Environmental Stewardship Branch
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Ms. Kim Coady
Canada Newfoundland and Labrador Offshore Petroleum Board
Fifth Floor, TD Place
140 Water Street
St. John's, NF A1C 6H6

Dear Ms. Coady:

RE: PDI PRODUCTION INC. PORT AU PORT EXPLORATION DRILLING PROGRAM EA EAS 2007-128B

Environment Canada's Meteorological Service has reviewed the environmental assessment for PDI's Exploration Drilling Program on the Port au Port Peninsula. The following EC comments stem from the department's meteorological expertise.

REVIEW COMMENTS

The scoping document for this EA specified the requirements for the description of the physical environment: "For the Study Area, provide a summary description of the meteorological and oceanographic characteristics, including extreme conditions, and any change to the Project that may be caused by the environment".

The information on winds and waves presented in the EA is fairly general and brief. It is based on the description of winds and waves in the Strategic Environmental Assessment for western Newfoundland offshore areas (C-NLOPB 2005). Data for that SEA were obtained from the deep water AES40 hindcast of modeled winds and waves (Swail et al 2000). However there should be some additional analysis of both winds and waves specific to the project area. It would also be advisable to consider potential effects of storm surge and sea-ice.

Section 4.2.1 Wind

The AES40 winds used in the EA are representative of one-hour mean winds at 10-m. Estimates of extreme winds of shorter averaging periods such as a one-minute mean and a 3-second gust are generally used by industry for design purposes. There should be some discussion of adjustment factors to convert maximum one-hour mean winds to maximum winds at shorter averaging intervals or to gust values. Wind climate data from nearby stations, including hourly reports from Stephenville, available online from Environment Canada, should be assessed for the severity and frequency of extreme wind events. Any known local effects should be described. The importance of this information is clear from Section 6.8, which states that given the high winds anticipated at Shoal Point, the rig's derrick will be stabilized using high strength guy wires.

Section 4.2.2 Waves

The wave information provided in the EA is based on the AES40 hindcast for the deep water to the west of the project area. The MSC50 hindcast dataset is now available and should be examined also, as it improves upon the AES40 in a number of ways including finer grid spacing and time step, and the inclusion of shallow water wave physics (Swail et al 2006). The EA gives the maximum value for the significant wave height (Hs) during the 5 decades of the AES40 hindcast as Hs 9.43 m. Typical winter peak wave periods in winter were given as 6 to 7 seconds. Normally the peak wave period associated with the highest waves is given, rather than the typical peak wave periods. The MSC50 Wind and Wave Climatology Atlas [at http://www.oceanweather.net/msc50waveatlas/] shows a 50-yr return period extremal analysis of Hs 8 to 9m and Tp of 12 s for western Newfoundland. Waves with Tp of 12 s would be in transitional depth water for depths of less than 58 m (WMO 1998), which is the condition for nearly all of the project area.

Although the rig would be on land, it would be located at low elevations close to the shore. Figure 3.1 shows the drill hole on Shoal Point at an elevation of 1.21 m, about 45 m from the highwater mark. Other equipment on the drill site would be closer. Section 3.5.3 Site Plans mentions a berm to contain potential spills but no height was specified. The EA should consider the possibility of high waves breaking on shore in extreme storms. Thus shallow water wave modelling of the transformation of high, long period, deep water waves is important. There is no discussion of this, or any mention of future plans to do this analysis. This would be relevant for waves from the north, entering Port au Port Bay and breaking on Shoal Point. In addition the western shore of Long Point is fully exposed to waves in the Gulf of St. Lawrence. There should be some discussion in 6.8 of the potential effects of waves reaching the drill site. A related issue is the effect of icing from freezing spray on the structure. This was not mentioned yet may be important.

Storm Surge

There should be some discussion of storm surge for the project area and its effects on the project. It seems that there is potential for flooding of low lying parts of Shoal Point or Long Point during an extreme event combining high storm surge, high waves, and high tide. As noted, the centre of the project site on Shoal Point is only 1.21 m above sea level and close to the water's edge. The estimate by Bernier and Thompson (2006) of 40-year return period storm surge height along the western coast of Newfoundland is 0.7 m. However that value may be larger within the bay due to wave set-up with north to northeast winds. Section 4.3.2 Tides gives the tidal amplitude as up to 0.53 m. What would be the combined effect on a drill rig or storage tanks of waves carried onshore by storm surge arriving at high tide?

Section 4.3.4 Ice

The ice section is quite short and general, however it is clear that the proponent is aware that sea ice is present in this area and the information provided is accurate.

Section 6.8 Effects of the Environment on the Project

The effect of sea-ice on the project was not discussed in section 6.8. What is the potential for damage caused by ice ride-up (ice carried onshore by wind stress, ice pressure, or storm surge)? During the extreme storm of January 20-22, 2000, the high storm surge caused ice to ride-up along the shores of PEI and southeastern NB, which caused significant damage to coastal infrastructure (McCulloch et al. 2006; also see Parlee 2006).

References

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McCulloch, M.M., Forbes, D.L., Shaw, R.W. and the CCAF A041 Scientific Team. 2002. Executive summary, *Coastal impacts of climate change and sea-level rise on Prince Edward Island* (Forbes, D.L. and Shaw, R.W., editors). Geological Survey of Canada, Open File 4261. Study report available on CD from: Geological Survey of Canada, Bedford Institute of Oceanography. [Executive summary at http://atlantic-web1.ns.ec.gc.ca/slr/default.asp?lang=En&n=D9D1EAF2-1/].

Parlee, Kathryn A., 2006. Climate Change Impacts and Implications: The Coastal Zone of the Southern Gulf of St. Lawrence, C-CIARN Coastal Zone Poster 06-1. **[**Online at the Geological Survey of Canada (Atlantic) C-CAIRN website http://www.c-ciarn.ca/pdf/sgslposter_final29march06.pdf]

Swail, V.R., E.A. Ceccafi, and A.T. Cox, 2000. The AES40 North Atlantic wave reanalysis: Validation and climate assessment, in 6th International Workshop on Wave Hindcasting and Forecasting, Monterey, California, USA, 2000.

Swail, V.R., V.J. Cardone, M. Ferguson, D.J. Gummerz, E.L. Harris, E.A. Orelup, and A.T. Cox, 2006. The MSC50 Wind and Wave Reanalysis. Proceedings of the 9th International Workshop on Wave Hindcasting and Forecasting, Sept. 25-29, 2006, Victoria, BC. [http://www.waveworkshop.org/9thWaves/].

WMO, 1998. Guide to Wave Analysis and Forecasting. World Meteorological Organization-No. 702.

I trust that this information will be of assistance in your review of this proposal. If you wish to discuss these comments or have further questions, please do not hesitate to contact me at your convenience.

Yours truly,

Original signed by Jeanette Goulet

Jeanette Goulet
(for Glenn Troke)
Environmental Assessment Officer
Environmental Protection Operations Directorate
EPB/NL

Attachment

cc G. Troke
K. Power
B. Jeffrey