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Environmental Assessment Division
580 Booth Street
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January 13, 2016

CEAR Reference number: #80032

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Project Manager
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Re: Response the Canadian Environmental Assessment Agency's November 12, 2015 Request for Advice and Assessment of the 3D Modelling Update Report (Nov., 2015) for the Pacific Northwest LNG Project

The attached submission represents Natural Resources Canada's (NRCan) culmination of a scientifically rigorous review process, focused on sediment transport aspects of the modelling completed to assess the potential effects of the marine structures on hydrodynamics and sediment deposition for the Pacific Northwest (PNW) LNG Project. NRCan's extensive involvement since December 2014 is witnessed through our participation in technical meetings with the Proponent, Aboriginal groups and their technical representatives, and federal experts, as well as through our review of the various PNW LNG studies supporting the modeling work, which resulted in numerous technical submissions provided to the Canadian Environmental Assessment Agency (CEAA) and the Proponent, which are highlighted in Attachment 1. The submission also responds to CEAA's November 12, 2015 request for advice to inform their work to complete the assessment and draft the EA Report and associated federal conditions.

NRCan is obligated under the *Canadian Environmental Assessment Act 2012* to provide specialist or expert information or knowledge to CEAA who is the Responsible Authority for the designated project. NRCan staff involved in the technical review have expertise in environmental marine geology, sedimentology and sediment transport.

NRCan officials would like to acknowledge the significant amount of time and effort put forth in this review by PNW LNG and their consultants; federal scientists from Fisheries and Oceans Canada (DFO) and NRCan; and, Aboriginal groups and their technical representatives. These efforts have resulted in a scientifically defensible modeling approach improving the understanding of the potential effects of the marine structures on site hydrodynamic and sediment patterns. The results from the modeling studies are key to the assessment of potential significant environmental effects on fish and fish habitat, including the important eel grass habitat of Flora Bank.

Background

On June 2, 2015, CEAA issued an Information Request (IR) to the Proponent indicating that their conclusions needed to be further substantiated by additional modeling based on the views from DFO and NRCan and signaled at that time, the information provided in the 3D Modelling Report (May 2015) was not adequate for the purposes of completing the environmental assessment. This was followed by the submission of a draft 3D Modelling Update Report by the Proponent on September 16, 2015, and subsequent technical reviews by NRCan and DFO on October 16, 2015, leading up to the submission of the PNW LNG Supplemental Modelling Report – 3D Modelling Update on November 10, 2015.

NRCan's Review

NRCan's response to CEAA's specific questions and NRCan's final assessment of the 3D Modelling Update Report (November 2015), are attached to this letter (attachment 2 and 3 respectively). However, a summary of NRCan's key findings are found hereafter.

The results provided in the 3D Modelling Update Report (November, 2015) have significantly improved the findings of the previous 3D Modelling Report (May, 2015) due to the following additional efforts: inclusion of seasonal and 1 year time series simulations, modelling of extreme storms using improved wind data and additional wind directions, presentation of sediment transport and morphological change results for selected modelling cases, and new high-resolution modelling of processes around the proposed marine terminal structures. In particular, the time series simulations in various modelled cases now adequately simulate the real physical processes and the maximum magnitude of the tides and storms. This ensured that the best available wave and current data were used to model sediment transport, seabed erosion/deposition and morphological changes on Flora Bank.

Adequate analysis of the impact of the marine structures on currents, waves, sediment transport, and seabed morphology for typical tide-dominant conditions, for the freshet period, and for natural and extreme storm conditions are the essential requirements for this assessment. While the impact for the freshet condition was properly modelled in the Proponent's Draft 3D Modelling Report (September, 2015), significant additional data and interpretation have been added to the 3D Modelling Update Report (November, 2015) so that possible changes to these processes for typical tide-dominant, extreme storm, and natural storm conditions are also adequately modelled.

The time series and maximum values of sediment transport related parameters such as suspended sediment concentration, sediment transport flux, net sediment transport flux, and seabed erosion and deposition are needed to substantiate the predictions of long-term morphological changes and are also important to assess the impact of the project on fish and fish habitat. These types of information were either not provided or could not be derived due to the weekly case approach used in previous rounds of modelling. Sediment transport related data and interpretation are now adequately presented for several key modelled cases in the 3D Modelling Update Report (November, 2015) to substantiate the predictions of long-term morphological changes and to support the assessment of the project impact on fish and fish habitat.

Predictions of the regional wave and current models for various conditions indicate that the construction of the marine structures will cause localized reduction of waves and currents. Sediment transport and the volumetric changes computed for the majority of the modelled cases show that the construction of the marine structures will slightly reduce the erosional volume, depositional volume, and net volume changes. While high-resolution simulations indicate that the marine structures will cause erosion of 5 cm per year in the immediate areas around the structures, regional model predictions support the preliminary conclusion that the proposed marine structures will likely dampen seabed erosion and deposition on Flora Bank.

Conclusion

Given the substantial amount of work and quantitative evidence provided by the Proponent to date, in NRCan's view, the impact of the marine structures on currents, waves, sediment transport, and seabed morphology for various seasonal and storm conditions has been modelled with acceptable certainty and therefore, NRCan has confidence in the Proponent's conclusions regarding sediment transport and morphological changes in the project area. DFO concurs with the Proponent's conclusions that no significant effects are expected from the marine structures (trestle pilings), with the south west tower and anchor block likely to cause the greatest disturbance. The impacts associated with these two large structures are predicted to be localized, resulting in a low risk to commercial, recreation and Aboriginal fisheries. Consequently, subject to a robust and long term monitoring program and implementation of effective mitigation measures, DFO has concluded that the effects of the marine structure on fish and fish habitat have been categorized as having a low potential of resulting in significant adverse effects.

Should you have any questions regarding the contents of this letter and the supporting attachments, I would be pleased to discuss.

Original signed by:
Jessica Coulson

A/Director
Environmental Assessment Division
Natural Resource Canada

cc:
Lisa Walls, CEAA
Carmel Lowe and Al Magnan, DFO
Linda Richard, NRCan

Attachments:

1: Chronology of key PNW LNG modeling studies and corresponding NRCan submissions (October 2014-January 2016)
2: NRCan's response to CEAA's November 12 request for advice
3: NRCan's assessment of the Supplemental Modelling Report - 3D Modelling Update (November 10, 2015)