

November 19, 2020

ATTACHMENT: Federal Authority Advice Record

Response due by December 9, 2020

Value Chain Solutions - Heartland Complex Expansion Project

Agency File: 81148

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1. Is it probable that your department or agency may be required to exercise a power or perform a duty or function related to the Project to enable it to proceed?

If yes, specify the Act of Parliament and that power, duty or function.

Based on the Initial Project Description (IPD), ECCC does not expect that we will be required to exercise a power or perform a duty or function related to the Project to enable it to proceed. ECCC notes that the Project is not located on federal land. Once the scope of the Project and the assessment are established by the Agency, this may change as additional activities or Project components could come into scope.

2. Is your department or agency in possession of specialist or expert information or knowledge that may be relevant to the conduct of an impact assessment of the Project?

Specify as appropriate.

ECCC has specialist or expert information that may be relevant to the impact assessment in the areas listed below; in each of these subject areas we have expertise related to establishing an adequate baseline, assessing potential effects to biophysical valued components, effectiveness of mitigation measures, methods for monitoring and follow-up, as well as information regarding federal policies, standards, and regulations that may be relevant to the assessment. Once the scope of the Project and of the assessment are established by the Agency, this list may change if additional project activities or components should come into scope.

Air Quality: ambient air quality; sources of emissions; emissions estimation and measurement; dispersion modelling; and follow-up monitoring.

Greenhouse Gas (GHG) Emissions and Climate Change: estimations of GHG emissions (net and upstream); GHG mitigation measures and determination of Best Available Technologies/Best Environmental practices (BAT/BEP); credible plans to achieve net-zero GHG emissions by 2050; climate change science to inform evaluation of potential changes to the environment and project resilience to effects of climate change; climate change policies; and national GHG projections.

Water Quality and Quantity: surface water quality; contamination sources for surface water; wastewater, seepage and runoff effects; management of contaminated soils or sediments; marine and freshwater dredging; hydrology (streamflow rates data and modelling, flooding and extreme events management, drainage control, water levels, water balances); follow-up and monitoring.

Wildlife, Species at Risk, and Habitat: migratory birds, their nests, eggs, and habitat; species at risk, their residences, habitat and critical habitat including recovery strategies and management plans; ecological function of wetlands; ecotoxicology. Note: for purposes of this document "terrestrial" species as referred to later in this document includes all species under ECCC's mandate including amphibians, a semi-aquatic species.

Environmental Emergencies: emergency management planning and guidance; atmospheric transport and dispersion modelling of contaminants in air; fate and behaviour, hydrologic trajectory modelling of contaminants in water.

Climate and Meteorology: long-term climate patterns and norms; marine winds, waves, and weather; and sea ice and icebergs.

3. Has your department or agency considered the Project; exercised a power or performed a duty or function under any Act of Parliament in relation to the Project; or taken any course of action that would allow the Project to proceed in whole or in part?

Specify as appropriate.

No.

4. Has your department or agency had previous contact or involvement with the proponent or other party in relation to the Project? (for example, enquiry about methodology, guidance, or data; introduction to the project)

Provide an overview of the information or advice exchanged.

Based on information readily available, ECCC [Prairie and Northern Region] has not had any involvement with the Proponent or other parties that would be relevant to the assessment of this Project.

5. Does your department or agency have additional information or knowledge not specified, above?

Specify as appropriate.

Not at this time.

6. From the perspective of the mandate and area(s) of expertise of your department or agency, what are the issues that should be addressed in the impact assessment of the Project, should the Agency determine that an impact assessment is required?

For each issue discussed, provide a concise, plain-language summary that is appropriate for inclusion in the Summary of Issues.

Air Quality

The construction, operation, and decommissioning of the Project is expected to result in adverse effects on air quality. Activities associated with combustion (which may include on-site transportation) can result in the emission of contaminants such as sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and particulate matter (PM_{2.5}, PM₁₀ and PM). Petroleum and chemical storage, handling, and processing, as well as wastewater treatment operations, can result in emissions of VOCs and toxic substances.

Air pollutant emission sources from the operations (fixed, mobile and fugitive) should be indicated, including but not limited to:

- Nitrogen oxides emissions from combustion processes: process furnaces (Hydrogen Manufacturing Unit and or Clean Oil Cracking (COCTM)); Wide Range Hydroprocessing (WRHPTM); Boilers (to produce steam, used by several units); Coke calciners (expected at the COCTM), Sulphur Recovery Unit (SRU) Incinerators or SRU Thermal Oxidizing Unit, Flare systems (HP, LP, sour gas), etc.

- Carbon monoxide emissions (intermediate product of combustion): Same sources as NO_x, and anywhere combustion occurs.
- Particulates (including metals): In addition to activities already mentioned, other sources of Particulates for the Project Hydrogen Manufacturing Unit, Coke plants, and the SRU incinerators (if any).
- Sulphur oxides emissions: Resulting from fuel combustion due to sulphur in the fuel burned. Other sources of sulphur for the Project may be the Coke calciners (sulphur in bitumen is greater than 4% in Athabasca); WRHP™; Flue gas of the SRU; Process Furnaces, Flare System.
- Volatile Organic Compounds: Hydrocarbon Storage and Handling facilities; Dilatant Recovery Unit (DRU), Gas separation unit if any; Fugitive emissions (valves, flanges, etc.); Vents; Flare systems.

Activities that cause a physical disturbance to land, such as earth moving, land clearing, blasting, and transportation can also introduce particulate matter (e.g., dust and soot) to the surrounding region. The emission of these air contaminants can result in to local or regional degradation of ambient air quality, with potential impacts on human health as well as on sensitive ecosystem receptors. Furthermore, emissions of air contaminants resultant from this Project may add cumulatively to the emissions from other activities, contributing to degradation of air quality in the region.

When contaminants settle out of the air in the surrounding environment, their deposition may result in adverse impacts to terrestrial and aquatic ecosystems. For example, metals and polycyclic aromatic compound (PAC) emissions from petroleum-based industries may result in elevated concentrations of these contaminants in water, soil, flora, and fauna. Emissions of NO_x and SO_x may also lead to acidification and potential exceedance of ecosystems' critical loads. Air contaminant emissions can result in contamination of nearby land and waterbodies, and may affect plants, wildlife, and fish and fish habitat. Deposition effects from this Project may add cumulatively to those of other activities in the region.

Potential sensitive receptors for air quality impacts and/or deposition effects can include, but are not limited to, residential, urban, or other inhabited areas, agricultural areas, and natural or park land. Due to the long-range transportation potential of many atmospheric pollutants, deposition effects may occur at locations well away from sources.

Greenhouse Gas Emissions and Climate Change

The construction, operation, and decommissioning of the proposed Project may result in GHG emissions, and may hinder or contribute to the Government of Canada's ability to meet its commitments in respect of climate change. Furthermore, the Project has the potential to be affected by future climate change, possibly resulting in impacts to the environment. Climate change may alter the likelihood or magnitude of sudden weather events such as extreme precipitation that can contribute to flooding, as well as contribute to longer-term changes such as sea level rise, permafrost thaw and changes to migration patterns. Changes related to warming are already evident in many parts of Canada, and are projected to continue in the future with further warming. If not properly considered, such changes may cause issues such as equipment failures that can threaten the environment, human health and safety, interrupt essential services, disrupt economic activity, and incur high costs for recovery and replacement.

The Strategic Assessment of Climate Change (SACC) (revised October 2020) provides guidance related to climate change throughout the impact assessment process. The SACC outlines information that the Proponent should provide during the impact assessment process on GHG emissions, GHG mitigation measures, and climate change resilience; the circumstances in which an upstream GHG assessment will be required; and the circumstances in which a credible plan for achieving net-zero GHG emissions by 2050 will be required.

Net GHG Emissions

The Proponent has estimated the direct GHG emissions associated with the operations phase of the Project to be 3,386 kt/year CO₂e. Based on a life cycle analysis comparing the GHG emissions with or without the application of Value Creation Inc. (VCI) technologies, the Proponent has also estimated the domestic GHG emissions that would be avoided to be 0.02 tonne CO₂e/barrel of bitumen processed. The net estimated GHG emissions are 1,800 kt/year.

ECCC recommends the Proponent include in the Detailed Project Description (DPD) the methodology, data, emission factors and assumptions used to quantify the annual GHG emission estimates.

ECCC recommends the Proponent revisit their approach for estimating the avoided domestic GHG emissions. Section 3.1.1 of the SACC presents criteria for avoided emissions. Amongst other criteria, avoided domestic GHG emissions should represent reductions or removals that are **real**. Therefore, estimating emissions based on a technology that is

not currently in operation does not qualify as avoided GHG emissions. A higher performing technology would instead be reflected in a lower direct estimate of emissions.

Upstream GHG Emissions

This Project will likely be required to complete an upstream GHG emissions assessment, which will be confirmed through the Tailored Impact Statement Guidelines (TISG).

Carbon Sinks

The Project as described could have adverse effects on carbon sinks (i.e., forests, oceans or other natural environments that absorb carbon dioxide from the atmosphere). Proponents are required to provide in their DPD:

- a description of the activities that would result in an impact on carbon sinks; and
- a quantification of land areas expected to be impacted by the Project, by ecosystem type (forests, cropland, grassland, wetlands, and built-up land) over the course of the Project lifetime, including any areas of restored or reclaimed ecosystems.

In the upcoming TISG (or equivalent document), the Proponent will be required to provide a qualitative description of the Project's positive or negative impact on carbon sinks.

Alternative Means

In the DPD, ECCC recommends that the Proponent provide a discussion and assessment of alternative means of carrying out the Project, including the technologies and processes considered for all aspects of the Project and all project phases, such as alternatives around the supporting process units, utilities and off-sites, stationary and mobile combustion, flaring, venting, fugitives, and other operational activities. This assessment should include the potential impacts of the alternatives on GHG emissions and how GHG emissions were considered as a criterion in the alternatives selection.

Mitigation Measures

The Proponent states in Section 19, "To address the environmental aspects of the Expansion, VCS is committed to using appropriate adaptive best management practices (BMP) and mitigation measures that will be identified, analyzed and considered in the project design. Based on project characteristics, VCS mitigation measures will be developed to directly address every identified potential impact."

The Proponent also states in Section 7, "VCS will apply best available technologies economically achievable (BATEA) in designing and operating the process units, in particular, the process heaters, sulphur recovery unit, and wastewater treatment and disposal."

ECCC encourages the Proponent to describe in their DPD the Best Available Technologies / Best Environmental Practices (BAT/BEP) and mitigation measures, which could include technologies and practices to reduce the Project's GHG emissions, which are being considered to reduce GHG emissions from all emissions sources.

Net-Zero Emissions by 2050

In Section 11 of the IPD, the Proponent specifies the earliest expansion operations will begin in 2029, and then continuing for over 50 years. In accordance with the Strategic Assessment of Climate Change (SACC), projects with a lifetime beyond 2050 are required to provide a credible plan that describes how the project will achieve net-zero emissions by 2050. ECCC encourages the Proponent to provide in the DPD an overview of the measures being considered to ensure the Project is net-zero emissions by 2050.

In the upcoming TISG, the Proponent will likely be required to provide details regarding alternative assessments, mitigation measures including their BAT/BEP determination, and a credible plan that describes how the Project will achieve net-zero emissions by 2050.

Climate Change Resilience

Because climate over the lifetime of the Project is projected to be different from past and current climate in the area, and the lifetime of the proposed Project is more than 50 years, climate change considerations are relevant to the project review. There is potential for climate change to effect the Project, which in turn, may have impacts on the surrounding environment (e.g. through accidents or malfunctions). Climate changes in the project area, such as possible changes in mean and extreme precipitation and temperature and related environmental conditions, may alter baseline conditions, with implications for climate sensitive aspects of project design and associated effects on the environment.

The Proponent will be required, via the TISG, to provide information in the Impact Statement on how the Project is resilient to and at risk from both the current and future impacts of a changing climate.

Water Quality and Quantity

The activities linked to the construction, operation, and decommissioning of the Project could have adverse effects on the quality of groundwater and surface water, as well as on the hydrological regimes of watercourses and water bodies.

The Project may include the following activities: operating heavy equipment, bitumen processing, land clearing etc. These activities could result in the introduction of particulate matter (dust), erosion, and high concentrations of sediments, hydrocarbons, and other contaminants to surrounding waters, resulting in adverse effects on water quality. The deposition of airborne particulate matter generated by the Project could also be a source of surface water contamination.

Surface water quantities could be changed by alteration of surface flows, and removal of wetlands, potentially affecting water quality. Furthermore, the production of process-affected water has the potential for contaminants to enter groundwater, with the potential for contaminants to be transported to surface waters.

Wildlife, Species at Risk, and Habitat

The activities linked to the construction, operation, and decommissioning of the Project and associated infrastructure could have negative effects on terrestrial wildlife resources (wildlife), including migratory birds and terrestrial species at risk (amphibians, arthropods, birds, lichens, terrestrial mammals, mosses, reptiles, and vascular plants) listed on the *Species at Risk Act* (SARA), their habitat, and wetlands.

The nature of effects to wildlife and habitat (including residences and critical habitat defined under the *Species at Risk Act*) can vary based on a number of factors, including: project location, duration, scale, and configuration; ancillary project activities (land clearing and flaring); existing cumulative effects; the type of habitat that may be disturbed; and sensitivity of species found in the project area. The pathway through which potential effects are conveyed will depend on the land, air, and water constituents associated with the site along with the behavioural adaptability, presence and interaction with the species limiting factor (e.g., habitat supporting staging, nesting, roosting or foraging) and population resilience.

Migratory Birds, Species at Risk and their Habitat

Individual mortality and the destruction of nests and eggs or any other structure necessary for the reproduction and survival of species at risk could occur during all project phases, particularly during site preparation, operational maintenance of surface water management ponds or vegetated corridors, and Project dismantling. Mortality in migratory birds and species at risk could also occur because of collisions with vehicles or infrastructure (e.g. towers, flare stacks, power lines), related to the Project. Attraction to flaring and lights at night or in poor visibility conditions during the day may cause birds to collide with lit structures (e.g. towers, flare stacks) or their vertical supports, resulting in injury or death. In some instances, birds can get disoriented while circling a light source and may deplete their energy reserves and either die of exhaustion or drop to the ground where they are at risk of predation. Accidental oil or chemical spills could also have adverse effects if these substances make their way into the habitats frequented by migratory birds and species at risk. There is a higher risk that these effects would be more severe for migratory birds that are also species at risk and species where habitat is sensitive to disturbance (e.g., wetlands) or where there is already a high degree of cumulative effects to habitat or individuals.

There is the potential for removal of habitat important for nesting, foraging, staging, and overwintering migratory birds.

Migratory birds and terrestrial species at risk could be affected by sensory disturbances during the construction, operation, and decommissioning of the Project. Some examples of potential sources of sensory disturbance include noise from various Project activities, lights, vibrations from excavation and the operation of machinery, as well as the presence of workers. The amount, duration, frequency, and timing of noise are important to understand potential effects. Sensory disturbance may make adjacent habitats unsuitable for use by wildlife and cause avoidance effects in many species.

Wetlands

The Project will overlap Astotin Creek and several open water, fen, marsh and swamp wetlands; the activities linked to the construction, operation, and decommissioning of the Project could have negative effects on wetlands and their ecological functions. The destruction and modification of wetlands is likely to

cause negative effects on or harm the migratory birds and species at risk that use these areas for breeding and migration, as well as for foraging or resting areas.

The Project has the potential to release emissions of NO_x and SO_x that can result in the acidification of waterbodies with subsequent effects on aquatic ecosystems/species including effects on wildlife habitat quality (e.g., inhalation and deposition on terrestrial vegetation or into water) and availability and quality of food (e.g., ingestion of benthic invertebrates and/or terrestrial/aquatic vegetation).

Environmental Emergencies

The proposed Project includes a railyard, storm water pond inside the railway loop, construction of a tank farm for diluted bitumen and storage of hazardous materials, new petroleum storage tanks, and wastewater treatment activities. As such, there is potential for adverse environmental effects from accidents and malfunctions, such as spills from the storm water holding pond, fuels, hydrocarbons, chemicals and waste products, derailment and/or failure of the water treatment system. Adverse effects to air quality, water quality, wildlife and wildlife habitat could result from the accidental release of hydrocarbons, explosion from the natural gas systems or the hydrogen-manufacturing unit and other contaminants to the surrounding environment. Optimized spill prevention, preparedness and response measures and systems will be important given the risk of spills of hazardous substances to the environment, especially to nearby waterways and environmentally sensitive areas.

Margaret Fairbairn

Name of Departmental / Agency Responder

Acting Regional Director, EPOD

Title of Responder

<Original signed by>

Signature

December 9, 2020

Date