Hi Jayne:

Below is our response to your questions on chemical management. In terms of your detailed observations on the environment design criteria report, I will try to provide comment later this week. Much of our engineering team was away last week and there are a number of supplier workshops being held this week so we haven't had a chance to discuss/respond. We are hoping to sit down to discuss tomorrow or Friday before they head out for another trip next week.

1. Chemical Management

The Deep Panuke EPP will include chemicals management guidelines that will reflect regulatory and EnCana's own EHS Management System requirements, such as:

- A general commitment to use the safest and most environmentally friendly chemical products, and to minimize volumes of chemicals stored on the MOPU, used and discharged;

- Screening of all chemicals expected to be discharged to the water through the most recent version of the CNSOPB Offshore Chemical Selection Guidelines (OCSG) to ascertain allowable discharge rates, their impact on the environment and/or determine other precautionary measures to be incorporated;

- Compliance with the most recent guidance published under the *CEPA*, including information gathering requested under EC's New Chemical Management Plan (for chemicals on the Domestic Substances List) as well as potential chemical-specific risk management measures resulting from that initiative;

- Chemical handling, transportation and disposal requirements, such as TDG and WHMIS; and

- Development of a chemical management database for the Project to track information such as product description (including MSDS) and use, supplier, chemical selection/approval process (including maximum allowable discharge rates when applicable), safety considerations and training requirements, maximum stock on hand and storage requirements, transport requirements, disposal requirements, volumes used and discharged, etc.

Additional guidance on disposal of chemicals will be provided under the waste management section of the EPP.

We intend to present this information as a section of its EPP (not as a separate plan). EnCana will contractually require that its contractors comply with these commitments and will verify compliance through periodic monitoring and auditing. The Deep Panuke EPP will be developed in consultation with the CNSOPB and key regulatory authorities, such as DFO and Environment Canada, during detailed engineering design prior to the commencement of Deep Panuke installation activities. Consultation with regulators on the EPP is anticipated to start in Q3/Q4 of 2008.

I hope this answers your questions on chemical management. If you would like to meet to discuss these points further, we would be pleased to meet with you.

Thanks,

Donna

Donna Morykot, P.Eng.
Regulatory Lead
Deep Panuke Project

From: Roma,Jayne [Dartmouth]
Sent: Tuesday, April 03, 2007 11:11 AM
To: Morykot, Donna
Subject: Chemical mgmt and environment design criteria report

Donna,

As discussed, Environment Canada has some questions and comments related to chemical management and the environmental design criteria for the Deep Panuke project. If you wish to discuss further, or organize a brief meeting to review with the questions and comments with EC experts, do not hesitate to contact me at [redacted]

Regards,

Jayne

Jayne Roma
Environmental Assessment Section
Environmental Protection Operations Directorate - Atlantic Division
Environment Canada

1. Chemical Management

As you are likely aware, the Government of Canada recently announced its categorization process (Canada's New Chemical Management Plan), which is likely to result in specific risk management actions under CEPA (e.g., prohibition, virtual elimination, performance agreements). Pertinent excerpts from the Plan accessible at http://www.ec.gc.ca/CEPARegistry/subs_list/dsl/s1.cfm are as follows:

- Government of Canada scientists, in co-operation with industry and health and environmental groups, have categorized the 23,000 substances on Canada's Domestic Substances List under CEPA 1999 into high, medium and low priorities for further work. Approximately 4300 chemicals were retained for further evaluation and/or management. Various processes are now in place to further define the risks associated with these chemicals including:

- An industry challenge program for the high priority chemicals (approximately 200).The federal government will be publishing, in batches of 15-30 substances every three months, a profile of these substances for industry and other stakeholders to provide any additional information in their possession. All challenge substances will be assessed within 3 years. Industry will have six months to comment on the profiles and provide requested information.

- Medium priority chemicals (approximately 2600) will be subject to standard risk assessment over the next 13 years

- Low priority substances (approximately 1200) will be subject to a rapid screening over the next year
- Government will review the information provided through the various assessment processes and decide what actions are to be taken through an expedited application of CEPA 1999. Risk management actions for all substances will be implemented in accordance with the CEPA Process.

In the 2002 CSR, EnCana committed to developing a chemical management plan which would "provide policy and procedure for the safe and efficient management of chemical substances throughout [EnCana's] operations and to ensure compliance with legislation and regulatory guidelines" (2002 CSR, Appendix D-23).

In Section 4.1 of the 2006 EA Report, EnCana states that the "[Environmental Protection Plan] will cover practices (referred to as plans in the approved 2002 CSR) such as waste and chemical management, physical environmental monitoring, and activities associated with onshore and offshore construction and decommissioning".

Please describe how chemical management, and in particular chemical selection, will be addressed in the EPP. Will a separate plan be developed as a subset of the EPP? Clarification on how EnCana intends to approach this matter will help us complete the comprehensive study.

2. Environmental Design Criteria Report

Environment Canada experts on climate and sea-state conditions have reviewed the report, *Deep Panuke Development Project Environmental Design Criteria January 2007*, prepared for EnCana by AMEC Earth & Environmental. Information provided in the report addresses many of the questions raised by Environment Canada to date and will facilitate completion of the comprehensive study as it relates to the consideration of effects of the environment on the project.

Some detailed observations on the report have been noted and are presented below. *Environment Canada would welcome any clarifications that EnCana may be in a position to offer at this stage in the process. In general, however, these detailed observations are presented for consideration and cross-check by the proponent as project planning and design proceeds.*

Section 1.2 Summary Tables of Design Criteria

- Table 1-1 (p. 3) does not include maximum wave crest height, in either the Waves or the Water Levels categories.

- Table 1-2 (Wave Parameters – Pipeline Route) is based on AES40 and Table 1-4 (Wave Parameters – Near shore Country Harbour) is based on AES40 transformed using a shallow water wave model. The amount of decrease in wave heights from the nearest section of the pipeline route (2-8.5 km) to the more detailed section near shore (1.5 – 2 km) is surprising. The 100 year return period Hs is 9.3 m in the one, down to 2.1 m in the next, with the depth shown as changing from 30 m to 20 m.

Section 2.1.1 Determination of Platform Winds (p. 10)

- Reference is made to the wind height adjustment method described in Walmsley (1981). That reference should be changed to Walmsley (1988).

- It is understood that the Sable Island winds were used to derive a longer term record for the COPAN winds. It would be helpful to describe the method used to correlate Sable Island winds with the observed COPAN platform winds.

Section 2.3 Operational Statistics (p. 14)

- Table 2-5 could include a column for the direction of the maximum wind. It is not necessarily the most frequent wind direction.

- In Table 2-6, the top 3 wind speed categories do not include information on the direction because only one digit is provided after the decimal. If the % signs were removed from the values, an additional digit (or two) might allow inclusion of this information. The totals show that there are cases of wind speeds in the top 3 categories.

- In Figure 2-1 (p.15), the wind speed exceedance plot for the months AMJ looks identical to the plot for JFM.

- In Figure 2-3 (p. 18), the wind speed persistence plot for the months AMJ looks identical to the plot for JFM.

Sections 3 and 5 Waves

- The analysis tools do not include the recently available MSC50 hindcast dataset (Swail et al 2006), which improves upon the strengths of the AES40 by increasing the temporal and spatial resolution and including shallow water wave physics. Given the importance of the derived wave parameters for design of the mobile production unit, it would be advisable to include an analysis of the MSC50 dataset, if feasible. This may be particularly useful given wide range of values for the 100 year return period significant wave height (Hs) from the data sources and methods that are presented in Appendix D.

- In the *Summary of Associated Appendices* (p. 23), it is stated that the AES40 is an unbiased record of wave parameters. However, it is recognized in Appendix B itself that, in general, the AES40 is slightly high for the field site, which is likely due to it including only deep water physics. It is also recognized in Appendix B that AES40 sometimes underestimates extreme events spanning a short period of time, such as tropical cyclones. This is one of the areas where the MSC50 improves on the performance of the AES40 (Swail et al 2006).

- In *Section 3.1.1 Determination of Platform Waves* (p. 23), it is stated that the design value of significant wave height at the MOPU site (Hs = 13.7m) was the coinciding mean and median value of the various estimates from the various combinations. It could be noted that the estimates ranged as high as Hs=15.2 m, based on the wave buoy data transferred at the new Deep Panuke Site (Appendix D).

- In *Section 3.2.1 Waves at MOPU Site* (p. 25), Figure 3-1 shows Hs vs Tp (peak wave period) of the largest storms modelled at Deep Panuke based on a wave refraction analysis of wave buoy data at Cohasset. It shows the peak Hs as near 12 m, with Tp about 16.6s. This was about the same as the peak Hs over the full record from the wave buoy, of near 12 m, in the severe storm of January 2000. Refraction analysis results presented in Appendix C would suggest a higher value would be expected at the Deep Panuke site.

- In *Section 5.4 Maximum Wave Crest Height* (p. 101) a previous value of 16.3 m from the PERDDISK for the 100 yr return period is noted, but is also stated that a somewhat higher (but unstated) value would be expected based on the refraction analysis. It is further indicated that non-linear wave theory may be used as an alternative, but a result is not provided. In *Section 5.6 Summary – Extreme Water Levels*, Table 5-1 states "see section 5.4" for 100 year return crest height. Is the height 16.3 m to be used or is a higher value appropriate? This seems to be a critical value for the design of the MOPU.

Section 9 Icing

- It is recognized in this section that superstructure icing will occur during winter months. However, it does not appear to consider any local information. It would be helpful to consider the frequency or severity of icing events at the COPAN platform during its 7 winters of operation.

- The values in Table 9-1, "Expected ice accretion at different heights above sea level", are from NORSOK (N-003, Actions and Action Effects). However, this document is not listed with the References. The References do include reports on icing by Lozowski et al (2000) and Chung and Lozowski (1996) but these reports are not mentioned or used in the text.

Appendix C – Wave Refraction Analysis of Deep Panuke Platform Site

- This appears to be a very useful analysis based on modelling shallow water wave effects at high resolution and bathymetry, using wave buoy data for calibration. It suggests differences of plus or minus 3 m in significant wave height (for background Hs of 10m), in the Cohasset-Panuke area, depending on location. Figure C-3 is very illustrative of the results of refraction and other shallow water effects. It shows modelled waves for a background Hs of 10 m, Tp 14s, for 4 different wave directions. The text states that the model was run from a range of values of Hs up to 15 s and Tp up to 20s. It would be useful to have a summary table of results that show the differences between the two sites for various combinations of severe Hs, Tp, and direction. In the case shown, the difference seems to be an additional 1-2 m at the Deep Panuke field centre (compared to the COPAN wave buoy), for waves from the west.

Appendix D – Extremal Analysis

- As noted above, the various data sets and methods give a range of values for the 100 year return period values of Hs, from 12.2 to 15.2 m. It would be helpful to explain why more weight was not placed on the Hs of 15.2 m as it results from the analysis of wave buoy data transferred to the new Deep Panuke site.

- Only traditional methods of extremal analysis, which assume a stationary time series, were considered. However, the International Ship and Offshore Structures Congress Technical Committee on the Environment (ISSC, 2006) recommends review of the underlying presumption of stationary climate applied to the estimation of design environmental extremes, and concludes that it may be appropriate, depending on the planned service life of a project, to explicitly include consideration of trends. Wang and Swail (2002) showed an increasing trend in the 90th and 99th percentile wave heights off the east coast of Canada, in the combined months of July, August, and September, and in the combined months of October, November and December, over the original 40-year period of the AES40 dataset, 1958-1997. Monthly statistics, for significant wave height at the AES40 grid point nearest the Deep Panuke site, show increases in the 99th percentile significant wave height, in every month of the year, over the period 1954 to 2003. The increases are slight in the spring, but are higher in summer, fall, and early winter. The increase is +0.016 cm per year in January, the month with the highest wave height statistics (highest monthly 75th and 99th percentiles). The assumption of a stationary time series may no longer be valid. Non-stationary extreme value methods have been described by Anderson et al (2001) and Caires et al (2006a), and applied by Caires et al (2006b), for example. Given the lifetime of the project, it is suggested that consideration be given to the results from these newer methods that do not require a stationary time series.