Fisheries and Oceans Canada | Pêches et Océans Canada

PO Box 5667
St. John's NL A1C 5X1

Your File Votre référence

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BAB 3970-175

August 8, 2011

Ms. Elizabeth Young
Environmental Assessment Officer
Canada-Newfoundland and Labrador Offshore Petroleum Board
5th Floor TD Place 140 Water St.
St. John's NL A1C 6H6

Dear Ms. Young:

Re: ExxonMobil Canada Properties Ltd. – Hebron Project Comprehensive Study Report: EMCP Response to April 19, 2011 Review Comments (Part II)

In response to your request dated July 21, 2011, Fisheries and Oceans Canada (DFO) has reviewed the *"ExxonMobil Canada Properties Ltd. – Hebron Project Comprehensive Study Report: EMCP Response to April 19, Review Comments (Part II)"* and would like to provide the following comments for your consideration:

Hebron Project Comprehensive Study Report – Spill Trajectory Modelling: ECMP Response to Comments from Regulatory Authorities

Comment 179-DFO F6)

This response is considered adequate.

Comment 19-DFO G)

This response is considered adequate.

Comment 179-DFO G2)

This response is considered adequate.

DFO Response – General Comments (Page 12)

- With regards to the statement: "*Non-linear effects are due to bottom stress or advection term. These terms are only significant in shallow water. Trinity Bay is generally too deep*

for these terms to become a dominant feature except near shore, where spatial scales are too small to consider." Despite the fact that Trinity Bay is deep, non-linear terms are important in strong horizontal gradients and strong currents. This occurs where there is upwelling along the northwest shore of Trinity Bay (for a southwesterly wind direction). Upwelling creates cold surface water (0°C) which contrasts starkly with summer surface temperatures of 10-14°C.

- In EMCP's response, the statement is made that: "*Spill simulations were not performed using storm event winds; however, the MSC50 wind hindcast includes storm generated winds in its hindcast data*". This is a short coming of the report. As the report does not cover oil spill scenarios under strong winds, there is potential to under predict maximum drift scenarios in Trinity Bay.

- With regards to the statement: "*Bay-wide oscillations in the circulation would have too high a frequency for the time scales considered in the oil trajectory modelling*", it is not a question of frequency, but a question of how far oil could be carried in one inertial oscillation period of roughly 16 hours. If this length scale is too small, it would be reassuring to see a quick calculation showing that inertial oscillations are not a factor.

Hebron Project Comprehensive Study Report – Spill Trajectory Modelling: ECMP Response to Environment Canada Comments

No comments.

Hebron Project Comprehensive Study Report Nearshore Bull Arm Spill Trajectory Modelling Report July 2011 Revision with Track Changes

General Comments

- Although a number of issues have been addressed thus improving the document, the main issue remains with the nearshore drift modelling from Bull Arm. The model applied is too simplistic and does not include coastal effects, even when the location in question is within the first baroclinic Rossby Radius of influence from shore (i.e., 5-10 km depending on seasonal stratification). Non-linear terms are not included in the ocean model and are considered a significant absence in the modelling activity.

  The validation plots with the observed currents in Bull Arm are very informative and helpful. It does show however, that the model error with respect to observations can range from 10 - 50 cm/s, which would translate into an additional transport of oil drift of 10 to 50 km per day. This leads to the conclusion that model results should be treated cautiously and that in the absence of more accurate modelling for Trinity Bay, the oil from an oil spill could potentially land on shore anywhere within the bay.

Executive Summary (Page ii)

- The third paragraph in this section states that: "*Wind driven current simulations were conducted for eight wind directions, each using a constant wind speed of* 8 *m/s. During simulations, the wind forced currents were scaled depending on the actual wind speed and direction for each simulation time step, these scaled wind forced currents were added to the tidal current simulation to create a combined current*". This statement is confusing as the first sentence states that wind is constant at 8 m/s, however, the newly added second sentence indicates that actual wind speed was used, leading the reader to believe that the wind is variable. Please clarify.

Section 2.4 (Page 4)

- In the sentence, "*Wind data for near shore model simulations were obtained from two sources, a model hindcast near the Study Area, and observations from a previous GBS construction program near the Study Area*", it is suggested that "*model hindcast*" be replaced with "*output from grid point located near the study area from a large scale model hindcast*".

Section 2.5 (Page 15)

- In the second paragraph on this page it is stated that: "*Non-linear effects that may, for example, result in advection of momentum of other effects due to bottom stress are only significant in shallow water. Trinity Bay is generally too deep for these terms to become a dominant feature except near shore where spatial scales are too small to consider*". Contrary to this statement, non-linear effects can be a factor in Trinity Bay. Non-linear effects such as the advection of tracers like salinity and temperature are important particularly where there are strong currents and strong horizontal temperature and salinity gradients. This occurs in Trinity Bay during upwelling conditions on the northwest shore in the summer.

Figure 2.5-7 (Page 18)

- Model currents very closely follow wind. This is indicative of a linear relationship to wind, and does not seem realistic in Bull Arm where coastal trapped waves under varying wind scenarios would be expected. Additionally, there appears to be no "land effect" in the resulting model predicted circulation; this seems unrealistic in a sheltered cove such as Bull Arm.

Figure 2.5-9 (Page 20)

- It would be valuable to have these two plots overlaid so it can be seen how the model fits the data. By superimposing the print out versions, one can see model-data differences up to 50 cm/s for an event near January 21st. Model-data discrepancies appear to be around 10-20 cm/s leading to drift errors of 10-20 km per day.

Hebron Project Comprehensive Study Report Offshore Spill Trajectory Modelling Report July 2011 Revision with Track Changes

No comments.

Hebron Project Comprehensive Study Report Section 14.1 (revised, track changes) July 2011

No comments.

Hebron Project Comprehensive Study Report Addendum: Results from Simulations of Oil Spills at the Hebron Offshore Location July 2011

No comments.

Should you have any questions, please do not hesitate to contact Katrina Sullivan at 772-0115 / katrina.sullivan@dfo-mpo@gc.ca or Sara Lewis at 772-4140 / sara.lewis@dfo-mpo.gc.ca

On behalf of DFO,

Sara Lewis
Environmental Assessment & Major Projects

cc Shawna Powell
Martin Anderson