Risk Assessment Of Indoor Settled Dust (2018).

Information Request:

a) Consider the Dispersion and Settling of Dust on Plants pathway in the construction phase as it has the potential to result in increased exposure. If this pathway is not included in the construction phase, provide a rationale for its exclusion.
b) Determine whether indoor settled dust is an operable exposure pathway in the human health risk assessment. Based on this determination, include the indoor settled dust as an operable exposure pathway in the Human Health Risk Assessment or provide rationale why this exposure route was not included.

IR#: IR1-13

Topic: Human Health Risk Assessment

Sources:

EIS Guidelines Part 2, Section 6.3.4 Aboriginal Peoples

EIS Volume 4, Appendix O, Section, pp. 3.2 & Appendix B – COPC Screening, Table B-1

Context and Rationale:

The HHRA carried forward contaminants of potential concern (COPC) via secondary pathways if the COPC had a:

- half-life in soil greater than or equal to six months (measure of persistence) or;
- Log K_{ow} greater than or equal to 5 (measure of potential to bioaccumulate).

As there is little discussion supporting the use of these screening criteria, it is unclear why these COPCs were screened out. All COPCs that pose a potential health risk need to be considered.

Information Request:

a) Provide references and supporting information for the numerical values used in the screening for persistence and bioaccumulation of COPCs.
b) Provide a rationale for the approach taken to carrying forward COPC via secondary pathways due to the criteria mentioned above. Discuss uncertainty associated with exposures using this approach and how exclusion of contaminants on this basis is protective of human health.

IR#: IR1-14

Topic: Human Health Risk Assessment

Sources:

EIS Guidelines Part 2, Section 6.3.4 Aboriginal Peoples

EIS reference Volume 4, Appendix O, Section 4.2.3, Figure 3-2, pp. 4.15

Context and Rationale:

Non-carcinogenic polycyclic aromatic hydrocarbons were not carried forward in the assessment of human health with the exception of naphthalene. Other non-carcinogenic polycyclic aromatic hydrocarbons may affect Indigenous health through inhalation or ingestion and need to be considered in the Human Health Risk Assessment.

Although Health Canada may not have toxicological reference values (TRVs) published for all non-carcinogenic polycyclic aromatic hydrocarbons, TRVs developed by other jurisdictions may be acceptable with justification and supporting data.

Health Canada has published guidance on this topic: Supplemental Guidance on Human Health Risk Assessment of Air Quality (2017).

Information Request:

a) Provide an updated assessment of human health, which carries forward COPCs that were screened out of the HHRA due to lack of a Health Canada TRV.
b) With the inclusion of additional COPCs, update the assessment of residual effects and include additional mitigation measures to address these effects.

IR#: IR1-15

Topic: Human Health Risk Assessment

Sources:

EIS Guidelines Part 2, Section 6.3.4 Aboriginal Peoples

EIS Volume 4, Appendix O, Section 6.0

Context and Rationale:

Exposure to some carcinogenic substances during early life stages may be associated with higher risk of cancer for those carcinogens that act through a mutagenic mode of action. For these substances, Health Canada recommends that age-dependent adjustment factors are applied. Due to residents located within close proximity to the Project and land use by individuals of all ages, the sensitivity associated with exposure of carcinogenic substances needs to consider age as a factor.

Information Request:

a) Within the Human Health Risk Assessment, include age-dependent adjustment factors to adjust for the different sensitivities of earlier life stages when determining incremental lifetime cancer risk of carcinogens acting through a mutagenic mode of action.

IR#: IR1-16

Topic: Human Health Risk Assessment

Sources:

EIS Guidelines Part 2, Section 6.3.4 Aboriginal Peoples

EIS Volume 4, Appendix O, Attachment 15A, Table 15A-1 & Section 4.2.2, pp. 4.12

Context and Rationale:

Inhalation of ethylbenzene can result in respiratory effects and needs to be reported in order to assess the potential effects to human and wildlife health.

In Table 15A-1 the health-based screening guidelines for acute inhalation of ethylbenzene is a 1-hour concentration of 2,000 $\mu g/m^3$. The toxicity assessment in Appendix O states the 1-hour exposure level of ethylbenzene is 86,000 $\mu g/m^3$.

Information Request:

a) Explain the discrepancies in the 1-hour acute inhalation values for ethylbenzene.

References:

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