Review of draft Tailored Impact Statement Guidelines for the Value Chain Solutions Heartland Complex Expansion Project – surface water quality

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Introduction

At the request of Lac Ste. Anne Métis Community Association (LSAM), Thompson Aquatic Consulting is pleased to provide the following technical review of the Value Chain Solutions - Heartland Complex Expansion Project Draft Tailored Impact Statement Guidelines (TISG) Pursuant to the Impact Assessment Act (draft for public comment), April 16, 2021.

The Heartland Complex Expansion (HCX) Project is an expansion of the already approved Heartland Project (Project 1), which is a bitumen upgrader and refinery, including a tank farm, which is still under construction. The Expansion Project will increase the upgrading/refining capacity of the Heartland Project by a factor of four, and will be implemented in three phases (Project 2, 3 and 4). The Heartland Project as a whole has an expected life of over 50 years (VCS Inc. 2021).

The HCX Project will overlap wetlands and portions of Astotin Creek, a tributary of the North Saskatchewan River. The Project proponent, Value Cain Solutions (VCS), plans to realign the Creek around the site, maintaining its connection to the North Saskatchewan River, however this will most likely require an assessment of harmful alteration, disruption or destruction of fish habitat (HADD) under the federal Fisheries Act, and a Department of Fisheries and Oceans (DFO) approved plan to offset this HADD. The loss of wetlands as a result of the Project construction will likely need to be offset according to the Alberta Wetland Policy. In addition, the Project is expected to emit acidifying compounds into the atmosphere, which may impact aquatic ecosystems at a much broader regional scale. Finally, the project will include disposal of wastewater underground via deep well injection (VCS Inc. 2021).

I. Water Quality

A. General Comments

Overall, the water quality sections of the TISG document are reasonably detailed and descriptive. However, there are opportunities to include more effective guidance that will ensure VCS Inc. presents a comprehensive baseline characterization and assessment of existing cumulative effects in surface water systems. Importantly, the TISG does not make an adequate linkage between impacts to air quality in the form of acidifying emissions and potential acidification impacts on aquatic ecosystems at a broader regional scale, especially in terms of establishing baseline conditions across an appropriately-sized study area. Moreover, the proposed local and regional study areas provided in the detailed Project description are inadequate and must be expanded. Finally, the potential for a spill of deleterious substances during transport, and subsequent impacts to aquatic ecosystems should be more explicitly addressed in the TISG risk assessment guidance.

B. Specific Requests/Recommendations

TISG, Section 7.3.2, Spatial Boundaries

Reference: TISG, Section 7.3.2, p. 22:
"*define spatial boundaries by taking into account:*

- *the appropriate scale and spatial extent of potential effects and impacts (direct and indirect) of the Project;*
- *the physical location of potential receptors, including, where applicable, the movement patterns of potential receptors;*
- *the relationships between VCs (e.g. interaction between wildlife and vegetation);*
- *community knowledge and Indigenous traditional knowledge;*
- *current or traditional land and resource use by Indigenous peoples;*
- *rights of Indigenous peoples, including cultural and spiritual practices;*
- *physical, ecological, technical, social, health, economic and cultural considerations; and*
- *take into account the size, nature and location of past, present and foreseeable projects and activities as factors included in the definition of spatial boundaries, particularly for regional study areas.*"

1. **Topic: Proposed aquatic resources local study area**
   From the Detailed Project Description (VCS Inc. 2021), Section A6.2:
   "*Hydrology, surface water quality, and aquatic ecology will share a common study area. The study areas will be finalized till later stage, however, based on an initial review of existing information it is expected that the Local Study Area (LSA) will consist of:*
   • the Project Lease Area;
   • Astotin Creek flowing downstream from south to north in and downstream of SW 03-054-21 W4M to its confluence with Beaverhill Creek; and

• Beaverhill Creek from its confluence with the unnamed creek to its confluence with the North Saskatchewan River (NSR)." (VCS 2021) p. 73

Comments/Rationale: The proposed local study area would not include the entirety of the potentially affected local watersheds (i.e., Astotin and Beaverhill Creeks). The Beaverhill Creek watershed is delineated as a "HUC 8" sub-basin or watershed, which is an often-used watershed delineation scale for impact assessments in Alberta. That watershed includes Astotin Creek and its headwater Astotin Lake in Elk Island National Park, as well as Beaverhill Creek and its headwater Beaverhill Lake plus contributing areas, including in Elk Island National Park (HUC maps are viewable at: https://maps.alberta.ca/genesis/rest/services/Hydrologic_Unit_Code_Watersheds_of_Alberta/Latest/MapServer/)

While it is reasonable to limit the extent of the North Saskatchewan River that falls within the local study area, considering the size and extent of its corresponding basin, it is not reasonable to truncate the Astotin or Beaverhill Creek study areas. This is especially true for assessment of the following anticipated impacts as described in the Project Description:

- Potential effects from changes in drainage patterns and changes in channel morphology
- Potential effects from changes in groundwater quality and quantity
- Potential effects through instream works (especially where fish passage or navigation is a concern)

Request/Recommendation: Explicitly expand the local study area for aquatic resources as described in the Detailed Project Description to include the entirety of the Beaverhill watershed (HUC 8).

2. **Topic: Proposed aquatic resources regional study area**
From the Detailed Project Description (VCS Inc. 2021), Section A6.2:
"*It is expected that the Regional Study Area (RSA) for these three components* [hydrology, surface water quality, and aquatic ecology] *will consist of the LSA plus the* [North Saskatchewan River] *downstream from its confluence with Beaverhill Creek downstream to the vicinity of Smoky Lake.*
The Air Quality Regional Study Area will be used as the basis for assessments of potential effects of acidifying emissions on surface water quality and aquatic biology." p. 73

Comments/Rationale: While it is reasonable that only a portion of the North Saskatchewan River will fall within the Project study areas, the regional study area cannot be limited to the area downstream of the River's confluence with Beaverhill Creek. Instead, the regional study area should include an upstream section of the North Saskatchewan River, above the Beaverhill Creek confluence. This is required, especially during baseline water quality data collection and characterization, in order to obtain a "control" measure of conditions before and after the Project effects occur. If this area in not included in the assessment and follow-up monitoring, then it will not be possible to

determine whether changes over time at the Beaverhill confluence or any other inflow with potential Project-related effects, are attributable to those inputs to or to other changes in upstream conditions.

In addition, regarding the potential project-related and cumulative effects in terms of acidifying emissions and acidification of surface waters, it is necessary to obtain baseline water quality data from lakes and wetlands in the air quality regional study area, and not just in the aquatics regional study area. There must also be ongoing monitoring of these surface waters at regular intervals as part of ongoing monitoring and follow-up programs. Generally speaking, the water quality data required will be a limited suite of conventional parameters, specifically alkalinity measures and related inorganic carbon species, base cation measures, and organic carbon measures.

According to the publicly accessible lake water quality data generated by the province of Alberta, very few of the lakes in the Beaverhill Creek watershed have water quality data available, and for many of those that do, the data may be 10 years old or older (for example, available data from Astotin Lake are from 2008 only) (lake data are available at: http://environment.alberta.ca/apps/EdwReportViewer/LakeWaterQuality.aspx). Furthermore, many of the lakes located within the broader regional air quality study area do not have available water quality data, and publicly available water quality data for wetlands are especially scarce.

The Alberta Acid Deposition Management Framework (Alberta Environment 2008) sets out deposition "monitoring loads" that serve as a threshold for not only deposition monitoring but also "receptor" (i.e., surface waters and soils) sensitivity studies to occur. It isn't clear from the Project description whether this will be the case. However, considering the sizeable increase in acidifying emissions that are expected to occur as a result of the Project (VCS Inc. 2021, Table 7, p. 41), the Proponent has a responsibility to contribute to the collection of the required baseline and ongoing monitoring water quality data from lakes and wetlands.

Given that acidifying emissions are sizeable at a regional scale, it would be reasonable to expect that other emitters, their representative organizations, as well as Alberta, and Canada (e.g., where federal lands are involved) must fulfill this obligation, possibly as part of existing management frameworks. There are existing Watershed Planning and Advisory Councils (WPACs) in Alberta that are designated by the province to report on watershed health and lead collaborative planning initiatives, among other activities. These include the North Saskatchewan Watershed Alliance, the Athabasca Watershed Council, the Battle River Watershed Alliance, and the LICA-Beaver River Watershed group. The Alberta Lake Management Society (ALMS), a non-profit organization, also carries out annual lake water quality sampling at several lakes across the province. Finally, Indigenous communities, including LSAM, have trained and experienced environmental monitors that are available to conduct water quality monitoring activities. Data collection efforts could therefore be undertaken by the Proponent, all or some emitters in the region as a group, governments, or

those groups could fund WPACS, ALMS and/or Indigenous communities or organizations to complete the monitoring. A multi-stakeholder approach to this regional monitoring is likely the most appropriate in this case, however regardless of the approach taken, if this data is not available for use in the Project impact assessment, ongoing monitoring, and follow-up programs, then the potential Project-specific and cumulative impacts related to surface water acidification will not have been appropriately assessed or addressed.

Request/Recommendation: Expand the regional study area for hydrology, surface water quality and aquatic resources as described in the Detailed Project Description to include areas of the North Saskatchewan River upstream of the Beaverhill confluence and any other inflow point with potential project-related effects (including discharge or outfall locations, if any). Also, please make an attempt to not include inflow effects from other developments within that upstream control area.

With regards to the effects of potential acidifying emissions, please commit to collecting/funding/reporting the collection of baseline water quality data relevant to acidification sensitivity from surface water systems (in particular, lakes and wetlands) within the Air Quality Regional Study Area. Baseline and ongoing surface water quality conditions related to acidification sensitivity must be assessed at that larger geographic scale. This regional monitoring may be undertaken in cooperation with other organizations, but is required to assess the potential for project-specific and especially cumulative effects on surface water quality.

TISG, Section 13.1, Potential accidents or malfunctions

Reference: TISG, Section 13.1.1, p. 83-84:

"*The Impact Statement must:*

- *identify hazards for each project phase that could lead to events of accidents and malfunctions and provide an explanation of how these events were identified (e.g. information sources, recognised risk assessment methodology, professional expertise, similar project, participants' input, etc.);*
- *take into account the lifespan of different project components;*
- *conduct an analysis of the risk of each hazard/adverse event (including likelihood and consequences) including:*
    - *risk of explosion linked to the Project;*
    - *risk of accidental leaks or failure of pipelines, or wastewater facilities;*
    - *risk of an accidental fuel spill, whether minor or major; and*
    - *loss of containment of dangerous goods at permanent or temporary facilities during construction and operation, or during maintenance activities;*"

3. **Topic: Potential impacts of spills on surface water systems during feed stock, product and/or waste transport**

   From the Detailed Project Description (VCS Inc. 2021), Section 9:

   > "*Operation of the proposed Expansion and the approved VCS-H Project 1 will be similar. The main difference between the approved and proposed Projects will be in the transportation of the upgraded/refined products to the market. VCS-H Project 1 will make use of pipeline, truck and rail transportation due to the smaller volumes of product while the Expansion will maximize the use of pipeline and rail transportation due to the higher product volumes.*" p. 19

   Comments/Rationale: The Project will require transport of hydrocarbon products and by-products, feed bitumen, and wastes (Appendix 2, Section 21.1: List of Project activities). This transport will be via road, pipeline or rail, and the potential for spills to occur during the transport of any potentially deleterious substance should be explicitly included in the Project impacts assessment. Reference to the potential for spills in general is included in the mitigation sections of the TISG Assessment methodology section (7.5), however that section does not refer to assessment of impacts from spills to surface waters. The TISG risk assessment discussion cited above (13.1.1.) does not list this specific potential impact, but the occurrence of such spills in the past, including the spill of heavy oil from a derailed train into Wabamun Lake that occurred in 2005, makes the inclusion of this specific risk a reasonable request.

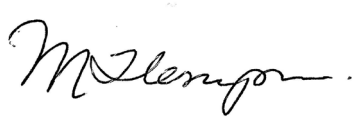
   Request/Recommendation: Please add the following point to the list of hazards/adverse events to be assessed as part of potential accidents or malfunctions risk assessment:

   - conduct an analysis of the risk of each hazard/adverse event (including likelihood and consequences) including:
     - **risk of accidental spills to surface waters of Project-specific hydrocarbon products and by-products, feed bitumen, and/or wastes during transport by road, rail or pipeline.**

Closing

Thank you for the opportunity to provide this technical review memo.
Please contact me with any questions or concerns.

Sincerely,



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References

Alberta Environment. 2008. Alberta Acid Deposition Framework. Available at: https://open.alberta.ca/publications/9780778567264

Impact Assessment Agency of Canada (IAAC). 2021. Value Chain Solutions-Heartland Complex Expansion Project: Draft Tailored Impact Statement Guidelines Pursuant to the Impact Assessment Act. Draft for Public Comment. April 16, 2021.

Value Chain Solutions, Inc. 2021. Value Chain Solutions-Heartland Complex (Bitumen Upgrader and Specialty Refinery) Expansion Project: Detailed Project Description. February 2021 Submitted to: Impact Assessment Agency of Canada.