SPECIFIC COMMENTS

EMCP Comment 141: C-NLOPB 37

***C-NLOPB 37 a*):**

The original C-NLOPB comment was that "*Statistical background data and its treatment should be in one section and exposure calculations should be in a different section (i.e. Drilling, Production/Maintenance).*"

EMPC responded that "The statistical background data are used in determining exposure calculations. These exposure calculations are discussed in Sections 14.1.1.1 (Blow-outs during Drilling) and 14.1.1.2 (Blow-outs during Production and Workovers)."

Some additional detail or clarity may be appropriate here.

The proponent persists in using qualifying words (ex. unlikely, small) without defining them. This is inappropriate and can only lead to misunderstanding on the part of the public. For example, on page 14-1 the proponent says the following, "*An oil spill could also occur, although unlikely, during offloading and/or transfer of crude oil at the offshore loading system (OLS).*" However, the term " unlikely" is not defined in terms of a probability of occurrence either by activity or for the project life. These types of spills have occurred in C-NLOPB jurisdiction and are not considered a remote possibility by the C-NLOPB.

On page 14-7 the proponent writes that there is "*…an extremely low risk of a deep blowout…*" but has not defined what that means. The proponent's calculated probability of a deep blowout is "*9.6 x 10^{-3}, or a probability of 1-in-100*" on page 14-9, followed by "*…the chances of having an hydrocarbon discharge associated with the blowout are extremely low*."

The proponent should either clearly define these qualifying words or delete them wherever they occur in relation to spills.

EMPC should consider bringing Table 14-3 data into tables in 14.1.1.1 and 14.1.1.2 separately for drilling and production phases (EMPC has improved this table… see EMPC response to comment 148).

Table 14-2 and Table 14-4 contain general information about spills from blowouts and should be discussed under 14.1.1 rather than 14.1.1.1. However, the information from 14-4 may be brought forward to separate tables under 14.1.1.1 ad 14.1.1.2.

In section *14.1.1.1 Blowouts During Drilling* on page 14-8 of the CSR the proponent, in the first paragraph starting on that page (line 5 of the text on that page), begins a discussion of the probability of accidental hydrocarbon spills associated with production, workovers and wireline operations. This discussion continues for 6 paragraphs, is followed by two paragraphs discussing blowout risks during drilling,

and then another 3 paragraphs about risks during production. This jumble is difficult to interpret, especially since the discussion of blowout frequency during production and workovers belongs in 14.1.1.2.

Is the title of Table 14-7 meant to read "Deep" instead of "Shallow." The discussion in the last paragraph on page 14-7 suggests that Table 14-6 is derived from the data in Table 14-7 and, as such, Table 14-7 and its discussion should precede Table 14-6 and its discussion.

Section 14.1.1.2 repeats some of the background "production related" discussion provided in 14.1.1.1. EMPC should rewrite 14.1.1.1 and 14.1.1.2 so that the information is located in the appropriate sections. EMPC should review the production related discussion in 14.1.1.1 and 14.1.1.2 to ensure they are consistent and redundancy is removed.

The title of section 14.2 in inappropriate since "Major" is not a word defined by the proponent. The proponent should either use defined terms (see Table 14-2) or qualify the term major in the first sentence of this section (i.e. Major includes spills >1000 bbl)

In section 14.1.2, the proponent has relied heavily on MMS OCS data for frequency of spills >1000 bbl. Is there no information available from other sources (i.e. UK and Norwegian North Sea)?

The discussion in section 14.1.2 is all brought forward in terms of "spills/well-year" and it is unclear that this includes or excludes spills during drilling which have been expressed in "spills/well".

The use of "to present" in the table titles throughout 14.1 is inappropriate as there is some actual cut-off date that the proponent has used for this data. The reader is left to infer this date.

In section 14.1.4, the Table 14-14 is confusing and does not effectively summarize the data. The >150,000 bbl class of spills is omitted. It is unclear if the >10,000 bbl class includes the >150,000 bbl class (which it should if the >150,000 bbl class is omitted from the table). The some blowout frequencies are expressed in rate per well drilled while some blowout frequencies and the platform spills are expressed in rate per well-year. The conversion to annualized probability is not easily understood since the "probability over the project life column is omitted". Spills of less than 1 barrel and less than 1 litre are omitted from the table although they will be the most frequent incidents.

The last sentence of section 14.1.4 should be deleted.

***C-NLOPB 37 b)*:**

The original C-NLOPB comment was that "*There does not appear to be a discussion of small (<1 bbl) spills.*"

EMPC responded that "The historical record small spills in NL waters, with categories for "Spills Greater Than 1 L and Less Than 159 L (1 bbl)" and "Spills of 1 L and Less", for the years 1997 through 2009, is presented in Table 14-13.

The text on page 14-13 (June 2010 CSR) will be revised as follows:
"The C-NLOPB also provides a statistical record of spills of greater than 1 L but less than 1 bbl (159 L), and of spills of 1 L and less. These are presented in Table 14-13. As in the previous category of spill size, a disproportionate number of these spills occurred in the first three years of operations, so it is reasonable to focus on the more recent years of production experience – *2000 to 2010*. For these years (*2000 to 2010*), there were a total of *452* producing well-years, with *86* spills in the 1 to 159 L category, and *218* spills less than 1 L. Note that the totals in Table 14.3 indicate all spills from 1997 to *2010*."

The section 14.1.3 discussion of spills <1000 barrels is incomplete and the proponents proposed revision of February 22, 2011 is not sufficient. The probability of spills of size range ≤ 1 litre and 1 litre to <1000 litres should be explicitly stated in comparable units (spills/well-year). This information should be included in Table 14-14.

EMCP Comment 143: C-NLOPB 39

The original C-NLOPB comment was that "*The CSR should not only consider how long it may take to drill a relief well but also the time required to mobilize a rig.*"

EMPC responded "See response provided in 142-C-NLOPB 38."

The spill scenario described in the response to Comment 142 is based on a drilling rig being available locally. The implication from this statement is that the proponent will ensure it has access to a suitable drilling rig through out the life of the project. If a drilling rig will not always be available locally, the proponent should expand the scenario to include the time it would take to secure and for the rig to arrive at location and begin drilling a relief well.

EMCP Comment 144: EC 49

The original C-NLOPB comment was that "*There have been at least 6 incidents in 2008-2009 of spills involving the OLS from the 3 active oil fields off Newfoundland. The proponent should quantify the risk associated with potential incidents involving the OLS."*

The proponent has not quantified the risk associated with spills from the OLS in units comparable to other parts of Section 14 (spills/well-year). They have not expressed a likelihood of such spills over the life of the project.

EMCP Comment 146: C-NLOPB 40

The original C-NLOPB comment was "*Is the concept safety analysis (CSA) being prepared. The spill/blow-out frequency estimates from the CSR should agree with the CSA. The data on wells drilled with ExxonMobil as operator from 1999-2009 should be presented to give a snapshot of spill/blow-out performance.*

Response a) is acceptable. The C-NLOPB will review CSR and CSA for consistency.

Response b) should be incorporated into Section 14 of the CSR.

EMCP Comment 147: C-NLOPB 41

The original C-NLOPB comment was "*Please provide the reference for the definitions in Table 14-2. Also, SI units (i.e. m^3) should be used and intervals should be reported as ranges (i.e. large = >1000 bbl to <10,000 bbl).*"

The response should be incorporated into Section 14 of the CSR.

EMCP Comment 148: C-NLOPB 42

The original C-NLOPB comment was "*Is this data set up to date? Table does not appear to be broken down by classes set out in Table 14-2.*"

The response should be incorporated into Section 14 of the CSR.

EMCP Comment 149: C-NLOPB 43

The original C-NLOPB comment was "*Please review for agreement with Table 14-3.*"

The response should be incorporated into Section 14 of the CSR.

EMCP Comment 150: C-NLOPB 44

The original C-NLOPB comment was "*Data are poorly reference. Please refer to Chevron work for that year. The data should be better documented or links to all base data should be provided for verification.*"

The response should be incorporated into Section 14 of the CSR.

EMCP Comment 152: C-NLOPB 45

The original C-NLOPB comment was "*The CSR should expand the data set used for blow and spill analysis to include data as close to 2010 as possible. Also, the statistical analysis showing that population is different statistically should be provided.*"

Page 4 of the Scandpower (2006) report states; "The time period in focus is 01.01.84 - 31.12.03 for the frequency calculations." The proponent has improved the data set by including two more years of data. There is potentially an additional 7 years of

data that could have been included in the analysis. The proponent has not satisfactorily addressed the request to expand the data set to include data as close to 2010 as possible.

The Scandpower report cited does not address, nor has the proponent in its response explained the statistical basis on which the adjustment due to trend is based. Without an understanding of the basis for trend adjustment based on years it is difficult to see how the formula can be used to show there is a decreasing trend. As per the request, the proponent should provide supporting information or conduct a documented statistical analysis to show a decreasing trend. A documented statistical analysis is one which shows the mathematical and statistical basis on which the analysis is based.

The proponent states in their response that: "A more recent analysis by Scandpower (2006), summarized in IAOGP (2010), confirms the reduced frequencies in recent years." The proponent should reference exactly where in the cited documents that this conclusion is made. A definite conclusion of reduction of frequencies was not found in either document.

Please properly reference where the statement: "The data, based on the 20-year record to 2005, indicate a deep blow-out frequency of 4.8×10^{-5}.", is in the reports. Whenever figures or statistics are quoted, they need to be properly referenced as to not only the source but also the page number in that source.

The proponent states: "Using this figure results in a probability of one blow-out for every 21,000 wells drilled." What figure is being referred to and where does the one in 21,000 come from?

How is the 1-in-520 probability derived? Either quote the source where the figure is obtained or show how the probability was derived.

How did the proponent arrive at 1/16,000 for item one of table 14-5?

What is meant by "virtually no chance of hydrocarbon release?"

EMCP Comment 153: C-NLOPB 46

The original C-NLOPB comment was "*Previously mentioned statistical testing is required to allow use of 0.51 factor and 64% as a useable ratio.*"

See response to Comment 152.

EMCP Comment 154: C-NLOPB 47

The original C-NLOPB comment was "*The calculations here may be supported in the data but the presentation is not easily followed (i.e. A table corresponding to classes in Table 14-2 with frequency numbers). The probability of a gas blow-out is 0.0234 over life of project. 1 in 1,300 per year is a bit disingenuous.*"

The EMCP response is responsive but the comments provided under C-NLOPB 37 may still apply.

EMCP Comment 155: C-NLOPB 48

The original C-NLOPB comment was "*What is a "major" platform spill. Define "major" or use one of the classifications from Table 14-2.*"

EMCP responded that "Section 14.1.2 will be renamed as follows: Large Platform Spills".

Even with the use of "Large", the titles of 14.1.2 and 14.1.3 are not consistent with what they represent. Perhaps *Platform Spills >1000 bbl* and *Platform Spills < 1000 bbl* would be more appropriate

EMCP Comment 166: C-NLOPB 54

The original C-NLOPB comment was "*It should be stated if the vessel used for the project would be pollution class and not allude to possibilities.*"

Does "meet current pollution class standards" mean vessels will be certified to pollution class standard?

Comment 179-DFO F6)

This response is considered adequate.

Comment 179-DFO G)

This response is considered adequate, provided the following comments are addressed:

As new information becomes available on the events in the Gulf of Mexico, it is important that ExxonMobil commits to taking this information into consideration during future plans concerning the protection of fish and fish habitat, as appropriate.

Comment 179-DFO G2)

This response is considered adequate.

Hebron Project Comprehensive Study Report: Nearshore Bull Arm Spill Trajectory Modelling Report

DFO Response

General Comments

The assumptions used during the modeling of ocean circulation in the area causes concern regarding validity of the results for retention of an oil spill in Trinity Bay. For instance, there is no reference to any *in situ* oceanographic measurements taken to validate or justify the modeling approach in HYDROMAP. Furthermore, there are numerous important features regarding regional oceanographic circulation that are not mentioned in the document, and therefore it is assumed that they were not incorporated in the circulation modeling. These features include:

- Realistic water column temperature and salinity stratifications in Trinity Bay and Conception Bay during winter and summer. (This affects the strength of circulation at the surface of the water column);
- Non-linear terms in the equations of motion, specifically advection of momentum. (This can create gyre circulation features in Trinity Bay that would affect residency times of oil within the bay. They also enhance upwelling and downwelling effects due to wind forcing by displacing surface water);
- Surface wind generated waves that induce Stokes drift. (This could move oil particles to shorelines quickly);
- Realistic wind scenarios, including strong summer southwesterly wind events; and
- Inertial oscillations caused by variable winds.

Inclusion of these features may alter the modeling results. Please provide a rationale as to why these features were not incorporated and why the modeling approach was not validated with observations.

Specific Comments

Section 2.4: Wind Data
Although downscaling methodology for wind from MSC50 grids to the Bull Arm location is reasonable, there is no mention of the MSC50 winds being used in model simulations. Please provide clarification.

Figure 2.4-2
Please provide the location of M6012874 on a map.

Appendix C: Figure C5
The main figure and the accompanying inset map do not appear to match up. Please correct this error.

Hebron Project Comprehensive Study Report: Offshore Spill Trajectory Modelling Report

C-NLOPB Response

General C omments

1. Generally the subject report is a superior effort to that originally submitted with the CSR.

2. Additional information should be provided to explain the well blowout rates chosen as input to the model simulations.

3. Further information is required to explain the rationale for the number of stochastic model runs performed for each simulation.

4. It is unclear why the stochastic model runs were not performed for a longer period to correspond with the predicted persistence of Hebron crude in the receiving environment. The rationale for this approach should be explained in detail.

5. The rationale for choosing TAR Code G for the thickness cut-off of the stochastic simulations requires considerable justification. This is considerably thicker than "sheen" thickness and potentially could considerably underestimate the area over which seabirds could be affected.

DFO Response

General Comments

Although the Spill Trajectory Model used in the offshore may have been validated in other regions, it has not been validated for the Newfoundland Shelf and adjacent deep ocean. The report does not provide any validation of the model ocean currents for the study area or how winter ice was dealt with in the circulation model. Furthermore, insufficient detail is provided on how the model output was used and which HYCOM model data was used.

Specific Comments

DFO would like to request the following information:

- The frequency and resolution of the HYCOM ocean model run output used, (i.e. full model resolution and daily averaged output or hourly output);
- More detail regarding how the runs were implemented. This is needed before DFO is able to comment on the acceptability of the approach used for these oil spill fate models;

- Justification as to why MSC50 winds were used as opposed to the original HYCOM wind forcing. Using the original HYCOM wind forcing would have made for a more consistent approach.
- More detail on the model drift runs, specifically with regards to:
    - The number of simulations run;
    - How the HYCOM system was used, (i.e. static currents or variable currents);
    - If a wind driven ocean component of drift was added to the HYCOM model output;
    - What defines the characteristics of a SIMAP model run in winter and summer;
    - Define how runs were set up in detail; and
    - How ice was incorporated in the SIMAP model runs.

Figure 2.6.1
It appears that this figure includes information for the Gulf of St. Lawrence, a portion of SW Newfoundland Shelf, Scotian Shelf and Gulf of Maine only, therefore it cannot represent the situation for the entire east coast.

Environment Canada response to the *Hebron Project – Comprehensive Study Report ExxonMobil Canada Ltd., Response to Comments, Part II*

(separate file)