



Canadian Environmental
Assessment Agency

Agence canadienne
d'évaluation environnementale

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November 3, 2016

Mr. Derek Holmes
Regional Manager, B.C. Aggregate Division
BURNCO Rock Products Ltd.
1A, 2760 Emerson Street
Abbotsford BC V2T 3J6

Dear Mr. Holmes:

The Canadian Environmental Assessment Agency (the Agency) and federal authorities have conducted a technical review of the Environmental Impact Statement (EIS) for the BURNCO Aggregate Mine Project (the Project), received from BURNCO Rock Products Ltd. (BURNCO) on August 4, 2016. The federal authorities participating in the review include Fisheries and Oceans Canada, Environment and Climate Change Canada, Health Canada, Natural Resources Canada, and Transport Canada.

The EIS Guidelines issued on December 16, 2014 describe the information required to support the assessment of effects described in the former *Canadian Environmental Assessment Act, 1992* (former Act) and section 79 of the *Species at Risk Act*, and for Canada to fulfil its Crown consultation to the extent possible during the environmental assessment (EA).

While the majority of the EIS Guideline requirements are addressed in the EIS, the Agency has identified additional information necessary to fulfill the requirements of the EIS Guidelines and determine whether the Project is likely to cause significant adverse environmental effects. These requests are informed by comments from federal authorities, Indigenous groups and members of the public. Please find attached as Annex 1, the Information Request detailing the items where additional information is required and the context for the requested information.

In accordance with the transition provisions of the *Canadian Environmental Assessment Act, 2012*, time taken by BURNCO to provide the requested information is not included in the legal timeframe within which the Comprehensive Study Report must be submitted to the Minister of the Environment and Climate Change Canada. Although the issuance of this Information Request pauses the timeline at day 92 of 182, the Agency and federal authorities will continue to work on the EA, with a focus on Indigenous consultation and technical working group meetings.

.../2



I will be in contact with your consultants to schedule a meeting to discuss and answer questions regarding the items and questions contained in the Information Request, and to understand and resolve issues as required. I will also send an email with detailed technical comments provided by the federal authorities for BURNCO's consideration and discussion as part of the EIS review.

Please contact me at 604-666-2601 or at Rob.Hajdu@ceaa-acee.gc.ca should you have any questions or concerns.

Sincerely,

<Original signed by>

Rob Hajdú
Project Manager
Canadian Environmental Assessment Agency

Enclosure: Annex 1 – Information Request – BURNCO EIS

c.c.: Alan Calder – Golder Associates Ltd.
Monica Perry – B.C. Environmental Assessment Office
Chief Ian Campbell – Squamish Nation
Lesley Giroday – Ratcliff and Company
June Yoo Rifkin – Environment and Climate Change Canada
Susanne L'Heureux – Transport Canada
Veronica Mossop – Natural Resources Canada
Allison Denning - Health Canada
Corrinne Gibson – Fisheries and Oceans Canada
Regent Dickey – Major Projects Management Office

**Annex 1 – Federal Information Request
BURNCO Aggregate Mine Project Environmental Impact Statement**

Item #

1

Valued Component or Topic

Fisheries and
Freshwater Habitat

EIS

Section 5.1

Agency Context

The creation of an outlet to the pit lake containment berm is not currently planned to occur until closure. At closure, the outlet is designed to connect to WC2 at the head of the proposed offset channel. Changes have recently been made by the Province to the criteria used in classifying berms and dams.

Information Request

Since the containment berm will likely be reclassified as a dam to meet new provincial regulations, provide the location of all outlet and overflow structures to the containment berm. This is required to assess any associated effects to fish and fish habitat.

Item #

2

Valued Component or Topic

Fisheries and
Freshwater Habitat

EIS

Section 5.1

Agency Context

Proposed mitigation includes designing the pit lake in such a way that the lake elevation can be used to manage hydrostatic pressure through the course of operations so that changes to groundwater flow do not lead to a loss of flow within McNab Creek. As well, the elevation of the pit lake will be used to manage baseflows in the groundwater watercourses below pit lake. No outlet / overflow channel is currently planned for the pit lake during operations and lake inflows are groundwater, precipitation, and surface runoff. As such, it is unclear at this time how the lake elevation will be managed.

Information Request

To evaluate the effectiveness of the proposed mitigation, provide details regarding how the elevation of the pit lake will be engineered to manage the groundwater and base flows within McNab Creek (upstream) and the groundwater channels below the pit lake (downstream). Describe how the elevation of the water in the pit lake will be monitored and what hydrological conditions would require active management of the elevation.

Item #

3

Valued Component or Topic

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Fisheries and
Freshwater Habitat

EIS

Section 5.1. Appendix 5.1-A and 5.1-B

Agency Context

Limited information on the groundwater flow patterns around the existing groundwater channels in the foreshore area and in the proposed mitigation area has been provided. The hydraulic properties of the sediments present in the area of the groundwater channels and foreshore below pit lake have not been described. More detailed baseline information and predictions are required to ascertain where the increased groundwater from the pit lake will discharge into the freshwater and marine environments.

The EIS predicts an increase in groundwater flow in WC3, WC4, WC5, and in the estuary. The proposed mitigation channel will also rely on groundwater flow. It is not clear where groundwater will leave the ground and enter the watercourses, estuary, and marine environment. A better understanding of where and how the groundwater would flow into the aquatic and marine environments is required to understand mixing with surface water and its potential effects. The source of the groundwater is not understood (from the pit lake or deep groundwater), which can have implications on fish habitat.

Information Request

Provide a description of the location where groundwater will enter each watercourse, the source of the groundwater, its flow volume (current and predicted), wetted area, flow depth, and potential effects on fish and fish habitat, including the effects of temperature changes. The description should include any new watercourses constructed as habitat to offset effects to fish habitat such as the extension to WC2.

Item #

4

Valued Component or Topic

Fisheries and
Freshwater Habitat

EIS

Section 5.1,
Appendix 5.1-A and 5.1-B

Agency Context

Limited information on seasonal water temperatures have been provided for the fish bearing watercourses downstream of the pit lake. Given the proximity to the pit lake and the groundwater inputs that will likely be sourced from the pit lake, water temperature changes are likely to be higher in the fall and lower in the spring. More detailed baseline information and predictions are required to identify and understand the magnitude of water temperature changes and any potential associated effects to fish and fish habitat including egg to fry survival, growth rates and changes to the aquatic invertebrate and macrophyte communities.

Information Request

Provide current and predicted post operation seasonal water temperatures in WC2, WC3, WC4 and WC5 as well as the proposed mitigation rearing channels. Discuss any potential effects (positive and negative) to the fish communities utilizing the watercourses including any changes to the habitat quality and food

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availability resulting from potential changes to the benthic macroinvertebrate and macrophyte communities.

Item #

5

Valued Component or Topic

Fisheries and
Freshwater Habitat

EIS

Section 5.1, Appendix 5.1-A and 5.1-B

Agency Context

Section 5.1 and Appendix 5.1-B of the EIS describes the upper portion of Water Course 2 (WC2) as only containing rearing and overwintering habitat; however, in Appendix 5.1-A, the upper 20% of the channel is described as having "riffle-glide habitat with suitable gravels for spawning salmonids." There are also sections of exposed gravels elsewhere in WC2 that are suitable for spawning.

In 2004 and 2012 adult Chum, Coho and Pink salmon were observed spawning in WC2. Cutthroat Trout are also known to spawn in the upper reaches of WC2 but these data have not been provided in the EIS.

In order to understand the effects to all life stages of salmon using WC2, provide a characterization of salmon spawning habitat in the upper and lower reaches of WC2.

Information Request

Describe how the loss of this habitat will affect the different salmon populations in WC2 including recruitment to WC2.

Item #

6

Valued Component or Topic

Fisheries and
Freshwater Habitat

EIS

Appendix 5.1-B

Agency Context

The proposed offsetting for the loss of fish habitat within WC2 is to develop rearing and overwintering habitat in the channel downstream of the pit lake. The proposed offsetting channel does not include any spawning habitat. While the plan proposes to use gravel suitable for spawning over 10% of its length there is no commitment to create functional spawning habitat to replace the loss of the spawning habitat in the upper reach of WC2.

Offsetting options for the creation of spawning habitat downslope of the pit lake or in adjacent fish bearing watercourses should be considered. If no opportunities exist within or near the local study area, opportunities within the region could also be explored. Changes to the proposed channel design

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optimizing slopes and groundwater capture to increase velocities and to maximize groundwater upwelling may be beneficial.

Information Request

Provide a conceptual plan to offset effects to fish habitat that includes replacing the loss of spawning habitat in upper WC2.

Item #

7

Valued Component or Topic

Marine Resources

EIS

Section 5.2

Agency Context

The groundwater contribution to the marine estuary (inactive fan) is anticipated to increase as a result of the proposed pit lake. The locations of where the groundwater is expected to upwell have not been identified / modelled. An increase in groundwater may result in an increase in the hydrostatic pressure in the subsurface. With only limited information on the geology and groundwater flow patterns, there is insufficient information to determine if there is a risk the increased hydrostatic pressure could impact the stability of the inactive fan forming the marine estuary.

Information Request

Describe the effects of the increased ground water flow and associated hydrostatic pressure on the stability of the sediments and slopes in the marine estuary, the potential for movement, and any associated effects to fish and fish habitat.

Item #

8

Valued Component or Topic

Marine Resources

EIS

Section 5.2

Agency Context

The EIS states that the barging route overlaps with the glass sponge reef at the mouth of Ramillies Channel. No other sponge reefs (glass sponge or otherwise) have been identified by the proponent in the proximity of the Project. At the public information sessions held Sept. 12-13, 2016 several members of the public expressed concern for cloud sponge reefs close to the proposed Project infrastructure.

Information Request

Confirm whether additional sponge reefs, including the cloud sponge reefs alleged to occur in proximity to the proposed project area, are present in the Marine Resources Local Study Area or Regional Study

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Area. If present, provide the location, depth and distance to the Project and provide an assessment of potential effects from barging activities.

Item #

9

Valued Component or Topic

Marine Resources

EIS

Section 5.2

Agency Context

The EIS states that in-air noise as a result of Project-related activities will be at least 108 dBA at the source, which exceeds the established bird disturbance threshold level of 80 dBA, (page 5.2-102).

The EIS also states, however, that residual effects to marine birds as a result of in-air noise will be negligible because threshold exceedances are not predicted in the McNab Creek estuary (Page 5.2-139).

The Agency notes that if behavioral disturbance occurs as a result of a threshold exceedance in the Project area where birds are known to be present, a residual effect occurs and this must be characterized.

Information Request

Provide a revised residual effects assessment of in-air noise on all birds that use the marine environment to fulfill any of their biological or life stage requirements. Ensure that all potentially impacted marine locations are assessed. Alternatively, provide a rationale for why this is not necessary.

Item #

10

Valued Component or Topic

Marine Resources

EIS

Section 5.2.5.2.2.1.1,

Agency Context

The EIS states that the benthic invertebrate community where the piles would be installed is “characterized by low species density and diversity... and associated with relatively low value benthic habitat” (page 5.2-67). The EIS states that habitat loss will occur, as well as changes in habitat quality, but that no residual effects would occur because “the majority of habitat loss corresponds with areas of low value habitat due to wood waste accumulation from historical log dump operations” (page 5.2-119).

However, the Non-Traditional Land Use section of the EIS, as well as comments received from the public, indicate that the Local Study Area is an important harvesting area for crabs, prawn, shrimp, fish and other marine resources. If marine resources are present in the area, and habitat destruction and

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alteration will occur after the implementation of mitigation measures, residual effects would likely occur.

Information Request

Conduct a revised residual effects assessment for marine benthic communities that reconciles the discrepancy.

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11

Valued Component or Topic

Marine Resources

EIS

Section 5.2.5.2.3.1.3. and Section 5.2.5.7.6 and Figures 5.2-7 and 5.2-8

Agency Context

The baseline data (pages 5.2-84 and 85) presented for the assessment of impacts to the marine mammals does not include noise generated from BC Ferry vessel transits. The EIS states on page 5.2-147 that “no concurrent vessel movements are expected and therefore no aggregate acoustic effects are predicted to occur.”

There is a potential for marine mammals to be affected by cumulative noise if a BURNCO barge operates in the same area at the same time as a BC Ferry vessel or an LNG carrier.

Information Request

Provide additional information to explain how it was determined that the radii for acoustic injury and disturbance resulting from a BURNCO barge and a BC Ferry vessel or an LNG carrier operating in Howe Sound would not overlap.

Item #

12

Valued Component or Topic

Marine Resources

EIS

Appendix 5.2-A

Agency Context

Marine habitat should be mapped using direct observations of the habitat type, rather than mapping substrate types and making assumptions about the resulting habitat. See Table 14, page 87 and Figure 36, page 88 of Appendix 5.2-A for reference.

Information Request

Provide updated marine habitat maps to be based on direct observation of habitat types (found in Appendix 5.2-A, Tables 11-13), and benthic invertebrate infauna groups (found in Appendix 5.2-A, Table 20).

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Alternatively, provide a rationale for why substrate types are an appropriate proxy.

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13

Valued Component or Topic

Marine Resources

EIS

Section 5.2

Agency Context

The EIS states that “exceedances of sediment quality guidelines were recorded for certain trace metals including arsenic, cadmium, copper and zinc...[as well as] a number of PAHs” (Page 5.2-23).

Information Request

Provide 95th percentile sediment quality and marine water quality modelling tables for all phases of the Project, with CCME Guideline exceedances clearly highlighted.

Item #

14

Valued Component or Topic

Marine Resources, and Terrestrial Wildlife and Vegetation

EIS

Sections 5.2 and 5.3

Agency Context

Some birds, including the SARA-listed Marbled Murrelet, use both terrestrial and marine environments. Due to the structure of the EIS, impacts to Marbled Murrelet are assessed in two different sections (terrestrial environment and marine resources, respectively).

Information Request

Provide an overall assessment of significance to SARA-listed birds, including the Marbled Murrelet, that incorporates all potential effects in both the marine environment and the terrestrial environment.

Item #

15

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Section 5.3

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Agency Context

The EIS notes that in-air noise as a result of Project-related activities will result in exceedances of terrestrial bird behavioral disturbance thresholds (>80 dBA), including to moderate suitability Northern Goshawk habitat (page 5.3-40).

Information Request

Provide an assessment of the effect of in-air noise on terrestrial birds, in both the marine and terrestrial environment, for all locations where birds may be present.

Item #

16

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Section 5.3

Agency Context

The EIS does not include an effects assessment of the impacts of the release of deleterious substances into the aquatic environment on birds and mammals as it does for amphibians. While birds and mammals do not use this aquatic habitat for breeding, they may use this habitat type for foraging and drinking, and thereby be exposed and affected. Refer to pages 5.3-31, 5.3-32, 5.3-34, 5.3-35, and 5.3-38 for reference.

Information Request

Provide an assessment of the effects of the release of deleterious substances into the aquatic environment on birds and mammals.

Item #

17

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Section 5.3.1.3.1 and Section 5.3.4.1.

Agency Context

The EIS uses certain SARA-listed or COSEWIC-assessed species as indicators for ecosystems and other species (e.g. amphibian species at risk as aquatic indicator species). Groups of species, which include species at risk, are also listed as a single VC (e.g. amphibian species at risk). It is not appropriate to use species identified under SARA or COSEWIC as indicators (e.g., Northern Goshawk and Western Screech-owl were selected as surrogates for Bald Eagle and Osprey; Common Nighthawk was selected for Purple Martin). SARA-listed species have specific habitat needs that may not reflect those of the larger species group. Chosen migratory breeding bird indicator species should consider all bird guilds present (waterbirds, waterfowl, shorebirds, and land birds) and all habitat types that the Project will likely impact (e.g. old growth forest, riparian areas, wetlands, freshwater/stream, alpine) as VCs when

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undertaking baseline work. Use the list of Priority Species provided by Bird Conservation Region Strategies as a guide for selecting indicator species:

http://nabci.net/Canada/English/bird_conservation_regions.html

The following can also aid in selection of indicator species:

- Caro, T. (2010). Conservation by proxy: indicator, umbrella, keystone, flagship, and other surrogate species. Island Press, Washington, DC, USA

- Kershner, J., Samhouri, J.F., James, C.A., and Levin, P.S. (2011). Selecting indicator portfolios for marine species and food webs: a Puget Sound case study. PLoS ONE 6:e25248

See page 5.3-2, table 5.3-3, page 5.3-4 and page 5.3-184 for reference.

Information Request

Assess the potential effects to each wildlife species listed under SARA and COSEWIC as a separate Valued Component, rather than grouping them. Since each SARA species has specific habitat requirements that may not reflect those under which they have been grouped provide mitigation measures to reduce or eliminate the potential effects for each of the species.

The use of indicator species is not recommended for assessing effects to species listed under SARA and COSEWIC.

Item #

18

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Section 5.3.1.3.1 and
Appendix 5.3-A

Agency Context

ECCC notes that no baseline surveys were conducted for invertebrate species at risk, nor were any included or addressed in the VC selection. See Table 5.3-2 and page 5.3-3 for reference.

Information Request

Provide baseline information for invertebrate species at risk, or provide a rationale for why they were not included as Valued Components.

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19

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

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Section 5.3.1.3.1,
Section 5.3.4.1, and
Appendix 5.3-A.

Agency Context

The rationale for exclusion of olive-sided flycatcher as a VC is that “the proposed Project area...is not considered highly suitable olive-sided flycatcher habitat...”, and that band-tailed pigeon was chosen as a surrogate.

The olive-sided flycatcher however, was observed in the proposed Project area and at other observation stations, as stated in the baseline report. ECCC notes that “no high suitability habitat” does not justify exclusion of olive-sided flycatcher, as it has been documented near the proposed Project area within the LSA. See Table 5.3-3, page 5.3-4, Table 5.3-7, page 5.3-15, and Appendix 5.-3A Table 12, page 38 and Figure 10 page 42.

Information Request

Assess the potential effects to olive-sided flycatcher species as its own VC, as this species is a species at risk and likely has specific habitat requirements that may not be considered appropriately by a proxy. Update Table 5.3-7 and the effects assessment to include olive-sided flycatcher as identified wildlife in the LSA.

Update Table 5.3-7 to include other species at risk confirmed in the LSA during surveys.

Item #

20

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Section 5.3.1.5.3.3

Agency Context

The Proponent indicates that “critical nesting habitat has been identified within the LSA but not within the Proposed Project Area, and therefore no direct loss of critical Marbled Murrelet nesting habitat is expected” (page 5.3-43).

The Recovery Strategy for Marbled Murrelet referenced in the baseline data may not include the most recent shapefiles for terrestrial critical habitat. Baseline studies should include:

- a determination of whether suitable nesting habitat (SNH) for Marbled Murrelet is present within or near the Project area;
- if a nest has been identified; and
- Marbled Murrelet surveys during the breeding season to determine whether Marbled Murrelets are likely nesting in the Project area.

Refer to Attachment 4: Standard Guidance for Environmental Assessments for Marbled Murrelet for detailed recommendations, as well as ECCC’s responsibilities, related to Marbled Murrelet.

Information Request

Provide baseline information and an assessment of potential effects on Marbled Murrelet that uses the most recent critical habitat geospatial files (available at <http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british->

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columbia/critical-habitat-for-species-at-risk-british-columbia-marbled-murrelet-brachyramphus-marmoratus/?lang=en).

Alternatively, provide a rationale as to why this information is not required.

Item #

21

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Section 5.3.1.5.4

Agency Context

No Marbled Murrelet monitoring plan is provided, even though Marbled Murrelets were observed during baseline studies (Page 5.3-67, Table 5.3-15, page 5.3-75).

Refer to Inventory methods for Marbled Murrelets in marine and terrestrial habitats, Version 2.0. Standards for components of British Columbia's biodiversity, No. 10. Ministry of Environment, Lands and Parks, Resources Inventory Branch, Victoria, BC.

URL:<http://www.ilmb.gov.bc.ca/risc/pubs/tebiodiv/murrelet2k1/mamu%20ml20.pdf>

Information Request

Provide a plan for monitoring the presence of the Marbled Murrelet in the local study area, or provide rationale as to why this is not necessary.

Item #

22

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Appendix 5.3-A

Agency Context

Breeding bird surveys were only conducted two days in one year. The existing baseline sampling for migratory birds does not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project, including those on COSEWIC-assessed and SARA-listed avian species detected in the LSA and RSA. The Common Nighthawks (SARA: Threatened), Barn Swallows (COSEWIC: threatened), and Short-eared Owls (SARA: Special Concern) are not well represented by standard avian point counts and other standard survey techniques because of their unique behaviours (Appendix 5.3-A, Section 2.2, Table 1, page 4; and Section 3.5, page 38).

Establishing an accurate baseline that reflects natural inter-annual variation is important for assessing potential Project effects, focusing mitigation and monitoring, and addressing potential cumulative effects. It is also important to note that a key purpose of collecting baseline data is to determine the

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presence of any biodiversity or distribution hotspots.

The sampling methods chosen do not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential effects of the Project on migratory birds.

Guiding principles on bird survey can be found at:

Hanson et al. 2009, A framework for the scientific assessment of potential Project impacts on birds - CWS Technical Report series No. 508 (available online at: http://publications.gc.ca/site/archived-archived.html?url=http://publications.gc.ca/collections/collection_2010/ec/CW69-5-508-eng.pdf).

Information Request

Provide additional baseline data on migratory bird surveys in the local study area. Conduct species-specific surveys for the Common Nighthawk, Barn Swallow, and Short-eared Owl over multiple years, incorporating multiple visits per year at the same points.

Item #

23

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Appendix 5.3-A

Agency Context

The baseline information notes that Northern Red-legged Frog, Coastal Tailed Frog, and Western Toad all have the potential to occur in the LSA. However, no species-specific surveys were conducted (Appendix 5.3-A, page 5 and 27).

Recommend that the Proponent refer to Attachment 4: Standard Guidance for Environmental Assessments for Western Toad for details on ECCC's suggested survey methodologies for Western Toad.

Information Request

Provide data from species-specific surveys to confirm the presence of Northern Red-legged Frog, Coastal Tailed Frog, and Western Toad. Alternatively, provide a rationale as to why species-specific surveys are not required.

Item #

24

Valued Component or Topic

Terrestrial Wildlife and Vegetation

EIS

Appendix 5.3-A

Agency Context

Three species of bat were stated to have the potential to occur in the LSA. Two of the species are considered species at risk under SARA. Keen's Long-eared Myotis is identified as 'Data Deficient' in the

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baseline but is included in Schedule 3 of SARA as Special Concern, and Little Brown Myotis is listed as endangered on Schedule 1 of SARA. However, no bat surveys were conducted specific to these two bat species (Appendix 5.3-A, page 75). Bat acoustic monitoring alone are not considered sufficient to determine the presence of bats, and monitoring should occur over more than two years. (Loeb et al. 2015, Holroyd and Craig 2016). See Bat Acoustic Monitoring Portal <http://databasin.org/groups/59d81a3951fd4915909efacbe2317efb>

References: Loeb, S.C., Rodhouse, T.J., Ellison, L.E., Lausen, C.L., Reichard, J.D., Irvine, K.M., Ingersoll, T.E., Coleman, J.T., Thogmartin, W.E., Sauer, J.R. and Francis, C.M., 2015. A plan for the North American bat monitoring program (NABat). Holroyd, S.L., and V.J. Craig. 2016. Best Management Practices for Bats in British Columbia, Chapter 2: Mine Developments and Inactive Mine Habitats. B.C. Ministry of Environment, Victoria, BC. 60pp.

Information Request

Provide baseline information from field studies assessing use of the local study area by bats, including Keen's Long-eared Myotis and the Little Brown Myotis. Field studies should include radio telemetry, visual surveys, and acoustic monitoring. Identify any hibernacula and maternity roosting sites in the local study area.

Item #

25

Valued Component or Topic

Surface Water Resources

EIS

Appendix 5.5

Agency Context

Chapman Creek records are used to establish the McNab Creek streamflow baseline. The proponent rationalizes that flows in Chapman Creek can be considered representative of flows in McNab Creek, because the McNab Creek flow monitoring station and the Chapman Creek hydrometric station have similar trends. The fact that data from the McNab Creek monitoring station collected during the period of Nov. 2011-Nov. 2012 is similar to Chapman Creek during that time does not mean that that data from Chapman Creek from 1970-1988 is analogous to McNab Creek.

Factors which could affect stream flow include different patterns of groundwater loss / gain between the two watersheds, differences in sediment porosity, and the presence of beaver dams.

Information Request

Provide streamflow baseline trends from McNab Creek between the Chapman Creek dataset and the McNab Creek flow dataset collected at station MC-US-01, or a rationale as to why flow records from Chapman Creek are an appropriate proxy given the temporal variation and that two creeks are in different watersheds.

Provide raw data for the one year (Nov 2011 – Nov 2012) of baseline monitoring that was conducted on McNab Creek at site MC-US-01.

Confirm whether McNab Creek modelled flows include inputs from Box Canyon Creek, as MC-US-01 is located above the confluence of the two streams. Confirm whether modelled flows as a result of the Box Canyon Hydro Project were included in the flow models, as it is the Agency's understanding that the Box

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Canyon Hydro Project began commercial operation in January 2016. If these were not included, provide revised flow estimates.

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Valued Component or Topic

Surface Water Resources

EIS

Appendix 5.5-D

Agency Context

The Maximum Authorized Monthly Mean TSS Concentration from Schedule 4 of MMER, 15 mg/L, in water quality modeling (Appendix 5.5-D, page 12/22) was used, rather than TSS data collected at the site of the proposed Project. In order to accurately assess the effects of the Project, site-specific TSS baseline measurements should be used in water quality modelling.

Information Request

Provide updated water quality modelling with site-specific TSS concentrations, and provide a rationale for the revised TSS concentrations selected.

Item #

27

Valued Component or Topic

Groundwater Resources

EIS

Section 5.6.5.1

Agency Context

Table 5.6-5 (pages 5.6-24 to 27) indicates that incidental fuel spills are addressed in Section 5.5 Surface Water. "Incidental" fuel spills still have the potential to affect groundwater quality. Further, Table 5.6-5 identifies the potential interaction between site preparation and groundwater quality during the construction phase of the Project as a result of incidental leaks and fuel spills.

Information Request

Describe and quantify the extent by which baseline groundwater chemistry is predicted to change as a result of these leaks / spills (if at all), including site preparation.

Alternatively, provide rationale as to why this is not required or possible.

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Valued Component or Topic

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Groundwater Resources

EIS

Section 5.6.5.2

Agency Context

The final EIS Guidelines states that the EAC Application/EIS will "use the numerical model to predict and characterize potential changes to LSA and RSA groundwater-surface water interactions (i.e., baseflow), including potential changes to the manmade groundwater channel resulting from the Proposed Project and potential changes to groundwater resulting from Project-induced changes to the channel" (page 5.6-28).

Information Request

Describe the potential effects to the manmade groundwater channel as a result of groundwater changes from the Project.

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Valued Component or Topic

Groundwater Resources

EIS

Section 5.6.5.3

Agency Context

The EIS states that "If observed water quality is poorer than predicted and/or the water flows are less than predicted, then corrective action will be taken" (page 5.6-31).

Information Request

Outline the technically and economically feasible action(s) that would be taken if measured groundwater flow and quality is worse than the changes predicted in the EIS.

Confirm whether "monitoring of the groundwater flow rates, hydraulic heads and quality" will be conducted during operations and at closure? If not, monitoring of the water quality in the pit lake and downstream creeks should be undertaken during these phases of the Project.

Item #

30

Valued Component or Topic

Groundwater Resources

EIS

Section 5.6.5.3.2

Agency Context

Table 5.6-5 identifies the potential interaction between site preparation and groundwater quality during the construction phase of the Project as a result of incidental leaks and fuel spills.

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Describe and quantify the extent by which baseline groundwater chemistry is predicted to change as a result of these leaks / spills (if at all) from site preparation. Alternatively, provide rationale as to why this is not required or possible.

Item #

31

Valued Component or Topic

Groundwater Resources

EIS

Section 5.6.5.3.3

Agency Context

The final EIS Guidelines states that the EAC Application/EIS will discuss "the effectiveness and *limitations* of identified mitigation measures, environmental management, and compensation strategies."

Information Request

Describe the limitations of the proposed measures in Table 5.6-7 to address potential effects to groundwater flow and quality.

Item #

32

Valued Component or Topic

Air Quality

EIS

Section 4.3

Agency Context

SO₂, NO₂, CO and PM are associated with combustion emissions. Estimates of carbon monoxide (CO) emissions associated with project-related mobile equipment were not included in the EIS (Table 4-4, page 4-24).

Information Request

Provide quantitative estimates of CO emissions related to the mobile equipment (on-road and off-road engines) required for the Project.

Item #

33

Valued Component or Topic

Air Quality

EIS

Section 5.7.2

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Agency Context

According to Table 5.7-1 there are no Federal guidelines for NO₂ or SO₂ in air. There are existing National Ambient Air Quality Objectives (NAAQOs), and the Government of Canada is in the process of updating the air quality standards for NO₂ and SO₂ to replace the outdated NAAQOs. The new standards for these two pollutants will likely be lower than the NAAQOs. Therefore a sensitivity analysis using NAAQS issued by US EPA for NO₂ and SO₂ should be conducted for a more meaningful analysis, as the US EPA NAAQS are based on a more current database similar to that being used in Canada to develop the new standards. The USEPA NAAQS can be found at <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

The supporting documents for these NAAQS can be found at:

<http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=259167#Download> (for NO₂); and

<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=198843> (for SO₂).

Information Request

Compare predicted future concentrations of NO₂ and SO₂ to current federal guidelines and the USEPA National Ambient Air Quality Objectives.

Item #

34

Valued Component or Topic

Climate Change

EIS

Section 5.8.3.2.2

Agency Context

The EIS states that “Due to the fact that intermittent nature of emissions associated with the construction and reclamation and closure phases of the Proposed Project and due to the fact that annual land clearing activities associated with pit expansion are incorporated in the operation phase’s emission activities, the climate change assessment temporal boundaries were limited to the Proposed Project’s operational phase.”

Information Request

Provide equipment inventories and their respective emissions. Conduct a GHG emissions assessment for all phases of the Project, including the construction, and reclamation and closure phases.

Alternatively, provide a rationale as to why this is not necessary.

Item #

35

Valued Component or Topic

Climate Change

EIS

Section 5.8.6

Agency Context

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The EIS states that “as discussed above the potential effect of changing climate on the Proposed Project is not carried through to the effects assessment because it is not a potential impact of the Proposed Project” (page 5.8-22).

Effects of the environment on the Project relating to climate change should be assessed as required in the EIS Guidelines (Part 15, page 126).

Information Request

Provide an assessment of the effects of the environment on the Project relating to climate change.

Alternatively, provide a rationale as to why this is not necessary.

Item #

36

Valued Component or Topic

Climate Change

EIS

Appendix 5.8-B

Agency Context

The greenhouse gas emissions (GHG) assessment uses data from the BC Chamber of Shipping Inventory from 2007, which has been updated in ECCC’s National Marine Emissions Inventory. It is necessary to use up-to-date emissions factors to confirm the marine emissions estimations, and ensure that this review is consistent with other Project reviews.

The National Marine Emissions Inventory (MEI), produced by ECCC, is a database of marine emissions from all commercial vessels operating in Canadian waters, based on current activity data, and is updated on an on-going basis. Proponents are encouraged to refer to the MEI for the most current and best available information for estimating marine emissions, (load factors, emission factors etc.).

ECCC is able to provide the proponent with updated emission factors upon request.

Link to the inventory: <http://data.tc.gc.ca/archive/eng/innovation/tdc-Projects-marine-g-5612-1214.htm>

Information Request

Provide an assessment of GHG emissions from tugs using updated load and emission factors data from ECCC’s National Marine Emissions Inventory.

Item #

37

Valued Component or Topic

Human Health

EIS

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Section 9.1
and
Appendix 9.1A

Agency Context

Appendix 9.1A states that “the purpose of the [baseline] sampling program was to provide site-specific chemistry results that will be used to determine baseline exposure concentrations and calculate site-specific bioaccumulation factors as a part of the public health assessment.” There was no discussion of bioaccumulation factors and no evaluation of the baseline risk from consumption of terrestrial or aquatic country foods in the Public Health Assessment (EIS Section 9.1).

Information Request

Provide an assessment of potential bioaccumulation of contaminants from water sources (ammonia, hardness, alkalinity and titanium), soil (metal concentrations that exceed any health-based guidelines including arsenic) and air (lead, beryllium (short-term), and cobalt, chromium, nickel (long-term) and any other substances that exceed their guideline values). Assess the effect of increased levels of those substances on human health. Consider any additional substances that should not have been screened out of the assessment (see IR 34 below).

Item #

38

Valued Component or Topic

Human Health

EIS

Section 9.1.3.3.1

Agency Context

The EIS indicates that crab tissue was analyzed for metal concentrations and muscle tissue was analyzed for background concentrations of metals and PAHs. Given the historical contamination of Howe Sound which includes dioxins and furans from current and historical industrial operations (e.g. the former pulp mill at Woodfibre) and the fact that marine sediment will most likely be disturbed during construction activities in the marine environment (which could remobilize existing contaminants), it is unclear why these marine species were not also analyzed for background concentrations of dioxins and furans. In addition, no marine fish (such as species consumed by local people - e.g. flounder) were analyzed as part of the baseline program. No rationale was provided for this.

Information Request

Include background concentration of dioxins and furan present in crab tissue in the analysis for the HHRA. Alternatively, provide a rationale as to why this is not necessary.

Item #

39

Valued Component or Topic

Human Health

EIS

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Section 9.1.3.3.1 and Appendix 9.1-C

Agency Context

Section 9.1.3.3.1 of the EIS states that “fish tissue data... were used to gain a better understanding of baseline conditions at the site.” Section 4.2.1 of Appendix 9.1C indicates that baseline fish data (freshwater fish only) was based on a single sample that was collected from McNab Creek. Analysis of one fish is not sufficient to determine baseline conditions, nor is it possible to determine baseline health risks or future health risks based on one fish sample. EIS Section 9.1.3.3.6 states that First Nations have reported harvesting all five species of salmon, steelhead and Dolly Varden char in McNab Creek. As such, it appears that additional fish species may be present in McNab Creek. In order to acquire sufficient numbers of the various species of fish expected to be present in McNab Creek, it would be useful to collaborate with local people who consume fish from this area to obtain samples for analysis.

Information Request

Include additional baseline samples of fish tissue for all species of fish consumed by Indigenous people. Alternatively, provide a rationale for why the single sample that was used is sufficient to describe the baseline conditions of contaminants in fish tissue.

Item #

40

Valued Component or Topic

Human Health

EIS

Section 9.1.5.1.2
and
Appendix 9.1-B

Agency Context

When comparing predicted maximum concentrations to acute screening criteria, the EIS states that “if the predicted maximum concentrations were greater than the selected screening criteria and the percent change from Base Case was greater than 10% then the chemical was retained as a COPC and considered further in the acute inhalation assessment.”

The use of a change of more or less than 10% to screen substances for further assessment in the HHRA is not appropriate and is arbitrary. This approach is not health-based and no rationale was provided in the report as to how this might affect human health. It is recommended that the EIS clarify this assumption and provide rationale on a chemical-specific basis to identify whether there may be adverse health impacts associated with an increase of <10% relative to baseline.

Health-based guidelines are based on human (and animal) toxicity studies and are intended to be protective of human health, whereas screening substances for inclusion in the HHRA based on a >10% increase from baseline conditions or screening out substances from the HHRA based on a <10% increase from baseline has no human toxicological basis.

All substances that exceed their applicable regulatory criteria/guideline value should be further evaluated in the HHRA irrespective of the percentage change in concentrations from Base Case.

See Health Canada (2012), below, for more information about appropriate methods for screening substances for further evaluation in an HHRA.

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Health Canada. 2012. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0. Ottawa, Ontario: Environmental

Health Assessment Services, Safe Environments Program. <http://www.hc-sc.gc.ca/ewh-semt/pubs/contamsite/index-eng.php>

Information Request

Include all COPCs in the HHRA that were screened out. This includes substances in:

- air emissions (TSP, PM₁₀ and PM_{2.5}, SO₂, NO₂, lead, beryllium (short-term), and cobalt, chromium, nickel (long-term) and any other substances that exceed their guideline values (or have no guideline value)),
- surface water (ammonia, hardness, alkalinity and titanium), and
- soil (arsenic).

Alternatively, provide a rationale as to why screening-out COPCs from the HHRA is appropriate if their predicted change is less than 10% of the baseline conditions.

Item #

41

Valued Component or Topic

Human Health

EIS

Section 9.2.5.7

Agency Context

No cumulative effects assessment was undertaken for noise, based on the assumption that “all potential Project-related residual adverse effects were determined to be negligible and requiring no further consideration. No residual effects were carried forward to a cumulative effects assessment.” Given that there are other industrial activities occurring in the vicinity of the Project (including logging), it is unclear why no cumulative assessment of noise was undertaken.

Information Request

Provide a cumulative effects assessment of noise on nearby human receptors or provide additional justification as to why this was not considered necessary.

Item #

42

Valued Component or Topic

Human Health

EIS

Appendix 9.1-B

Agency Context

As stated in Appendix 9.1-B, “the predicted 1-hour air concentrations for selected receptor locations screened against the selected thresholds are presented.” The background/baseline concentrations were not added to the predicted future concentrations when screening substances for further evaluation in

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the HHRA. In order to evaluate concentrations that may be present during Project operations, it is necessary to include background/baseline concentrations in addition to the predicted emissions from the Project to evaluate overall health risks.

Information Request

Provide a prediction of future concentrations of substances in air that includes baseline concentrations.

Item #

43

Valued Component or Topic

Human Health

EIS

Appendix 9.1C

Agency Context

Table 9.1-C-3 provides the input values and sources used to calculate fish and shellfish screening levels. For fish and shellfish ingestion rates Health Canada (2007) is cited. This consumption rate may not be representative of local Indigenous Peoples consumption rates for fish and shellfish. The First Nations Food Nutrition and Environment Study (FNFNES) should be consulted (in addition to any other dietary surveys or consumption studies for local Indigenous Peoples) in order to more accurately determine local consumption rates/patterns and those values should be used in screening equations to determine the COPCs to be evaluated in the HHRA. In addition, using consumption rates from Health Canada (2007) does not take into consideration the potential for very high rates of consumption for short periods of time, such as during a weekend fishing trip or a ceremonial event.

Information Request

Include in the HHRA current consumption rates of country foods by local Indigenous peoples based off the First Nations Food Nutrition and Environment Study and any other dietary surveys or consumption studies for local Indigenous people, rather than data from 2007. Alternatively, provide a rationale as to why data from 2007 is applicable for describing current consumption rates.

Item #

44

Valued Component or Topic

Human Health

EIS

Appendix 9.1-D

Agency Context

Tables 9.1-D-1 to D-4 identify the locations where predicted annual deposition rates were calculated. There were no predicted soil concentrations presented for the location(s) where the highest deposition of airborne particulates could occur. It also does not appear that the nearest community (McNab Strata community) was evaluated with regard to increases in concentrations of substances in soil as a result of deposition of airborne particulate matter during Project operation. In addition, there are two locations (Unknown First Nations and Unknown Residence) that were not identified either on a map or by

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geographical coordinates. Failure to evaluate soil at the nearest receptor locations may result in underestimation of potential human health risks associated with Project activities.

Information Request

Provide baseline and predicted future soil concentrations at the maximum point of impingement and at the community of McNab Strata. Alternatively, provide a rationale as to why this is not required.

Item #

45

Valued Component or Topic

Aboriginal Rights, and Current Use of Lands and Resources for Traditional Purposes

EIS

Sections 11.3.3.2.1 and 11.4.2.3

Agency Context

Part C should include an analysis of all residual effects on current use of lands and resources for traditional purposes, and impacts on Aboriginal rights.

The EIS states that "there will be no significant adverse effects to deer, elk, or key habitats". The EIS indicates, however, that the proponent has not yet engaged the Squamish Nation in detailed technical consultation on the assessment of effects to deer, elk, or key habitats for these species". On page 11-30 the Squamish Nation is reported as saying that there may be still be impacts to their Aboriginal Rights such as access to these species for current use purposes, and that additional mitigation may be required (pending further review and consultation).

There may also be residual effects from potential accidents and malfunctions.

Information Request

Provide an analysis of all effects of the Project on Aboriginal groups' current use in the study area. This includes impacts to deer, elk and their key habitats, use of the area by all potentially impacted Aboriginal groups, and the effects from any potential accidents or malfunctions related to the project.

Provide a list of additional proposed mitigation measures to avoid or reduce any impacts.

Item #

46

Valued Component or Topic

Aboriginal Rights, and Current Use of Lands and Resources for Traditional Purposes

EIS

Sections 5.3.3.5.1.1 and 5.3.3.7.2

Agency Context

The Squamish Nation uses Roosevelt elk from the project area for current uses purposes.

The cumulative effect assessment should consider how all stressors (direct habitat loss, indirect effects, impacts to movement etc.) from all land uses may affect the Roosevelt elk population. This requires a more meaningful and descriptive assessment than only stating that 16% of the RSA winter habitat will

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be affected, and that "The magnitude of the potential cumulative residual effects on Roosevelt elk winter habitat loss, mortality, and barriers to movement are predicted to be medium, negligible and negligible, respectively" without evidence or rationale to explain these determinations of the cumulative effect within the RSA.

Information Request

Provide a discussion and analysis of the cumulative effects to the Roosevelt elk population, considering all stressors and land uses that may result in direct habitat loss, indirect effects, and effects to elk movement.

If a residual cumulative effect is identified, provide an assessment of this effect on Squamish Nation's current use of Roosevelt elk, and any corresponding impacts to their asserted Aboriginal rights.

Item #

47

Valued Component or Topic

Aboriginal Rights, and Current Use of Lands and Resources for Traditional Purposes

EIS

Sections 11.3.2.1 and 11.3.3

Agency Context

Table 11-5 identifies all the activities carried out at the traditional use and occupancy sites identified in the LSA by the Squamish Nation. Part C does not analyze Project effects on these current use activities for Squamish Nation nor does it provide an assessment on Project effects on Aboriginal rights, including current use.

Information Request

Provide an assessment on the effects of the Project on current use of lands and resources for traditional purposes by Aboriginal peoples, separate from the assessment of impacts to Aboriginal rights. Include a determination of significance of the residual effects to current use of lands and resources for traditional purposes by Aboriginal peoples that is separate from impacts to Aboriginal rights.

Item #

48

Valued Component or Topic

Aboriginal Rights, and Current Use of Lands and Resources for Traditional Purposes

EIS

Section 11.4.2.3

Agency Context

The EIS indicates that the only two Indigenous groups that use Howe Sound for the current use of lands and resources for traditional purposes are the Squamish Nation and the Tsleil-Waututh Nation.

Musqueam Indian Band have reported using Howe Sound for traditional purposes, including for hunting, fishing, and harvesting of marine resources. Other Aboriginal groups whose asserted traditional

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territories overlap the marine shipping route in Howe Sound may also use the area for traditional purposes.

Information Request

Provide an explanation of how the information related to current use of lands and resources for traditional purposes was verified with all Aboriginal groups. If confirmed traditional use exists in Howe Sound that was not included in the EIS:

- provide a new description of each group's use of the area;
- conduct a new residual effects assessment on each Aboriginal group's current use of lands and resources for traditional purposes;
- conduct a new assessment of the potential effects of the Project on their asserted Aboriginal rights; and
- if residual effects are identified, conduct a revised cumulative effects assessment on current use and assess the impacts to Aboriginal Rights.

Item #

49

Valued Component or Topic

Aboriginal Rights, and Current Use of Lands and Resources for Traditional Purposes

EIS

Appendix 5.3 A

Agency Context

The Squamish Nation uses elk from the Project area for current uses purposes. In the remote camera survey for Roosevelt elk the baseline report says that "Data from such studies can be particularly helpful in assessing the presence of wildlife in the landscape, and in assessing wildlife activity and movement patterns, on a seasonal basis." (s.2.2.6.1). Interpretations of the camera data in 3.6.5.1 and 3.6.7.2 do not describe potential movement patterns on a seasonal basis for elk and deer. No analysis has been conducted on migration patterns of the Roosevelt elk from these data. The data from the EIS suggests that preferred migration routes are along the main road (elk observations high at camera locations 18, 14 and 20). This interpretation is important to understand how the Project will affect seasonal movements of ungulates along this route and to determine how mitigation measures may be applied.

Information Request

Provide a description of seasonal movement patterns of Roosevelt elk in the LSA and RSA using the data that was collected and Aboriginal traditional knowledge. Remote camera data indicate that preferred ungulate movement routes are along the main road. Describe how the Project may affect ungulate use of this route. Quantify the proportion of direct and indirect habitat loss for Roosevelt elk in the Regional Study Area, with a particular focus on percentage of low elevation winter habitat loss. Discuss any potential effects to the ability of Roosevelt elk to persist in the McNab Creek watershed or move and persist in adjacent watersheds, which may also be affected by other land use and/or industrial activities. If a residual effect is identified provide an assessment of this effect on Squamish Nation's current use of Roosevelt elk, and any corresponding impacts to their asserted Aboriginal rights.

Item #

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Valued Component or Topic

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Accidents and Malfunctions

EIS

Section 2.5

Agency Context

In order to assess all potential accidents and malfunctions, and develop appropriate Spill Prevention and Emergency Response Procedures associated with fuel spills in the marine environment, it is important to know where tug boats servicing the Project will be housed and refueled (Table 2-5, page 2-20).

Information Request

Indicate where tug boats that service the Project will be bunkered and refueled.

Item #

51

Accidents and Malfunctions

EIS

Section 15.1.4

Agency Context

The EIS (Table 15-4) includes “Likelihood of occurrence” values for each of the Accident and Malfunction types.

There is no discussion of the characterization of either “likelihood” or “severity” that is applicable to Section 15.4.1 wherein all Accident and Malfunction types have been assigned one or a mix of “Negligible” or “Not-Significant.”

Information Request

Provide the Risk Rating Matrix that was used to inform the "Likelihood of Occurrence" of an Accident or Malfunction.

Item #

52

Valued Component or Topic

Accidents and Malfunctions

EIS

Section 15.1.4

Agency Context

Thirteen “key” mitigation measures are presented for land-based hazardous material spills that may impact surface water quality (Table 15-5). No human health-based mitigation measures were presented. In the event of chemical spills to surface water, drinking water, fish and other aquatic foods consumed by Indigenous Peoples may also be impacted.

Information Request

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Provide mitigation measures that are relevant from a human health perspective or provide justification as to why additional mitigation measures are not necessary (e.g. surface water is not expected to be consumed by people).

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53

Valued Component or Topic

Effects of the Environment on the Project

EIS

Section 5.4.4.5

Agency Context

Page 5.4-28 states: “Further investigation and assessment will be required to evaluate the debris flood/debris flow potential and determine if engineering designs are required to mitigate potential risks.” The very next two sentences state: “There is no evidence for debris flood/debris flows that could potentially impact the Project area. Therefore no further investigations or assessments for debris floods / flows are required and engineering designs are expected to mitigate the potential risks”. These statements are contradictory.

Information Request

Confirm if additional studies are required to determine whether debris flood / debris flow has the potential to impact the Project. If the potential exists, conduct a residual effects assessment to determine significance, and discuss mitigation measures to mitigate potential risks.