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Canada-Newfoundland & Labrador Offshore Petroleum Board

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Mr. Dave Burley
Manager, Environmental Affairs
Canada-Newfoundland and Labrador
Offshore Petroleum Board
5th Floor TD Place
140 Water Street
St. John's NL A1A 6H6

Dear Mr. Burley:

Re: Hebron Project Comprehensive Study Report - Response to Review Comments, Part I

ExxonMobil Canada Properties (EMCP) is submitting the enclosed responses to the comments received from the C-NLOPB on August 24, 2011 regarding the review of the **Hebron Project Comprehensive Study Report: Response to Review Comments Part I, August 18, 2011.**

Where responses indicate that changes will be made to the CSR, these changes have been incorporated into the CSR. We would appreciate if you could advise us as soon as possible if there are any further comments resulting from the review of the enclosed responses. With the exception of these comments, it appears that comments on Phase I of the responses are closed and we would like to close out these remaining comments in a timely manner.

We would be pleased to meet with you and/or the other Responsible Authorities in the interest of closing out any outstanding review comments whether they originate from either Part I, Part II, or CSR track-changed comments/feedback. If you have any questions regarding our response document, please contact Kim Coady (709-752-6441).

Yours truly,

James O'Reilly

James O'Reilly
Environment and Regulatory Manager

Enclosures

EMCP Comment 129: EC 46 Attraction of Seabirds to Platforms
EC is satisfied with the changes made by the proponent. It was noted that the wording in the response was correctly modified from "Environment Canada Canadian Wildlife Service" to "Environment Canada's Canadian Wildlife Service". This change should also be reflected in the Draft CSR.

Response: Noted. The change has been made to the CSR.

EMCP Comment 28: EC 14 Offshore Wind Climate and Offshore Extremal Wave Analysis
The proponent's responses were satisfactory. However, clarification is needed regarding the adjustment of peak values of sustained winds from one sampling period to another (mentioned in July 29 comments and August 4 responses).

a) With regard to section 3.2.1.2, sustained winds are averaged over some period, such as one hour or 10 minutes. The adjustment is applied to peak or extreme values from one averaging interval to another, not to all values. This adjustment (reference US Geological Survey 1979) is applied in sections 3.1.3.1 (Nearshore Environment, Wind and Wave Extremes, Wind), 3.2.1.2 (Offshore, Wind Climatology), and 3.2.2.6 (Offshore, Wind and Wave Extremes). It appears that the adjustment was used incorrectly for part of section 3.2.1.2. Regrettably, this was not noticed earlier. The text in section 3.2.1.2 states that the "MSC50 one-hour average wind speeds have been adjusted to 10-minute mean wind speeds, for consistency with the observations from the platforms". It was assumed that the statement was applied only to the monthly maxima in Table 3-21 (and to the Extreme Value Estimates (sections 3.1.3.1 and 3.2.2.6)). However, it appears that the adjustment was inappropriately applied to the individual values used to calculate the MSC50 monthly means in Table 3-20 and the distributions in Figures 3-18 and 3-19. Revision of the table and figures may be required.

Response: The text on page 3-37 of the CSR "*For consistency, wind speeds from the MSC50 data set have been adjusted to 10-minute mean wind speeds.*" Has been replaced with "*For consistency, maximum wind speeds from the MSC50 data set have been adjusted to 10-minute maximum wind speeds.*"

The changes have been incorporated (as shown below) into Table 3-25 (formerly Table 3-20 in the June 2010 CSR).

Table 3-25 Mean Wind Speed Statistics

Month	MSC50 Grid Point 10632 (m/s)	Terra Nova FPSO (m/s)	Glomar Grand Banks[A] (m/s)	GSF Grand Banks[A] (m/s)	Henry Goodrich (m/s)	Hibernia (m/s)
January	10.9	14.5	12.9	13.7	15.2	16.0
February	10.8	13.9	11.9	12.9	14.9	15.4

Month	MSC50 Grid Point 10632 (m/s)	Terra Nova FPSO (m/s)	Glomar Grand Banks[A] (m/s)	GSF Grand Banks[A] (m/s)	Henry Goodrich (m/s)	Hibernia (m/s)
March	9.8	13.3	11.9	13.6	13.6	14.6
April	8.3	12.0	11.4	11.3	12.6	13.3
May	6.9	10.7	9.7	11.1	11.7	12.1
June	6.5	9.3	9.4	8.3	11.2	11.4
July	6.0	8.9	9.5	9.2	10.9	10.8
August	6.4	9.6	8.4	9.1	9.8	10.5
September	7.5	9.9	10.3	9.3	10.3	11.2
October	8.8	11.0	12.8	9.7	12.0	13.0
November	9.5	12.7	11.0	11.6	12.7	13.5
December	10.5	15.0	12.6	13.0	14.5	15.5

[A] Glomar Grand Banks and GSF Grand Banks were the same platform, reporting at different periods under different names.

Note: The height measurements are collected is 139 m at Hibernia GBS, 50 m at Terra Nova FPSO and 82.5 m at GFS Grand Banks

The corresponding figures do not require revisions as they represent the unadjusted wind speeds.

b) In section 3.2.1.2, the phrase "to convert from 1-hour mean values to 10-minute mean values" should be corrected to read "to convert from peak 1-hour mean values to peak 10-minute mean values".

Response: The text in the CSR has been revised as recommended above.

Chapter 3 Physical Environment Setting

Note on Data Sources: Description of the nearshore and offshore environment used the MSC50 1954-2005 wind and wave dataset. The MSC50 now extends another 4 years, to 2009. For future analyses, it would be advisable to use the most up-to-date set available.

Response: Noted. If future analysis are required, the most recent MSC50 dataset will be used.

3.1 Nearshore Environment

3.1.1.1 Wind Climatology

a) Please clarify in the text use of the terms Mosquito Cove and Bull Arm as related to the Oceans wind measurements. While in the Revised Draft CSR, the Oceans Ltd. Weather Station is now referred to as the Oceans Bull Arm station, there is still text that refers to winds measured within Mosquito Cove (p3-2).

Response: The text has been revised as follows:

Wind roses of the annual wind speed from Grid Point M12874 (Figure 3-2) and the Bull Arm weather station (Figure 3-3) highlight the differences between the climatologically winds and those measured within Bull Arm.

b) It was noted in the document "Spill Trajectory Modelling for the Hebron Project" by AMEC (2010), section 3.3.2 states that the Oceans Bull Arm (OBA) winds were from an RM Young anemometer on a floating dock at the Hibernia GBS deepwater site in Bull Arm. If applicable, it would be relevant to include this information here.

Response: The Report "Spill Trajectory Modelling for the Hebron Project" (AMEC 2010) was superceded by the following reports: Hebron Project Comprehensive Study Report – Offshore Spill Trajectory Modelling Report (ASA 2011) and Hebron Project Comprehensive Study Report – Nearshore Spill Trajectory Modelling Report (ASA 2011).

Figure 3-1 MSC Climatology Grid Point (M6012874)
It would be helpful to include on this map the locations of the other data sources listed in Table 3-1. If the map was shifted 0.1° longitude further to the west, it would include the locations of Argentia and Arnold's Cove, without losing the location of any data sources to the east.

Response: A change in the figure at this time will not alter the conslusions in the CSR. EMCP, for any future environmetnal assessments, will ensure that figures adequately represent the data being discussed.

Table 3-1 Data Sources for Grid Point M12874 and other Observation Points
a) Title could just be Data Sources.

Response: Noted. The title has been changed (see revised table below).

b) Suggest column header "Depth", could be "Water Depth" for clarity.

Response: The title in the column header has been changed to "Water Depth" (see revised table below).

c) Request: Please clarify in the table/text the information concerning elevation - does this refer to station elevation ASL or instrument elevation? If instrument elevation, is this ASL or AGL? It would be useful to include both station elevation and anemometer height (above ground level). The elevation for the Bull Arm Environment Canada weather station (climate ID 8400755) was 119 m (ASL), but the table shows 13.7 m.

Response: Table 3-1 has been modified to clarify the elevation data presented. The following revised table will replace Table 3-1 in the CSR.

Table 3-1 Data Sources

Source	Period	Location	Station Elevation (m ASL)	Anemometer Height (ASL)[A]	Water Depth (m)
M12874	January 01, 1954 to December 31, 2005	47.70°N; -53.80°W			140.89
Environment Canada Bull Arm	June 08, 1994 to May 28, 1997	47.82°N; -53.90°W	119.0	129.0	
Oceans Bull Arm (Wind)	January 26, 1995 to May 27, 1997	47.82°N; -53.86°W	1.0	11.0	
Oceans Bull Arm (Wave)	May 15, 1995 to January 31, 1996	47.82°N; -53.86°W			155.00
Argentia, NL	January 01, 1953 to May 25, 1970	47.30°N; -54.00°W	13.7	23.7	
	May 01, 1976 to October 31, 1986	47.30°N; -54.00°W	15.5	25.5	
	January 01, 1987 to July 26, 2006	47.30°N; -54.00°W	19.0	29.0	
Arnold's Cove, NL	July 01, 1971 to July 01, 1993	47.78°N; -54.00°W	15.2	25.2	

[A] Anemometer heights for the Environment Canada stations assume that the standard 10 m anemometer height was used

d) The longitudes for the Oceans Bull Arm wind and waves contain a typo: -51°, should that be -53°?

Response: Noted. The text has been corrected to read "-53°"

P 3-6:
The highest wind speed of 27.8 m/s recorded at Bull Arm - need to specify that this is the Environment Canada station. The date was February 13, 1995, not the 14th as in the Revised Draft CSR.

Response: The text has been revised to read as :
The highest wind speed of 27.8 m/s recorded at the Envoronment Canada station in Bull Arm occurred on February 13, 1995. During this event, a mid-latitude low pressure system tracked eastward across Newfoundland, and deepened rapidly as it moved over the cold North Atlantic Ocean. During this same event, the Oceans Bull Arm weather station reported wind speeds of 15.9 m/s. Unfortunately, the waverider buoy at Bull Arm was not reporting during this event.

3.1.1.2 Temperature
It should be clarified whether EC or Oceans was the source of the temperatures (text and table 3-4) (or add "s" to station).

Response: Table 3-4 already has a notation at the bottom of the table identifying the source of the data. It states "Source: Oceans Ltd. weather station in Bull Arm 01/95-04/97."

3.1.1.3 Tropical Systems

The values in the text need to be updated (including the number of storms) to correspond to the updated values in Figure 3-5 and Table 3-5.

Response: The first paragraph in Section 3.1.1.3 has been revised as follows: *During the 59-year period from 1950 to 2009, 60 tropical systems have passed within 278 km of Bull Arm. The tracks over Trinity Bay are shown in Figure 3-5 and the names of each hurricane are listed in Table 3-5.*

3.1.3 Wind and Wave Extremes, 3.1.3.2 Waves

a) The text incorrectly says that the MSC50 grid point used was "outside of the nearshore environment". Although it was outside Bull Arm, it was still near shore, well inside Trinity Bay.

Response: The first paragraph in Section 3.1.3.2 has been revised as follows: *The annual and monthly extreme value estimates for Hs for return periods of 1 year, 10 years, 25 years, 50 years and 100 years are presented in Table 3-15. The annual 100-year extreme Hs was 1.9 m at Grid Point M12874 (located outside of Bull Arm (but well inside Trinity Bay) at 47.7°N 53.8°W). On a monthly basis, the highest extreme Hs of 1.8 m is predicted to occur during the months of December and January.*

b) The text refers to results in Table 3-18 - should that be Table 3-13?

Response: The text is correct – the error in the table numbering is a result of inserting table captions in tracked changes. The Table captions have been corrected.

3.2 Offshore

3.2.1.2 Wind Climatology

a) P3-37: Table 3-20. The text or a note in the table could indicate that Glomar Grand Banks and GSF Grand Banks (not GFS as in the note) were the same platform, reporting at different periods under different names.

Response: A note will be included in Table 3-20, per the above request, to clarify the data sources. Note that with the correction of the Table captions, this is now Table 3-25.

b) The text refers to Table 3-25 twice (should it be 3-20?)

Response: With the correction of the Table captions, Table 20 is Table 25

c) Note: The text says that "methods to reduce wind speeds from anemometer level to 10 m have proven ineffective due to atmospheric stability issues". It is interesting to note that the report by AMEC (2010) with regard to winds input to the oil spill trajectory modeling (Section 4.3) does describe use of a height dependent scaling factor that is reasonable to use over the open ocean to adjust sustained winds from platforms to 10 m. In future analyses, it may be helpful to use platform air and sea temperature measurements to include stability in height adjustment of wind speeds.

Response: Noted.

d) Table 3-27. The wind speed units were changed from m/s to knots, but the values are in m/s.

Response: The table has been revised back to the unit 'm/s', as the values listed are in m/s.

3.2.2.1 Waves and 3.2.2.6 Wind and Waves Extremes

There are two different sections numbers 3.2.2.1: Bathymetry and Waves. 3.2.2.1 Waves includes results of an extremal wave analysis (Table 3-20 Extreme Wave Statistics, p. 3-57), which is separate from the results of a different extremal wave analysis presented in Section 3.2.2.6 Wind and Waves Extremes (Table 3-51 Extreme Significant Wave Estimates..., p 3-74). It is requested that the information on two different extremal wave analysis results for the offshore (part of 3.2.2.1 and 3.2.2.6) be adjacent and appropriately titled, rather than separated.

Response: The fourth-level heading numbering under Section 3.2.2 has been corrected. The section on Wind and Waves Extremes has moved to immediately follow Section 3.2.2.2 Waves.