



REVIEW OF BEPCO'S EXPLORATION DRILLING ENVIRONMENTAL ASSESSMENT UPDATE

Context

In June 2005, the Minister of the Environment approved a Comprehensive Study Report that allowed for BEPCo. to drill three exploratory wells (with associated seismic) on Exploration License (EL) 2407 in the offshore of Nova Scotia. Pending the results of exploratory drilling, the approval also permitted BEPCo. to follow-up with three delineation/appraisal wells (a total of 6 wells may be drilled). The Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) was the Responsible Authority and DFO provided expert advice (DFO 2004). The work was to be carried out from 2005-2009. Following approval, however, BEPCo. postponed the Project.

Recently, BEPCo. has returned to the CNSOPB to request allowance that the Project proceed from 2009-2015. The nature of the Project remains the same as that approved in 2005, although the proposed Project lease area has been reduced in size by approximately 50%. Prior to approving the request, the CNSOPB has asked that BEPCo. verify that the predictions remain valid regarding the Valued Ecosystem Components (VECs) used in their initial Environmental Assessment (EA) that was approved.

DFO was asked by the CNSOPB to provide advice on the accuracy of a report entitled "BEPCo Update on the Environmental Assessment Report: Exploratory Drilling on EL 2407" by 25 May 2009. On 5 May 2009, DFO Science was asked the following questions:

1. Assuming the drilling and seismic activities are undertaken using the most up-to-date guidelines and protocols, are there any other potential drilling and seismic impacts to the marine environment that BEPCo. should be aware of?
2. Is there any new information since 2005 regarding marine benthic habitat, non-commercial fish species, marine mammals and turtles, or spawning areas and critical habitat in the revised EL 2407 that BEPCo should be aware of (refer to Figure 1.1 on Page 8 of the attached report)? Note, the bottom habitat is primarily characterized by glacial muds, and the presence of corals have not been identified by BEPCo.
3. Does DFO Science have any plans to undertake research in the revised EL 2407 from 2009-2015 that BEPCo. should be aware of?

Given the short timeframe for review, the Science Special Response Process was used to produce this Science Response.

Analyses and Responses

New Information on Environmental Impacts

Additional research has been conducted by DFO Science and others on a variety of topics related to the environmental effects of offshore oil and gas exploration and development since DFO Science reviewed the original BEPCo. Environmental Assessment in 2004.

For example, laboratory research initiated by DFO Science following a spill of drilling muds by Marathon Oil Corporation has shown a difference in toxicity between fresh and used drilling muds. Used mud formulations appear to be quite toxic, due to contaminants from the cuttings and addition of process chemicals. Further studies on the environmental persistence rather than toxicity of drilling muds are underway.

A report that investigated near-bottom dispersion of drilling muds for locations on Georges Bank, Sable Bank, and the Grand Bank using the benthic boundary layer transport model was published in 2005 (Hannah and Drzdowski 2005).

Results of studies and literature reviews on the effects of seismic noise on aquatic animals have also been published since the review of the original BEPCo. Environmental Assessment. For example, results of the acoustic monitoring and marine mammal surveys in the Gully and Outer Scotian Shelf have been published (Lee et al. 2005), and updates on the effects of seismic noise on fish and marine mammals have been produced (Abgrall et al. 2008; Payne et al. 2008; Worcester 2006).

In June 2006, produced water collected from the Hibernia platform off the coast of Newfoundland was investigated at the Gulf Fisheries Centre to determine its toxicity to the development of mummichog (*Fundulus heteroclitus*) embryos. Produced water, released during the drilling and extraction process of oil and gas, contains a wide variety of contaminants including metals, petroleum hydrocarbons and alkylphenols. All of these constituents are known to be harmful to the sensitive early-life stages of fish in sufficient concentrations. However, the dilution factor *in situ* generally appears to result in little, if any, elevation of these contaminants in the receiving waters beyond the outflow in the offshore environment. The responses of fish to salinity and metals have been characterized and are generally considered to be of low risk under the conditions of exposure in the offshore environment. However, studies of the effects of alkylphenols (from a number of sources, i.e., not just produced water) have shown that low levels of these compounds can affect the endocrine systems of aquatic species. More recently, additional work has been done on the effects of produced water on Atlantic cod and the effects of contaminants on fertilization success. New publications in terms of assessment of produced water include Azetsu-Scott et al. (2007), Lee and Neff (2009), and Zhao et al. (2008).

A book on offshore oil and gas environmental effects monitoring, including results of effects monitoring on the Scotian Shelf (e.g., quantifying fine-grained drill waste, effects of drill wastes on scallops, effects of produced water on haddock, lobster and scallop) was published in 2005 (Armsworthy, Cranford and Lee 2005). An article on the application of autonomous underwater vehicles in offshore environmental effects monitoring was published in 2009 (Niu et al. 2009). Also, a review of recommended seabird and marine mammal observational protocols for Atlantic Canada has been published (Moulton and Mactavish 2004). These reports may be useful in the design of any Environmental Effects Monitoring for the project.

New Ecosystem Information

Benthic Information

New information has been collected by DFO on the deep water environment of the Scotian Slope since 2005. For example, a field program in 2007 involved the deployment of a deepwater submersible (ROPOS) in four areas, including the Gully Marine Protected Area and the Stone Fence. Approximately 1000 high resolution digital photographs and over 90 hours of video were taken during this survey. While not conducted within the immediate vicinity of Exploration License 2407, this information is helping to better understand the slope environment, including species found at depths from 1000 to 2500 m. In fact, for just coral alone there were 11 newly discovered or recently confirmed taxa during the 2007 ROPOS mission. The results of this study have not yet been published but will likely be available within the coming year (e.g., Cogswell et al. 2009).

Species at Risk

As mentioned by the proponent, a number of aquatic species of relevance to Exploration License 2407 have been evaluated or re-evaluated by COSEWIC for consideration under the Species at Risk Act (SARA) since 2004.

The proponent mentions that there have been no new allowable harm assessments since the original EA report; however, DFO Science no longer conducts allowable harm assessments in isolation. Evaluations of potential species at risk are now conducted by DFO Science in either a pre-COSEWIC assessment, for species that are to be assessed or re-assessed by COSEWIC, or a recovery potential assessment (RPA), for species that have been evaluated as threatened or endangered by COSEWIC and are to be considered for listing under SARA. Since 2004, DFO Science has conducted pre-COSEWIC assessments for smooth skate (2006), spiny dogfish (2007), basking shark (2008), barndoor skate (2008), Atlantic killer whale (2007), American plaice (2007), Atlantic cod (2008), and Atlantic salmon (2009). Pre-COSEWIC assessments for Atlantic halibut and bluefin tuna will be conducted in the near future. DFO Science has also conducted RPAs for porbeagle shark (2005), winter skate (2005), shortfin mako shark (2006), white shark (2006), cusk (2007), North Atlantic right whale (2007), northern bottlenose whale (2007), and Inner Bay of Fundy salmon (2008). An RPA for loggerhead turtles was initiated in 2006 (DFO 2006a), and additional work on the loggerhead RPA is expected to continue in 2009.

Table 4.1, which is the summary of new information on fish species of special status provided by the proponent, contains some inaccuracies, some sections that are out of date, and not all available information is included (e.g., the allowable harm column is often blank when there is information available). The column "reason for designation (COSEWIC)" includes information that is not part of the reason for designation, including information from sources other than COSEWIC. For example, the reason for designation for cusk is written as: "Over-exploitation from fishing is the greatest source of mortality for cusk. Although there is some directed fishing, it is mainly taken as bycatch on longlines that target Atlantic halibut, cod, haddock, and pollock. Overall, landings of cusk have been declining since the late 1970s, coinciding with declining lengths and weights. It is estimated that the Scotia-Fundy region has experienced a 93% decline in cusk populations from 1970 to 2001. Habitat destruction is also a threat for this species." However, the rationale provided in the COSEWIC assessment is as follows: "The main population of this large, slow-growing, solitary bottom-living fish resides in the Gulf of Maine/Southeastern Scotian Shelf and has been in decline since 1970. Over three generations, the decline rate is over 90%, and the fish occurs in fewer and fewer survey trawls over time.

Fishing, unrestricted until 1999, is now capped but remains a source of mortality. This species is in a monotypic North Atlantic genus.” Also, the table cell related to the reason for designation for Atlantic cod by COSEWIC includes statements about why cod has not been added to Schedule 1 of SARA.

There are some other inaccuracies in Table 4.1 such as the statement: “The Governor in Council Decision on 06 Apr 2006 referred the assessment of this species back to COSEWIC for further information or consideration based on several factors including lack of clarity regarding speciation or definition of the designable unit, incomplete use of available abundance and distributional information and questions regarding the suitable incorporation of abundance and distributional information.” This statement was a generic one applied to all the species discussed within that particular Annex. For example, lack of clarity regarding speciation was not an issue for cusk.

Although marine turtles were identified as a VEC in the original EA and are mentioned as a VEC in the update, no new information has been provided on marine turtles in this report (e.g., James et al. 2005; Frick et al. 2006; James et al. 2006; James et al. 2007; Rees et al. 2008).

Special Areas

Additional analysis has been conducted by DFO on the identification of Ecologically and Biologically Significant Areas on the Scotian Shelf. The paragraph in the updated EA applies primarily to the inshore, “Inshore areas are critical nursery areas...insufficient scientific data at this time to meaningfully contribute to either integrated management of the inshore or definitions of EBSAs.” There are several references (e.g., DFO 2006b, Doherty and Horsman 2007) and internal DFO documents available on these areas.

Additional analysis is being conducted by DFO on the use of Roseway Basin by North Atlantic Right Whale. Potential interactions with right whale during vessel transitting, particularly if Southwest Nova Scotia is used as a shorebase, continue to be an important consideration.

Commercial and Non-Commercial Species

In addition to new assessments for species at risk, DFO Maritimes Science has also conducted research and stock assessments of other commercial and non-commercial species of relevance to EL2407. This includes tagging studies to investigate the movement of aquatic species in the offshore, as well as development of population models to better understand stock status.

DFO Research Activities

It is unlikely that there would be any conflict with the proposed Ocean Tracking Network (OTN) acoustic receiver line and EL2407. The OTN Line is intended to stop at around the 200m isobath.

There are moorings out on the Halifax line, which looks to be to the east of EL 2407. DFO Science is not aware of any other mooring work on this part of the Scotian Slope, i.e. in vicinity of the lease block. However, it may be useful to confirm the activities of Natural Resources Canada, other government agencies, and Dalhousie University.

Marine fish and invertebrate surveys continue each year on the Scotian Shelf; however, they do not typically extend into the depths of the revised EL2407 (i.e., beyond 1000m).

Conclusions

There is new information available on environmental effects of offshore exploration and development, on the deep water environment of the Scotian Slope, on species at risk and other commercial and non-commercial species that has not been incorporated into BEPCo.'s Updated Environmental Assessment. It is unclear whether any of this new information would alter the conclusions of the EA; however, it would likely be useful in the design and implementation of any Environmental Effects Monitoring that was conducted. At present, there is no known DFO Science equipment or planned research activities within EL 2407 that would potentially be disrupted by the proposed exploration drilling program. Given the potential duration of the project (2009-2015), however, ongoing communication with DFO about its activities in this area is recommended.

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