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Canada-Newfoundland and Labrador
Offshore Petroleum Board
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Environment Canada / Environnement Canada

Environmental Stewardship Branch/NF
6 Bruce Street
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April 27, 2006

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: Orphan Basin Exploratory Drilling Program EA Update EAS2004-467E

As requested in your letter of March 29, 2006, Environment Canada has reviewed the "*Orphan Basin Exploratory Drilling Program Environmental Assessment Update*". The document was reviewed by several reviewers and the following commentary is a compilation of comments received.

Consideration of Alternative Means of Carrying out the Project (Comments EC-1 and 3)

The proponent has provided some additional consideration of alternative means and pollution prevention opportunities in the EA Addendum.

- It would be preferable that the proponents actually commit to transferring any remaining WBM to another operator, rather than just examining potential opportunities.
- Further explanation could be provided regarding how the current well design provides the optimal solution in minimizing the total volume of rock drilled in open water.
- The proponents indicate that all additives will pass the OCSG review process and that an attempt will be made to select the most environmentally friendly suitable alternative. Limitations of the OCSG that should be taken into consideration are provided below.

Offshore Chemical Selection Guidelines

It should be noted that the OCSG themselves recognize that "although the goal of these Guidelines is to reduce the environmental impact of discharges from offshore installations through a rigorous chemical selection process, the potential for adverse environmental effects still exist" (p. 6).

In addition, it should be noted that the OCSG are no longer up to date (e.g., do not reference the *Canadian Environmental Protection Act* **1999** and all relevant instruments).

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Migratory Birds

Response to EC-08 does not satisfy the factors to be considered in the scoping document.

Reference: 6.0 Assessment of Accidental Spills

Scoping Document Cross Reference: 6.0 Spatial and Temporal Boundaries

Scoping Document Satisfied Section 6.0 **not satisfied**

Preamble: The Scoping Document 6.0 states that 'the time required for recovery from an effect and/or return to pre-effect condition, including the estimated proportion, level and amount of recovery' will be considered. Time required for recovery is not considered in the CSR.

Request: Recovery times need to be considered for those species that would most likely be impacted by a large oil spill. Many species that would likely be impacted have slow generation times (e.g. murres do not begin breeding until 5-7 years old and lay one egg per year). It is likely that most seabird populations would recover from the impacts of oil spill, but if the impact was large enough, it could take decades for the population to recover. In the case of murres, a population recovery time of decades could reduce or eliminate hunting for a generation of murre hunters. An assessment of recovery time is an important component in determining potential impacts.

Effects of the Environment on the Project (Comments EC-18 to 27)

EC-19

As requested, a description of the interannual climate variability and trend of winds and waves with links to atmospheric circulation indices and references was added. The addition includes a fairly detailed analysis of AES40 summer and winter winds and waves in the area, along with the relationship to the North Atlantic Oscillation (NAO) atmospheric circulation index. The proponents may wish to consider the following two new papers, both by Wang et al. (2006), in any further assessments of the climate including a description of the storm frequency. These results may have implications on analysis of wave climate extremes.

Wang, X.L., Wan, H., and Swail, V.R., 2006. Observed Changes in Cyclone Activity in Canada and Their Relationships to Major Circulation Regimes. *J. of Climate*. 19, pp. 896-915.

Wang, X.L., Swail, V.R., and Zwiers, F.W., 2006. Climatology and Changes of Extra-Tropical Cyclone Activity: Comparison of ERA40 with NCEP/NCAR Reanalysis for 1958-2001. J. Climate, in press.

The first of these two papers described results of a study that used hourly mean sea level pressure (MSLP) data observed at Canadian land stations for up to 50 years (1953-2002) to assess climate and trend of cyclone activity. The paper gave a result from the database of Wang et al. 2006 (the second paper) that showed an increase in the 20-yr cyclone counts over Newfoundland in winter (Jan-Feb-Mar) from 1958-77 to 1978-2001.

Over Newfoundland and eastern NS, in the autumn and winter (Oct-Nov-Dec and Jan-Feb-Mar), the land station pressure data showed statistically significant increasing trends in cyclone deepening rates and in the variances of cyclone deepening rates. Increased variability indicates increased probability for the occurrence of extreme values. However, there was a decreasing trend in the numbers of cyclone deepening events (negative pressure tendency and MSLP below 1000 mb) in winter (Jan-Feb-Mar), with an increase in summer (Jul-Aug-Sept). There were trends of increasing intensity (as defined by lowest MSLP) in summer and autumn but not in winter.

This study found a negative relationship between the simultaneous North Atlantic Oscillation (NAO) index and cyclone deepening events on the east coast of Canada, which was statistically significant in autumn and winter (Oct-Nov-Dec and Jan-Feb-Mar). The negative relationship between the NAO and cyclone deepening events on the east coast of Canada does not necessarily contradict the results of the analysis presented in the EA Addendum, which found a positive relationship between seasonal wind speed and NAO (and both show a slight increasing trend). This is expected from the general synoptic pattern associated with a positive NAO index which corresponds to strengthening of prevailing northwesterly winds over the Labrador Sea and strengthening of the westerlies across the N. Atlantic.

The second study identified cyclones from two gridded 6-hourly mean sea level pressure datasets, the ERA40 reanalysis and the NCEP/NCAR reanalysis (NNR) for 1958-2001 using a cyclone detection/tracking algorithm. The ERA40 showed systematically stronger cyclone activity over the extra-tropical oceans in the northern hemisphere than the NNR. The difference is at least partly explained by the coarser resolution of the NNR.

Both show a pronounced cyclone track from Cape Hatteras extending northeastward over the Maritimes and Nwefoundland and into the N. Atlantic. Changes in the 20-yr counts of winter (Jan-Feb-Mar) cyclones from 1958-77 to 1982-2001 show a small area of increased cyclone counts over Newfoundland and eastern Labrador and adjacent waters (between about 60 W and 45 W), from both reanalyses. This is different to other regions in the mid-latitude band 45-55° N over the N. Atlantic and southern Canada which generally showed decreases, with significant increases north of 55° N. The area over Newfoundland and south of NS also showed increases in cyclone counts in the summer (Jul-Aug-Sept).

EC-20

Most requests were addressed appropriately. However, with regard to adjustment of wind speed for height, the proponents reiterate the importance of providing information on adjustment factors to adjust winds from 10-metre values to values equivalent to the higher heights on offshore platforms. While it is true that atmospheric stability information is not available in AES40 to correspond to the extreme wind statistics, the assumption of neutral stability when adjusting for

height is appropriate in many cases. This includes very strong winds where the stability in the lowest level of the marine boundary layer, the surface layer, does approach neutral conditions, according to theory (see Walmsley, 1988).

Walmsley, J.L., 1988: On theoretical wind speed and temperature profiles over the sea with applications to data from Sable Island, N.S. *Atmosphere-Ocean,* **26**(2), 202-233.

EC-21

The COADS data set (Comprehensive Atmosphere-Ocean Data Set) was renamed the International COADS, or ICOADS (see http://icoads.noaa.gov/). However use of COADS for this time period is fine. An appropriate reference is:

Woodruff, S.D., S.J. Lubker, K. Wolter, S.J. Worley, and J.D. Elms, 1993: Comprehensive Ocean-Atmosphere Data Set (COADS) Release 1a: 1980-92. Earth System Monitor, 4, No. 1, 1-8.

EC-22

The request to include joint frequency distributions of wave height and period was very adequately satisfied, with the additional of annual and monthly tables of percent occurrence. A possible slight low bias in peak wave period (WP) from wave models was noted and referenced as requested. The tables show values of peak WP of up to 14 seconds from the AES40 for this site. However, extreme storms in the Atlantic provinces have resulted in buoy measurements of peak WP of 17 to 19 seconds at some locations, in rare cases. For future assessments of the wave climate, it would be useful to include an analysis of wave data during strong cyclones from waveriders or buoys near the area of interest. Wave data are archived by the Marine Environmental Data Service of Fisheries and Oceans Canada. This would be of value to relate the deep water wave model hindcast values to measured values near the particular local area of interest.

EC-24

In responding to request 1, the proponents indicate that center positions of licence areas were used for their analysis. EC agrees that if one uses the specified position 4830N 4830W, then the 42% value provided for frequency of ice in licence area 1078 is in agreement with the CIS atlas frequency of ice for March 12 at this location. The proponent also recognizes that the western edge of this licence area could be subject to higher frequencies. The southern edge, as well as licence area 1080, is also subject to higher frequencies as shown in the CIS atlas frequency for March 12. Taking center position was a limitation of the analysis but the fact remains that portions of these licence areas can have frequencies higher than 50%.
Although only the first request was submitted by EC, the following comments are offered on the proponents' response to requests 2a to e.

Response to request 2a: the proponents reply that CIS Sigrid data are available only until 2000, to explain why no sea ice data were presented after that year. It is true that CIS does not support Sigrid data after 2000, but later CIS sea ice data are available in other formats.
Response to request 2c: while this request was to add the maximum sea ice cover to Fig. 3.39, the new figure may have been mislabelled as 3.4.1. Nonetheless, the maximum sea ice cover was

added, and agrees with the CIS atlas frequencies for March 12. It is noted that the median line was also changed to agree with the CIS atlas frequencies for March 12.

Response to request 2d: the request was to add numbers to additional cells to the south in Fig. 3.41, and to clarify what the numbers represent. Again, the new figure may be mislabelled as 3.3.9. Numbers were added but no clarification provided.

The proponents have not responded to requests 2b or 2e.

EC-25

The CIS Sigrid database for 1969-2000 encodes data in Sigrid code format; in that format, bergy water is coded as "CT02" and it simply means bergy water (no assumption made as to what concentration value should be assigned). The proponents must have used a program that incorrectly interpreted this "CT02" (bergy water) as 1/10.

EC-26 and 27

Response to request a: Although some mitigation has been outlined in paragraph 1, details have not been provided as to how extreme conditions acting on the environment could have environmental consequences.

Response to request b: The potential impact on the project from an extreme extra-tropical or tropical cyclone on the project was not really described, although it was noted that the Erik Raude, the semi-submersible drill ship that may be used part of the project, easily endured the passage of Hurricane Juan, including peak wind speeds of at least 99 kt (51 m/s). The nearest buoy, the Halifax Harbour buoy, reported a peak significant wave height (SWH) of 8 m with a corresponding peak WP of 14 s. The Lahave Bank buoy further offshore to the south reported a peak SWH of 12 m with a corresponding peak WP of 17 s. It would be of value to consider typical actions that might be taken and possible effects on the project that could occur, for various scenarios corresponding to critical metocean conditions for each relevant platform type.

I trust that this is satisfactory.

Best regards,

Glenn Troke
Environmental Assessment Coordinator
EPOD/NL

cc K. Power
B. Jeffrey