

From: D. McDonald, Project Manager, Canadian Environmental Assessment Agency
To: A. Perry, Regional Manager, Nova Scotia, BP Canada Energy Group ULC

Dear Ms. Perry,

The Canadian Environmental Assessment Agency (Agency) has completed its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Scotian Basin Exploration Drilling Project. The Agency also received submissions from government experts, the public and Indigenous peoples. The Agency has analyzed the comments from government experts and determined that additional information is required, as per the information requests (IRs) attached. The Agency is currently analyzing submissions from the public and Indigenous peoples and will make further information requests as required after it completes that analysis.

The Agency requires acceptable responses to the IRs in order to complete the EIS Review phase of the federal environmental assessment process and to proceed with the preparation of its Environmental Assessment Report. Once you have submitted complete responses to all IRs, the Agency will take a period of up to 15 days to form an opinion on whether the requested information has been provided. If, at that time, the Agency determines the responses to be complete, it will commence a technical review of the additional information and the timeline for the environmental assessment will resume the following day. If the responses are determined to be incomplete, you will be notified at that time. For further information, please consult the Agency document *Information Requests and Timelines* <https://www.canada.ca/en/environmental-assessment-agency/news/policy-guidance/information-requests-timelines.html>.

The responses may be in a format of your choice; however the format must be such that the responses to individual IRs can be easily identified. You may wish to discuss certain IRs with the Agency or other government experts as necessary to obtain clarification or additional information, prior to submission of the responses. If necessary, the Agency can assist in arranging meetings with government experts, at your request. Working directly with government experts in this manner, prior to responding to the Agency, will help to minimize the potential for additional IRs related to your responses.

The IRs and your responses will be made public on the Canadian Environmental Assessment Registry (CEAR) Internet site.

Please confirm receipt of this message and contact me if you require further information.

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Scotian Basin Exploration Drilling Project
Information Requests (IRs) from Environmental Impact Statement Review:
November 8 to December 9, 2016
December 23, 2016

INTRODUCTION

The Canadian Environmental Assessment Agency (Agency) has completed its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Scotian Basin Exploration Drilling Project. The Agency also received submissions from government experts, the public and Indigenous peoples. The Agency has analyzed the comments from government experts and determined that additional information is required, as per the information requests (IRs) below. The Agency is currently analyzing submissions from the public and Indigenous peoples and will make further information requests as required after it completes that analysis.

ACRONYMS

BOP: Blowout preventer

BP: BP Canada Energy Group ULC (proponent)

CEAA: Canadian Environmental Assessment Agency

CNSOPB: Canada-Nova Scotia Offshore Petroleum Board (or the Board)

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

DFO: Fisheries and Oceans Canada

ECCC: Environment and Climate Change Canada

EIS: Environmental Impact Statement

EL: Exploration Licence

IR: Information Request

LAA: Local assessment area

MARPOL: International Convention for the Prevention of Pollution from Ships

MODU: Mobile offshore drilling unit

OWTG: *Offshore Waste Treatment Guidelines*

OCSG: *Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands*

PSV: Platform supply vessel

RAA: Regional assessment area

ROV: Remotely-operated vehicle

SBM: Synthetic-based drilling mud

VSP: Vertical Seismic Profiling

WBM: Water-based drilling mud

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INFORMATION REQUESTS (IRs)

EA Method

IR 001

Applicable CEAA 2012 effect(s)¹: All

EIS Guidelines Reference: Part 1, 3.3.2 Valued components to be examined; Part 2, 6.3.1 Fish and fish habitat; 3.3.3 Marine mammals; 6.3.4 Marine turtles; 6.3.5 Migratory birds

EIS Reference: 6.2.5 Assessment of Project-Related Environmental Effects; 7.2.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance; 7.2.8.3 Characterization of Residual Project-Related Environmental Effects; 7.3.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance; 7.4.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance; 7.5.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance

Context and Rationale: For some valued components, the definitions for the characterization of the magnitude of residual effects are not clear.

The Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012 states that if categories such as “low,” “moderate,” or “high” are used to describe magnitude of residual effect, each should be clearly defined and the rationale for identifying an effect as low, moderate, or high should be clearly documented. In the EIS (sections 7.2.5, 7.3.5, 7.4.5, 7.5.5), the magnitude of effects on fish and fish habitat, to marine mammals and turtles, to migratory birds, and to special areas is defined using terms such as “range of natural variability,” “population viability,” and “exceeds the limits of population viability,” however the meanings of those terms are not clear.

Specific Question or Request: For fish and fish habitat, marine mammals and sea turtles, and migratory birds:

- Clarify how the “range of natural variability” is defined, and how residual effects can be determined to be within this range for all species included in the valued component if using qualitative definitions. For example, the Project will introduce underwater noise that could cause injury or behaviour change in fish close to the source of the noise (EIS section 7.2.8.3), which is described as a low magnitude effect (i.e. within the range of natural variability);
- Clarify what population is referred to by “population viability”, how the population of each species is included in the valued component, and if species at risk or of conservation concern are included (i.e. is the most sensitive species to disturbance being used as an indicator species?);
- Clarify the difference between “measurable change, but not posing a risk to population viability” (moderate magnitude) and “measurable change that exceeds the limits of natural variability and may affect long-term population viability” (high magnitude). Clarify how population viability is

¹ See legend at end of document for a description of applicable environmental effects

taken into consideration for species at risk. Clarify how a determination of measurable change is made without quantitative analysis; and

- Clarify if the definition of magnitude of residual effects as negligible, low, moderate, or high is based on an average across all species in the valued component (e.g. marine mammals and turtles), or reflective of the more at risk species included in that valued component (e.g. endangered northern bottlenose whale, blue whale, and leatherback sea turtle). If the former, indicate where the assessment of residual effects on individual species at risk can be found.

Update the magnitude and significance analysis for direct effects and cumulative effects for each valued component as negligible, low, moderate, or high, as needed.

IR 002

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.3.1 Fish and fish habitat; 6.3.6 Marine mammal; 6.3.4 Marine turtles; 6.3.9 Commercial fisheries; 6.3.6 Federal species at risk

EIS Reference: 7.3.8.3 Characterization of Residual Project-Related Environmental Effects

Context and Rationale: In characterizing the residual effects for each valued component, it is not always clear how the timing of the effect is considered, as described in the *Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012*.

The EIS Guidelines (6.3.9) require a discussion of how drilling activities correlate to key commercial fisheries windows, and any potential impacts resulting from overlapping periods. The EIS Guidelines (6.3.6) also require a discussion of migration patterns of federal species at risk and related effects (e.g. displacement, increased risk of collision). Although the EIS includes a discussion of underwater noise effects on marine mammals during different seasons (section 7.3.8.3), it is not clear how this affects the characterization of residual effects.

Specific Question or Request: For each valued component, describe the timing of any residual effects and assess how that affects the valued component including during the following times:

- A period of migration for species at risk for fish or marine mammals;
- During summer when benthic fauna are more susceptible to smothering;
- When species are using an area for sensitive life stages; and
- When the project area is being used by Indigenous peoples.

IR 003

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 1, 4.2 Study strategy and methodology

EIS Reference: Various – see context

Context and Rationale: The context within which residual environmental effects could occur to each valued component is not described thoroughly enough to support the assessment of direct and cumulative effects.

The *Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012*² advises that the ecological and social context within which potential adverse residual effects may occur be considered in determining significance. It also advises that the determination of significance consider the state (health, status or condition) of valued components that may be impacted by the environmental effects.

The *Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* states that it is important to consider if past physical activities that are no longer physically present, operating, or active continue to affect a given valued component. If the state of the valued component is likely to be stable, then the cumulative effects assessment can address how the baseline will be further affected by additional changes in the environment due to future activities. If the valued component is still changing as a result of past or existing activities, then the analysis has to address two influences: how past and existing activities are expected to affect the future and how future activities will affect the future.

The EIS Guidelines (Part 1, section 4.2) require that the assessment of effects be based on a comparison of the biophysical and human environments between the predicted future conditions with the project and the predicted future conditions without the project, and that it considers the resilience of relevant species populations, communities, and their habitats.

The EIS (section 6.2.4) states existing conditions of the marine physical environment, marine biological environment, and socio-economic environment are described in section 5 to characterize the setting for the Project, support an understanding of the receiving environment, and provide sufficient context for the effects assessment. The EIS assessment methodology (section 6.2.5) describes the context criteria for all valued components as “the current degree of anthropogenic disturbance and/or ecological sensitivity in the area in which the residual effect may occur.” The generic qualitative categories for context are “undisturbed” (area is relatively undisturbed or not adversely affected by human activity) and “disturbed” (area has been substantially disturbed by previous human development or human development is still present). More specific qualitative category descriptions are also provided for each valued component. It is not clear how these generic categories (disturbed or undisturbed) were determined for each VC.

When considering cumulative environmental effects, the EIS (section 10.1.2.1) states that the description of existing conditions provides sufficient context for the cumulative effects assessment, assuming that the existing status or baseline conditions of each valued component reflect the influence of other past and present physical activities within the RAA. A description is also provided in section

² Updated version released in November 2015

10.2.1 of how other physical activities have affected or may affect each valued component, providing context to support the cumulative effects assessment.

The EIS provides some comments that inform the context of effects on valued components. For example, regarding existing conditions for fish and fish habitat (section 7.2.6), the EIS briefly describes how “following the collapse of the traditional groundfish stocks (e.g. cod, flatfish and Pollock), shellfish stocks have grown significantly in their contribution to revenue and profitability of the Scotian Shelf fishery.” However, the EIS also describes the context for commercial fisheries (7.6.8.3) as undisturbed.

Specific Question or Request: For each valued component (VC), provide the criteria or rationale used to determine the ecological and socio economic context and describe the context for residual effects for each VC, including historic stressors and the current trend for the VC. For biophysical VCs, consider whether they are in recovery, in decline, or stable.

Where a species at risk forms part of the VC (or for a few representative species most at risk), describe the risks to that species identified in any recovery strategy or action plan, and the extent to which the residual effects of the Project overlap with those risks.

For the significance analysis for each VC, explicitly discuss how context was considered in the analysis of each significance rating criteria (e.g. magnitude, timing, reversibility); provide updates as appropriate to the effects characterizations and significance determinations. Consider both direct project effects and cumulative effects for each VC.

Please clarify if the context for effects on fish and fish habitat (section 7.2.8.3) should be described as disturbed for both changes to risks of mortality or physical injury and changes in habitat quality and use; the former is described as occurring within a disturbed context, the latter as within an undisturbed context.

IR 004

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 1, 3.3.3 Spatial and Temporal boundaries

EIS Reference: Various – see context

Context and Rationale: It is not clear why the spatial boundaries for assessing cumulative effects are identical for all valued components. The Agency’s *Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* states that when setting spatial boundaries for cumulative effects assessment, a valued component’s geographic range and the zone of influence of the project for the valued component should be considered. For example, spatial boundaries for a migratory species may take into account seasonal migration paths, regardless of jurisdictional boundaries. The guidance further states that administrative, political, or other human-made boundaries may not take into account the spatial pattern of ecosystems; such boundaries may not reflect the spatial distribution of a mobile species.

The EIS (section 10.1.1.2) describes the same regional assessment area (RAA) for the cumulative effects assessment to all six valued components, an area bounded primarily by political boundaries.

Specific Question or Request: Provide the rationale for the spatial scope of the cumulative effects assessment for each valued component, or adjust the scope for any valued components as appropriate.

IR 005 (CNSOPB-3)

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 4 Public Consultation and Concerns

EIS Reference: 3 Stakeholder Consultation and Engagement

Context and Rationale: The EIS Guidelines require the proponent to describe the ongoing and proposed consultations and the information sessions that the proponent will hold or that it has already held on the project. The stakeholder consultation log in section 3 of the EIS reflects some consultation with fishers and fisheries associations.

Specific Question or Request: Explain the proponent's approach to consultation and the rationale for deciding which groups to consult in ensuring key issues of concern have been understood and appropriately addressed in the EIS.

IR 006 (CNSOPB-7)

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.3.1 Fish and fish habitat; 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.4.3 Model Scenarios; Appendix C Acoustic Modelling Report; Appendix D

Context and Rationale: The locations selected for modelling of underwater noise, drill waste dispersion, and oil spill trajectory do not coincide. In particular, the deeper water site for oil spill trajectory modelling is approximately 78 kilometres away from the deeper-water noise modelling site and the drill waste dispersion modelling site, which are essentially the same.

Specific Question or Request: Explain why modelling for all potential emissions and discharges was not conducted at the same two locations (i.e. same deeper water site and shallow water site).

Project Description

IR 007

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 3.2 Project Activities

EIS Reference: Various – see context

Context and Rationale: The EIS Guidelines require that the EIS include the location of each activity, and the water depths for potential drill sites.

The EIS (section 2.3.2) indicates that the well locations have not yet been finalized. Water depths in the exploration licenses range from 100 metres to more than 3000 metres (section 2.2). Section 6.1.1 says that the area under assessment is the four exploratory licence areas. Section 7.1.1.2 states that for underwater acoustic modelling “two representative wellsites were selected within the viable drilling area and included the deepest and shallowest potential locations within the drilling area.” Section 7.1.2.1 of the EIS says that these same two sites, with water depths of 2104 metres and 2790 metres respectively, were used for sediment dispersion modelling.

Specific Question or Request: Clarify if the seven proposed wells would only be drilled in depths between 2104 metres and 2790 metres within the exploration licenses. If this is not the case, please clarify if there are any limits to where drilling could occur within the exploration license areas.

Explain how the effects assessment addresses all geographical areas within the Exploration Licences where potential drilling could occur (e.g. shallow and deep, flat and sloped). Do the representative wellsite locations chosen reflect the potentially most sensitive areas with the ELs (i.e. highest potential for sensitive benthic habitats)? Would sediment deposition be thicker around wellsites in shallower water where the muds would not be as dispersed given shorter distance to seafloor?

IR 008

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 1.2 Project Overview; 3.2 Project activities

EIS Reference: 2.7 Project Schedule

Context and Rationale: The EIS Guidelines require the EIS to describe the “scheduling details, the timing of each phase of the project and other key features” and to include “a detailed schedule including time of year, frequency, and duration of project activities.”

The EIS (section 2.7) states that drilling will be carried out in “multiple phases so that initial well results can be analyzed to inform the strategy for subsequent wells.” The EIS is clear that up to seven wells are proposed, and describes a number of steps in Figure 2.7.1, however it is not clear what is meant by “multiple phases,” the number of phases, and the nature of activities for each phase. Furthermore, the project schedule in Figure 2.7.1 extends to the end of 2020, while the licenses are described in the Executive Summary as extending to 2022.

Specific Question or Request: Clearly describe all possible anticipated phases, the activities in each phase, the time of year, frequency, duration, and scheduling of all phases to abandonment of the last well. Where only approximations can be provided, please explain.

The Agency understands that the drilling program is divided into two phases; the first phase includes the first one or two wells, while the second phase includes any remaining wells. Confirm or correct the Agency's understanding as appropriate.

IR 009

Applicable CEAA 2012 effect(s): 5(1)(a)

EIS Guidelines Reference: Part 2, 3.1 Project Components - "... the proponent will describe the management and disposal of wastes (e.g. type and constituents of waste, quantity, treatment and method of disposal) including operational discharges from subsea systems and the installation of subsea systems."

EIS Reference: 2.3.2 Offshore Exploration Wells

Context and Rationale: It is stated in several places that during the riserless phase, excess cement may be discharged to the seafloor.

Specific Question or Request: What volume of cement is predicted to be discharged and what are the associated environmental effects? What other management options are available? Are any measures proposed that would mitigate the effects of this activity?

IR 010

Applicable CEAA 2012 effect(s): 5(1)(a)(i); 5(1)(a)(ii); 5(1)(b)(i)

EIS Guidelines Reference: Part 2, 3.1 Project Components: "...the proponent will describe the management and disposal of wastes including operational discharges from subsea systems and the installation of subsea systems."

EIS Reference: 2.4.3.3 Well Flow Testing

Context and Rationale: It is stated in EIS section 2.4.3.3 that flow testing of wells (in the event that hydrocarbons are discovered in sufficient quantity to merit it) is not expected to be carried out during the initial-phase of drilling (first one or two wells).

Specific Question or Request: Confirm that, unless there is no possibility of testing the first or second wells, the analysis of air emissions and associated effects includes testing those wells. If not, provide an updated analysis or a rationale as to why no update is required.

IR 011 (CNSOPB-2)

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 3 Project Description

EIS Reference: 2.5 Well Control and Blowout Prevention

Context and Rationale: The EIS states that the BOP will be pressure tested every 21 days. The CNSOPB's standard policy is to pressure test BOPs every 14 days. Any variance on this frequency would require approval from the CNSOPB and the CNSOPB has advised the Agency that it likely would not accept a general schedule of 21 days, but would consider extending a specific test on a case by case basis.

Specific Question or Request: Update the planned pressure testing frequency as required.

IR 012 (ECCC-IR-27, ECCC-IR-30)

Applicable CEAA 2012 effect(s): 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 6.1.1 Atmospheric environment and climate; 6.3.8 Air quality and greenhouse gas emissions

EIS Reference: 2.8.1 Atmospheric Emissions; 10.1 Cumulative Environmental Effects Assessment Scope and Methods; 10.2 Cumulative Environmental Effects Assessment

Context and Rationale: The EIS refers to IMO efficiency measures (EEDI, or Energy Efficiency Design Index), which only apply to vessels that are 2014 or newer, but doesn't state the age of vessels to be used.

Also, The NO_x Tier III limits for ships may be incorrectly characterized. The EIS seems to indicate all marine vessels will have NO_x Tier III engines, but this requirement only applies to vessels that are 2016 and newer.

Specific Question or Request: Confirm if vessels used during the project will be 2014 or newer vessels, to confirm whether the EEDI will actually impact emission levels. If the assessment provided does not consider the likely age of vessels to be used, update the assessment accordingly.

Provide the expected age distribution of vessels to confirm the applicability of the NO_x Tier III requirements, or describe the expected emissions impact if ships 2015 or older ships are used, and update the assessment accordingly.

IR 013 (ECCC-IR-28)

Applicable CEAA 2012 effect(s): 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 6.1.1 Atmospheric environment and climate; 6.3.8 Air quality and greenhouse gas emissions

EIS Reference: 2.8.1 Atmospheric Emissions

Context and Rationale: The EIS states that the types of MODUs (Mobile Drilling Units) and PSVs (Platform Supply Vessels) are not yet decided, so it is not known how conservative or accurate marine air emissions estimates are. The example provided for a semi-submersible diesel powered MODU does not describe whether this is at a high or low-end of the emissions range that could be expected.

Specific Question or Request: Discuss whether emissions could be higher or lower if MODUs and PSVs other than those outlined in the EIS are used for the Project.

IR 014 (ECCC-IR-29)

Applicable CEAA 2012 effect(s): 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 6.1.1 Atmospheric environment and climate; 6.3.8 Air quality and greenhouse gas emissions

EIS Reference: 2.8.1 Atmospheric Emissions

Context and Rationale: Emissions for the MODU and PSVs are provided but there is insufficient information on how they were estimated.

Specific Question or Request: Provide the basis or reference for the estimate of drilling unit and marine vessel fuel consumption, activity, and air emissions (i.e. vessel size, engine size, and Brake Specific Fuel Consumption (BSFC)).

IR 015 (CNSOPB-6)

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 3 Project Description

EIS Reference: 7.3.4.2 Temporal Boundaries

Context and Rationale: In several sections of the EIS, it is stated that the estimated number of days for drilling each well is 120. Section 7.3.4.2 however, indicates a maximum drilling time of 120 days.

Specific Question or Request: Clarify whether the 120-day drilling timeline is an estimate or a maximum.

IR 016 (DFO-02)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.2 Marine environment

EIS Reference: section 5.2.2.2 Geohazard Survey, p.5.87, section 7.2.8.3, p. 7.38

Context and Rationale: It is stated on page 5.87 of the EIS that “footage will be captured over an area with a 500-metre radius.” However, the proponent has indicated verbally to DFO that the tether limitations may restrict the radius to 200 metres.

The EIS, on page 7.38, predicts that adverse effects on benthic organisms would occur where average drilling waste burial depths are 9.6 millimetres or greater. The EIS predicts that drilling waste thickness greater than 10 millimetres will extend up to 116 metres from the wellsite.

Specific Question or Request: Confirm the area that the geohazard survey would cover. Discuss whether the survey coverage would be sufficient to verify the predicted extent of benthic smothering (average burial depth greater than 9.6 millimetres). Explain whether survey coverage would be sufficient to ensure that sensitive features that may experience deposition (e.g. aggregations of habitat-forming corals) would be detected.

Alternative Means

IR 017 (ECCC-IR-02)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 2.2 Alternative means of carrying out the Project; 6.3.5 Migratory Birds; 6.4 Mitigation

EIS Reference: 2.9.2.2 Drilling Waste Management; 7.4.3 Potential Environmental Effects, Pathways and Measurable Parameters; 8.5.3.3 Characterization of Residual Project-Related Environmental Effects

Context and Rationale: The proponent has not yet identified its preferred option for drilling muds, despite the fact that the option of water-based muds is considered both technically and economically feasible in Table 2.9.1.

The EIS states that “Although there are several types of discharges that migratory birds may interact with during drilling of the well and operation of the PSVs, all will be in compliance with the OWTG and in adherence to MARPOL...”

As stated in section 8.5.3.1, O’Hara and Morandin (2010) showed effects of sub-visible sheens on the microstructure of feathers of pelagic seabirds, providing a plausible link between operational discharges of hydrocarbons and increased seabird mortality.

Since birds may be attracted to the MODU and PSVs due to lights and flares, as well as food, the potential for adverse effects on birds in the area of project infrastructure from operational discharges should be adequately addressed.

Specific Question or Request: In assessing alternative means of carrying out the Project, discuss the feasibility of exclusively using water based drilling muds, taking into consideration technical and economic feasibility, as well as environmental considerations, including potential impacts on migratory birds.

Clarify whether the results of O’Hara and Morandin (2010) were considered in the analysis of effects of synthetic based muds (section 8.5.3.3). If not, update the analysis accordingly, or explain why it was not considered necessary.

IR 018 (ECCC-IR-01)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 2.2 Alternative means of carrying out the Project; 6.3.5 Migratory birds; 6.4 Mitigation

EIS Reference: 2.9.2.3 Offshore Vessel Lighting; 2.9.2.4 Well Test Flaring; 7.4 Migratory Birds

Context and Rationale: A catastrophic mortality event at an LNG facility in New Brunswick in the fall of 2013 resulted in the deaths of over 7500 landbirds in one night. ECCC has advised that bird collisions at lit and floodlit structures are also a known problem. In Atlantic Canada, including coastal and offshore Nova Scotia, nocturnal migrants and night-flying seabirds (e.g. storm-petrels) are the birds most at risk of attraction to lights and flares. Attraction to lights may result in collision with lit structures or their support structures, or with other birds. Disoriented birds are prone to circling a light source and may deplete their energy reserves and either die of exhaustion, drop into the ocean and perish or drop to the ground (or a hard surface) where they are at risk of depredation. Incineration or partial incineration in flares is also a major concern.

ECCC has advised that bird attraction to flares is a known problem in the offshore with challenges involved in monitoring bird mortality in offshore flares since platform monitoring does not likely accurately measure mortality (i.e. affected birds may not land on the MODU, incinerated birds may not leave a carcass). The EIS guidelines require the proponent to analyze alternative means to light the platform at night, and alternative means to flare at night when testing the well, to reduce attraction and mortality of birds, such as installing flare shields.

Specific Question or Request: The proponent rejects spectral modified lighting due to “restricted by commercial availability, limited capability in extreme weather, safety concerns around helicopter approach and landing and lower energy efficiency (Marquenie et al. 2014)”. Advise whether enquiries have been made with suppliers of spectral modified lights, or whether it was inferred that they would not be available based on Marquenie et al. (2014). If they are currently unavailable, clarify whether the proponent is considering platforms which would have the flexibility to change the lighting regime should spectral modified lighting become available in the near future. Clarify whether helicopters for the Project would have windshields rated “Military Clear” (as per Marquenie et al. 2014). Clarify the “limited capabilities in extreme weather and lower energy efficiency” associated with spectral modified lighting mentioned by the proponent. Clarify whether any additional benefits or disadvantages of spectral modified lighting in coastal areas or the offshore have been identified in jurisdictions where the lighting has satisfied regulatory requirements (e.g. Netherlands, Germany, United States of America), including effects on birds.

The EIS (section 2.9.2.3) states that “...red light (570 nm to 650 nm) has been tested on offshore platforms and has demonstrated a reduced effect on marine birds”. Clarify which studies have demonstrated a reduced effect on birds by the use of red lights, as Marquenie et al. (2014) showed a reduced effect due to green lights.

Explain why the option of avoidance of flaring at night, which the proponent has stated is technically and economically feasible (Table 2.9.4) and that would likely reduce or avoid incidental take of

migratory birds, is not the preferred option. Discuss the technical and economic feasibility of installing flare shields or commercially-available enclosed incineration systems.

Fish and Fish Habitat

IR 019 (CNSOPB-1)

Applicable CEAA 2012 effect(s): 5(1)(a); 5(1)(b)(i)

EIS Guidelines Reference: Part 2, 3.1 Project Components: "...the proponent will describe the management and disposal of wastes (e.g. type and constituents of waste, quantity, treatment and method of disposal) including operational discharges from subsea systems and the installation of subsea systems."

EIS Reference: Table 2.8.5 Potential Project-Related Liquid Discharges

Context and Rationale: The table indicates that blowout preventer (BOP) testing fluids and other discharges from subsea equipment will be discharged according to the *Offshore Waste Treatment Guidelines* and the *Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands* (referred to more commonly as simply the *Offshore Chemical Selection Guidelines*).

The table also says that "BOP fluids are typically freshwater based, seawater soluble chemicals". It is estimated that approximately 5 barrels of BOP testing fluids freshwater based, seawater soluble "chemicals", or other discharges per BOP test would be discharged and 50 barrels would be discharged when the riser is disconnected.

It is not clear what the effects from such discharges would be, or what mitigation measures would be applied to reduce effects.

Specific Question or Request: Provide additional information on the release of BOP fluid into the marine environment. In particular, describe its (typical) components; the various circumstances under which it is released, including any bulk discharges when the riser is recovered to the rig; and the estimated volume in each circumstance (i.e. provide sample calculations). Provide amounts expected to be discharged per well and over the life of the Project.

Also provide BOP testing fluids properties (e.g. toxicity) and describe the potential effects of the discharged BOP testing fluids and what specific mitigation measures are proposed.

IR 020

Applicable CEAA 2012 effect(s): 5(1)(a)(i)

EIS Guidelines Reference: 6.1.3 Fish and Fish Habitat

EIS Reference: Various – see context

Context and Rationale: The EIS Guidelines (section 6.1.3) require that the EIS describe the following biophysical water and sediment characteristics for areas in which effects are anticipated:

- Location of potential or confirmed fish habitats, description of these habitats - water depth, type of sediment, vegetation, and potential use for spawning, rearing, growth, feeding, migration, and overwintering;
- Quality, thickness, grain size, and mobility of sediments;
- Available bathymetry information for drilling; maximum and mean depths; and
- Benthic flora and fauna and associated habitat, including sensitive features such as corals and sponges.

The EIS (section 6.2.3.4) describes the project area as the footprint of the four Exploration License (EL) areas, covering 13,982 square kilometres (section 2.2), with water depths ranging from 100 metres to more than 3000 metres, and provides the following:

- a summary of the characteristics and distribution of groundfish of commercial, recreational, or aboriginal (CRA) value, pelagic fish of CRA value, invertebrates of CRA value, species at risk, and species of special concern likely to occur in the vicinity of the Project (section 5.2.5);
- a map showing a bathymetric overview of the Scotian Shelf and Slope, identifying the location of the project area (section 5.1.3.1);
- general information about the sediments on the Scotian Shelf and Slope, including the project area (section 5.1.1);
- results of benthic surveys within the project area that were carried out in 2002 (in former ELs 2381 and 2382) in depths ranging from 1500 to 3400 metres (including less than half of the project area), results of earlier nearby benthic surveys at similar depths (section 5.2.2.1);
- Figure 5.2.10, showing surficial seafloor geology built from a geodatabase that includes specific core sampling information such as grain size distribution, shelf and slope surficial geology, and sediment type maps that covers much of the project area (approximately 90 percent) (section 5.2.2.2);
- Figure 5.2.10, showing seafloor geomorphology and infrastructures that covers some of the project area (approximately 60 percent) (section 5.2.2.2);
- reference to information from 3D WATS seismic survey covering 8500 square kilometres, with water depths 1573 to 3730 metres, that was used to develop the Figure 5.2.10 (section 5.2.2.2); and
- maps showing where corals and sponges have been located in previous surveys of the shallower part of the project area (section 5.2.3).

Specific Question or Request: For the benthic surveys done in 2002 (in former ELs 2381 and 2382), elaborate on the intensity of the survey work done; how many grab samples were collected over what area, and what percentage of the ELs' areas the still-camera transects covered. Clarify the percentage of the current project area that was included in those former ELs.

In order to assess the relevance of information provided in Figure 5.2.10, provide the number of core samples that were used to characterize surficial seabed conditions, the locations of these core samples, and describe the confidence with which this number of samples can be used to characterize the seabed conditions.

Describe how the 3D WATS seismic survey data was used to generate Figure 5.2.10.

Based on the baseline information provided, assess the likelihood that additional coral or sponges are located in or near the project area further to those shown in Figure 5.2.13, taking into account available information available about sediment types, water depths, coral and sponge preferences, and existing coral and sponge locations.

IR 021 (DFO-04)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.3.1 Fish and fish habitat; 6.3.2 Marine plants; 6.4 Mitigation

EIS Reference: 2.3.2 Offshore Exploration Wells; 7.2.8.2 Mitigation of Project-Related Effects, p. 7.34

Context and Rationale: The EIS Guidelines (section 6.4) require that the mitigation measures included in the EIS be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation, and implementation. The EIS must also present an assessment of the effectiveness of the proposed technically and economically viable mitigation measures, and describe any other technically and economically feasible mitigation measures that were considered and rejected.

The EIS (section 2.3.2) describes how the locations of the seven proposed wells have not yet been finalized within the project area. The EIS (section 7.2.8.2) describes measures to mitigate effects on fish and fish habitat, and includes a commitment to carry out an imagery-based seabed survey in the vicinity of wellsites once the sites have been determined to confirm the absence of, including among other things, sensitive environmental features such as species at risk or aggregations of habitat-forming corals. If feasible, the proponent would move the drilling location to avoid affecting the sensitive area; if not feasible, the proponent will consult with the CNSOPB to determine an appropriate course of action.

DFO has suggested that the mitigation could be strengthened by having an individual trained in deep-water benthic environments review the seabed survey in real time and has offered to provide guidance to this individual prior to surveying to ensure that the assessment would be consistent with DFO's view.

Specific Question or Request: Describe the procedure planned for surveying the area prior to drilling. Describe the timing of the survey relative to drilling, how the information collected during the survey would be reviewed and by whom.

Describe the conditions under which proceeding to drill on or near a sensitive environmental feature would be requested of the Board. State whether the proponent has a Standard Operating Procedure for what it would consider a threshold for environmental sensitivity that would trigger moving the drilling location. Describe the criteria that would inform a decision as to whether or not to proceed (i.e. what features would be considered sensitive?), the qualifications of personnel making the decision, and any parties other than the Board that would be consulted. For example, under what circumstances, if any, does the proponent intend to consult with DFO concurrently with the Board to assist in determining an appropriate course of action that is in compliance with the *Fisheries Act* and the *Species at Risk Act*?

Clarify the factors that would be considered in a determination of whether or not it would be feasible to move the well. Discuss technical and economic limitations and considerations associated with moving the drilling location. Explain how far a drilling location may be moved, taking into consideration the potential presence of sensitive features and the predicted extent of drilling waste.

Advise whether the proponent will employ an individual trained in deep-water benthic environments to review the seabed survey in real time. Provide the proposed qualifications of this individual and state whether DFO's offer to provide guidance to this individual would be accepted. If not, propose an alternative approach that would ensure that the individual reviewing seabed survey is appropriately qualified.

State whether seabed survey footage would ultimately be made available to DFO or other interested parties.

IR 022 (DFO-05)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.2 Predicted Changes to the Physical Environment

EIS Reference: 11.1.1.1 Fish and Fish Habitat, p.11.3; 7.2.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance; 7.2.8.3 Characterization of Residual Project-Related Environmental Effects

Context and Rationale: Additional information is required in the characterization of the duration of project effects on fish and fish habitat.

For fish and fish habitat, the EIS (section 7.2.5) defines duration of effects as medium-term where effects extend through the entire duration of project activities, and long-term where effects extend beyond the duration of project activities and continue after well abandonment.

The EIS (section 7.2.8.3) describes effects of fish mortality or injury associated with the discharge of drill muds and cuttings as expected to subside with time (one to four years), and characterizes these effects as medium-term. However, effects from wells drilled toward the end of the exploration license terms could extend past the duration of project activities. Furthermore, the statement that "habitat altered by the deposition of drill muds and cuttings will become available for use as fish habitat following the completion of drilling operations and is expected to be recolonized by benthic communities in less than 5 years" requires further consideration. The statement appears to be largely based on studies in shallower, more-dynamic, waters than deep water sites.

Specific Question or Request: Provide specific references to studies in deep water environments to support the statement that drill muds and cuttings will be available for use as fish habitat and recolonized by benthic communities in less than five years. Provide rationale for describing the duration of waste discharge effects on fish mortality or physical injury, or effects on habitat quality and use, as medium term; alternately, update the effects characterization.

IR 023 (DFO-09)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.3 Fish and fish habitat, 6.1.5 Species at risk and species of conservation concern and 6.1.6 Marine mammals

EIS Reference: Tables 5.2.5, 5.2.6, 5.2.7, 5.2.8, 5.2.9, 7.2.3 and 7.2.4

Context and Rationale: It is not clear how the “potential for occurrence” was assessed and categorized as low, moderate, high. Baseline information provided regarding the potential occurrence of some fish and marine mammal species in the project area may be inconsistent or not accurate.

The information presented in Table 5.2.5 regarding the potential for occurrence of groundfish in the project area seems inaccurate. For example, haddock are listed as having low potential to occur despite the inclusion of a corner of the Haddock Box in the project area. Tables 5.2.8 and 7.2.3 indicate high potential of Bluefin Tuna being present in the project area, yet Tables 5.2.6 and 7.2.4 indicate low potential occurrence in the project area, despite the statement on page 7.29 that tuna is among the most commonly harvested species in the project area. Table 5.2.9 indicates a low potential for encountering Northern Bottlenose Whales in the project area yet mapping in Appendix E shows 10 sightings directly in the project Area despite the small population (143 individuals). The indication in Table 5.2.7 that snow crabs have a low potential for occurrence in the project area seems at odds with the statement that there are high concentrations on the Western Bank and its shelf edge. Atlantic Halibut should be noted as “high potential for occurrence in the project area” considering fisheries landings. Silver Hake should be noted as “moderate to high in the project area”.

Specific Question or Request: Describe how the “potential for occurrence” was assessed and categorized as low, moderate, high. Review the columns in the tables indicating the potential occurrence of species in the project area to ensure that baseline information presented is accurate and consistent and provide updated tables as necessary. Update the effects assessment, as appropriate, or provide a rationale as to why no update is required.

IR 024 (DFO-20)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.3.1 Fish and fish habitat and 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 7.2.8.3 Characterization of Project Related Environmental Effects, p.7.39; 8.1.5.3 Characterization of Project Related Environmental Effects, p.8.99

Context and Rationale: The EIS states “The diversity and abundance of fish eggs and larvae in the project area and surrounding LAA, with the exception of the Haddock Box, is generally expected to be low.” This information is not consistent with other statements in the document such as in section 8.5.1.3 where it is indicated “it should be emphasized that the majority of fish species on the Scotian Shelf and

Slope spawn in a variety of large areas, over long time scales, and a spill is not predicted to encompass all of these areas or time scales within the RAA to such a degree that natural recruitment of juvenile organisms may not re-establish the population(s) to their original level within one generation.”

Specific Question or Request: Provide updated text for section 7.2.8.3 that reflects the variety of spawning areas and presence of fish eggs and larvae along the Scotian Shelf and Slope outside of the Haddock Box. Update the effects assessment, as appropriate, or explain why no update is required.

IR 025

Applicable CEAA 2012 effect(s): 5(1)(a)(i) fish and fish habitat

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects

EIS Reference: 7.2.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance

Context and Rationale: The EIS states that “For the purposes of this effects assessment, a significant adverse residual environmental effect on Fish and Fish Habitat is defined as a project-related environmental effect that:

- causes a significant decline in abundance or change in distribution of fish populations within the RAA, such that natural recruitment may not re-establish the population(s) to its original level within one generation;
- jeopardizes the achievement of self-sustaining population objectives or recovery goals for listed species;
- results in permanent and irreversible loss of critical habitat as defined in a recovery plan or an action strategy; or
- results in serious harm to fish as defined by the *Fisheries Act* that is unauthorized, unmitigated, or not compensated through offsetting measures in accordance with DFO’s *Fisheries Protection Policy Statement* (DFO 2013z).”

Additional information on the choice of thresholds is required.

Specific Question or Request: Provide a rationale to justify for the use of these significance thresholds for Fish and Fish Habitat proposed in the EIS, including information on why effects less than the threshold described would not be considered significant by the proponent.

Marine Mammals and Sea Turtles

IR 026

Applicable CEAA 2012 effect(s): 5(1)(a)(i); 5(1)(a)(ii); 5(1)(b)(i)

EIS Guidelines Reference: Part 2, 6.3.1 Fish and Fish Habitat; 6.3.3 Marine Mammals

EIS Reference: 7.2.8.2 Mitigation of Project-Related Environmental Effects, p. 7.36

Context and Rationale: VSP activities may adversely affect marine mammals. The EIS states in section 7.2.8.2 that measures to mitigate the effects of vertical seismic profiling include “BP will use the minimum amount of energy necessary to achieve operational objectives, reduce the energy at frequencies above those necessary for the purpose of the survey; and will reduce the proportion of energy that propagates horizontally.” Typical energy levels are provided in Appendix D (Acoustic Modeling Report).

Specific Question or Request: What would be considered a reduced level? Above what frequency is energy considered unnecessary for the purpose of the survey? What techniques will be used to reduce the proportion of energy that propagates horizontally? How much reduction can be achieved? To what extent would these changes reduce potential effects on marine mammals?

IR 027

Applicable CEAA 2012 effect(s): 5(1)(a)(i) fish and fish habitat

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects

EIS Reference: 7.3.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance

Context and Rationale: The EIS states that “For the purposes of this effects assessment, a significant adverse residual environmental effect on Marine Mammals and Sea Turtles is defined as a project-related environmental effect that:

- causes a decline in abundance or change in distribution of marine mammal or sea turtle populations within the RAA, such that natural recruitment may not re-establish the population(s) to its original level within one generation;
- jeopardizes the achievement of self-sustaining population objectives or recovery goals for listed SARA species; or
- results in permanent and irreversible loss of critical habitat as defined in a recovery plan or an action strategy.”

Additional information on the choice of thresholds is required.

Specific Question or Request: Provide a rationale to justify the selection of the significance thresholds for Marine Mammals and Sea Turtles proposed in the EIS, including information on why effects less than the threshold described would not be considered significant by the proponent.

IR 028 (DFO-07)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.6.3 Cumulative effects assessment

EIS Reference: 7.3.3 Potential Environmental Effects, Pathways and Measureable Parameters; Table 7.3.1, p.7.49

Context and Rationale: Behavioural effects are not included in the effects pathway table for marine mammals.

Specific Question or Request: Update the assessment of effects on marine mammals to explicitly include “changes in behaviour,” such as masking (i.e. reduced ability to communicate).

IR 029 (DFO-11)

Applicable CEEA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.3.3 Marine mammals and 6.3.6 Federal species at risk

EIS Reference: 2.8.5 Sound and Light Emissions, p.2.36

Context and Rationale: Sound generated by helicopters will carry underwater, and marine mammal disturbance reactions resulting from aircraft overflights have been documented.

Specific Question or Request: Update the effects assessment for marine mammals to explicitly consider sound produced from the regular helicopter activities, or explain why an update is not required.

IR 030 (DFO-12)

Applicable CEEA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.5 Species at risk and species of conservation concern; 6.1.6 Marine mammals

EIS Reference: 5.2.6 Marine Mammals

Context and Rationale: Sightings data of marine mammals presented and used in this document only includes data up to 2013 and does not include all available sightings data prior to 2013.

Specific Question or Request: Provide updated sightings data for the Scotian Shelf and Slope region and figures that incorporate all relevant sources (e.g. NEFSC, DFO, seismic survey data, NARWC data). For example, the North Atlantic Right Whale Consortium database (<http://www.narwc.org/index.php?mc=8&p=28>) is a source of whale sightings data for the Scotian Shelf region and would provide additional information not included in the document. Update the effects analysis, as applicable.

IR 031 (DFO-13)

Applicable CEEA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.5 Species at risk and species of conservation concern and 6.1.6 Marine mammals

EIS Reference: 5.2.6 Marine Mammals, p.5.121; Table 5.2.9, p.5.124; Table 5.2.10, p.5.125

Context and Rationale: Relatively little effort has been spent searching for marine mammals in the project area, thus reported sightings are sparse. The recent 2013 and 2014 seismic survey data from the area represent particularly important sources of information. Given northern bottlenose whales' affinity for deep water and that there are several northern bottlenose whale sightings near the project area, their potential for occurrence should be considered as "moderate". Risso's dolphins, Atlantic spotted dolphins and pantropical spotted dolphins were also reported during the 2014 seismic surveys indicating that these species also occur in the project area, yet they are not included in Table 5.2.9 or 5.2.10.

Specific Question or Request: Please update the potential for occurrence and species information. Update the effects assessment, as appropriate, or explain why no update is necessary.

IR 032 (DFO-16)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.5 Species at risk and species of conservation concern

EIS Reference: 5.2.6.4 Species at Risk and Species of Conservation Concern p 5.141

Context and Rationale: Sightings data of Sowerby's Beaked Whales presented in this document only includes data from 1998-2004. Updated and comprehensive sightings data for Sowerby's Beaked Whale on the Scotian Shelf and Slope region are available in DFOs Sowerby's Beaked Whale Management Plan and should be consulted.

Specific Question or Request: Summarize sighting data for the Sowerby's Beaked Whale on the Scotian Shelf and Slope region in DFOs Sowerby's Beaked Whale Management Plan. Update the effects assessment and proposed mitigation measures accordingly.

IR 033 (DFO-17)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.6 Marine mammals

EIS Reference: Figure 5.2.20 Seal Sightings on the Scotian Shelf and Slope, p.5.142

Context and Rationale: The DFO seal observations recorded on the Scotian Shelf and Slope mapped in Figure 5.2.20 are not an exhaustive map of all known sightings of seals in the region. Data from intensive seal surveys and tagging studies are not considered in this document.

Specific Question or Request: Summarize information available in the most up to date sightings data and indicate the source and limitations of the data. Update the effects assessment and proposed mitigation measures accordingly.

IR 034 (DFO-18)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.7 Marine turtles

EIS Reference: Figure 5.2.21 Sea Turtle Sightings on the Scotian Shelf and Slope (1911-2013) p5.144

Context and Rationale: More sea turtles sightings have occurred in the region than are represented in the map. For example, Figure 2 in James et. al. (2006), shows 851 Leatherback sea turtle sightings off Nova Scotia recorded between 1998-2005. (James, M.C., Sherrill-Mix, S.A., Martin, K. and Myers, R.A. (2006) Canadian waters provide critical foraging habitat for leatherback sea turtles. *Biol. Conserv.* 133: 347-357.) The Canadian Sea Turtle Network is a good reference for sea turtle sightings.

Specific Question or Request: Summarize the baseline information provided in the references cited above. Update the effects assessment and proposed mitigation measures accordingly.

IR 035 (DFO-19)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 3.1 Project components; 6.2 Predicted Changes to the Physical Environment

EIS Reference: 7.1.1.2 Underwater Sound; 7.1.3 Vertical Seismic Profiling; Figure 7.1.1 Sound Transmission Pathways and Sources of Sound Associated with a Drillship or Semi-submersible Drilling Vessel, p.7.6

Context and Rationale: Information regarding generated sound is incomplete.

Specific Question or Request: Update the description of underwater sound to include sound generated by the acoustic positioning (p. 7.6) and sounds from VSP activities. Update the assessment of effects as appropriate.

IR 036 (DFO-21)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.3.3 Marine mammals; 6.3.6 Federal species at risk

EIS Reference: 7.3.8.2 Mitigation of Project Related Environmental Effects, p.7.65

Context and Rationale: Present in the project area are deep-diving odontocete species that spend most of their time underwater, that may be quite difficult to detect when at the surface, and that can be acoustically detected as they regularly vocalize.

The use of passive acoustic monitoring (PAM) during good visibility conditions to increase the likelihood of detecting deep-diving cetaceans is recommended by DFO; however, concurrent visual and acoustic

monitoring would increase the probability of detection for many species, including beaked whales which are difficult to visually detect. DFO also recommends concurrent visual and acoustic monitoring for all VSP surveys. In addition, to increase the probability to accommodate deeper, longer diving behaviour, a pre-ramp up watch period of 60 minutes in deep water areas where beaked and other deep diving whales may be present is recommended by DFO.

Specific Question or Request: Consider the recommendations identified above, and describe whether and how such recommendations would be included in the mitigation measures and follow-up programs proposed. If the proponent does not believe additional mitigation and follow-up recommended by DFO is required, provide rationale.

IR 037 (DFO-22)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.3.3 Marine mammals; 6.3.6 Federal species at risk

EIS Reference: 7.3.8.2 Mitigation of Project Related Environmental Effects, p.7.66

Context and Rationale: Avoiding Critical Habitat and using shipping lanes during vessel transits is important mitigation. However, DFO has advised the Agency that additional measures could also be appropriate. For example, maintaining a watch for nearby marine mammals during vessel transits should be considered.

Specific Question or Request: Please advise whether additional mitigation measures, such as that suggested by DFO, have been considered and would be implemented. If not, provide rationale.

Marine Plants

IR 038

Applicable CEAA 2012 effect(s): 5(1)(a)(ii)

EIS Guidelines Reference: Part 2, 6.3.2 Marine Plants

EIS Reference: 7.2 Fish and Fish Habitat

Context and Rationale: The EIS Guidelines (section 6.3.2) require the proponent to assess the environmental effects of the Project on marine plants from routine operations and accidents and malfunctions. As defined in the *Fisheries Act*, marine plants³ includes all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae, and phytoplankton.

The EIS (section 5.2.1.2) describes phytoplankton as the base of the marine food web, influencing production of all higher trophic levels in an ecosystem. The section provides a description of the annual

³ The definition of environmental effects in section 5 of CEAA 2012 includes effects on aquatic species (sub-paragraph 5(1)(a)(ii)), as defined in subsection 2(1) of the *Species at Risk Act*. In the *Species at Risk Act*, aquatic species means a wildlife species that is a fish or a marine plant (as defined in section 47 of the *Fisheries Act*).

phytoplankton blooms in the project area. However, further on, the EIS (Table 6.2.1) describes how marine plants are not located in the Project Area (given water depth) and routine project activities are not predicted to interact with marine plants which occur in the nearshore. As such, marine plants were not identified as a stand-alone valued component, but addressed within the fish and fish habitat valued component where applicable. In the absence of comprehensive benthic survey data and considering that water depths in the project area vary from 100 metres to 3000 metres (page 2.1), it is not clear that this can be categorically stated. Also, some marine plants (e.g. phytoplankton) are known to be present at or near the sea surface as described in the EIS (section 5.2.1.2).

The project pathways identified for effects on the valued component fish and fish habitat from routine operations (section 7.2.8.1) does not appear to address project pathways for effects on the marine plant phytoplankton, specifically, such as changes in water quality as a result of waste management. The description of residual effects (7.2.8.3) and conclusions regarding significance (7.2.9) do not address effects on the marine plant phytoplankton.

With regard to effects from accidents and malfunctions, the EIS (section 8.5.1.1) describes how an oil spill or well blowout incident could result in reduced productivity and growth for phytoplankton and a change in community composition. It is not clear what the duration and level of residual effects could be to phytoplankton from a well blowout incident, nor how the conclusions regarding significance of adverse effects address potential effects on phytoplankton.

Specific Question or Request: Provide an assessment of potential adverse effects from both routine operations and from accidents and malfunctions to phytoplankton. Include in the accidents and malfunctions assessment consideration as to the applicability of the effects thresholds in Table 8.4.7 to phytoplankton.

Migratory Birds

IR 039 (ECCC-IR-05)

Applicable CEAA 2012 effect(s): 5(1)(a); 5(1)(b)(i)

EIS Guidelines Reference: Part 2, 3.1 Project Components (“In its EIS, the proponent will describe: helicopters, including routes, number and frequency of trips”); 6.4 Mitigation

EIS Reference: 2.4.5.2 Helicopter Traffic and Operations; 7.1.4.1 Helicopter Transportation; 7.4.8.2 Mitigation of Project-Related Environmental Effects; 7.4.8.3 Characterization of Residual Project-Related Environmental Effects; 7.5.8.2 Mitigation of Project-Related Environmental Effects; 13.2 Summary of Mitigation, Monitoring and Follow-up Commitments.

Context and Rationale: The text states that “...areas of high environmental sensitivity have been identified and will be avoided as the helicopter flight paths are determined by the helicopter operators.”

Text in 7.1.4.1 states that “helicopters.....will fly at altitudes greater than 300 metres and at a lateral distance of 2 kilometres around active bird colonies when possible (underlining added). Helicopters will

also avoid flying over Sable Island (“a 2-kilometre buffer will be recognized except...in the case of an emergency.”) The same text appears in other locations (e.g. page 7.111).

Additional clarity is needed to better understand the potential for adverse effects arising from project-related helicopter traffic.

Specific Question or Request: Specify all areas of high environmental sensitivity that have been identified in relation to helicopter flight paths and describe the factors that influence helicopter operators’ ability to avoid them. Describe the potential environmental effects associated with and anticipated frequency of situations where sensitive areas cannot be avoided.

IR 040 (ECCC-IR-07)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.3.5

EIS Reference: 7.4.8.2 Mitigation of Project-Related Environmental Effects; 7.4.8.3 Characterization of Residual Project-Related Environmental Effects; 10.2.1.1 Potential Residual Environmental Effects of Offshore gas Development Projects in the RAA; 10.2.5.1 Change in Risk of Mortality or Physical Injury

Context and Rationale: In section 7.4.8.2, the EIS states that “Seabird monitoring conducted as part of the SOEP and Deep Panuke EEM programs has shown little to no effect of flaring on birds transiting to and from Sable Island or the Scotian Slope (CNSOPB 2011; McGregor Geoscience Limited 2012). In 2012, only a single stranding (Leach’s Storm-petrel) was recorded during the Deep Panuke bird monitoring program, with the bird released unharmed (McGregor Geoscience Limited 2012).”

In Table 10.2.1, the EIS states that “Nocturnally migrating birds may be attracted and/or disoriented by artificial night lighting on the SOEP and Deep Panuke platforms, thereby increasing the risk of injury or mortality. However, EEM data for these projects indicate a very minor effect on migratory birds (ExxonMobil 2012, McGregor Geoscience Limited 2013)”.

The Sable Island Offshore Energy Project (SOEP) Environmental Effects Monitoring (EEM) was not designed to test for an effect of flaring on birds, so cannot be used to provide evidence of an effect or lack thereof.

Environment and Climate Change Canada does not agree with the proponent that it is possible to come to conclusions regarding EEM data for SOEP and Deep Panuke, since the data on bird strandings were not collected systematically and therefore cannot be used to measure effects of lights and flares on birds. Instead, stranded bird data are collected and reported opportunistically for these projects. In the absence of a program where stranded birds are searched for systematically, and reporting of stranded birds is complete, a conclusion that effect of lighting on migratory birds is low should not be made.

The interactions between flaring and migratory birds is simply not known beyond what is being monitored on the platforms and does in fact pose potential risks (Fraser et al. 2016 and Ronconi et al. 2015). Furthermore, while Leach’s Storm-Petrels may be one of the most numerous seabirds in the Northwest Atlantic, concern has been raised recently as to their status in Eastern Canada. Specifically,

many of the largest colonies are showing substantial population declines (Wilhelm et al. 2015; CWS, unpublished data). In addition, recent studies are revealing that adult survival is low for Leach's Storm-Petrels at breeding colonies in both Nova Scotia and Newfoundland (Fife et al. 2015; A. Hedd, unpublished data) which is also alarming as Leach's Storm-Petrels have long life spans but low reproductive rates, resulting in slow population recoveries. Finally, recent studies tracking foraging patterns of Leach's Storm-Petrels from breeding colonies in Nova Scotia and Newfoundland are showing foraging areas overlapping with current oil and gas production areas (Hedd et al. in revision). Hence, to adequately assess and address environmental effects, Environment and Climate Change Canada has advised that there is an urgent need for information on avian attraction and interaction with offshore platforms off Canada's east coast.

Specific Question or Request: In light of the comments above, discuss any changes to the information provided in the EIS regarding SOEP and Deep Panuke EEM data on bird strandings and mortality, describe how the information does or does not change the expected residual effects (direct and cumulative), and update the confidence with which conclusions are drawn, as appropriate (e.g. conclusions regarding residual cumulative change in risk of mortality or physical injury for migratory birds are made with "a high level of confidence" (section 10.2.5.1)).

IR 041

Applicable CEAA 2012 effect(s): 5(1)(a)(iii)

EIS Guidelines Reference: Part 2, 6.3.5 Migratory Birds; 6.5 Mitigation

EIS Reference: 7.4.8.3 Characterization of Residual Project-Related Environmental Effects

Context and Rationale: The text box on page 7.95 includes the following statement: "In consideration of mitigation, including efforts to reduce flaring..." Likewise, it is stated on page 7.97 that "...mitigation measures to limit flaring....will reduce potential effects."

In the discussion of mitigation (7.4.8.2 Mitigation of Project-Related Environmental Effects), there is no mention of flaring or any measures to reduce it.

Specific Question or Request: Describe specific mitigation measures that are being proposed to reduce flaring, the expected effectiveness of those measures, and the residual effects of flaring.

IR 042 (ECCC-IR-06)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.4 Mitigation; 6.6.3 Cumulative effects assessment; 8.2 Monitoring

EIS Reference: 7.4.8.2 Mitigation of Project-Related Environmental Effects; 7.4.10 Follow-up and Monitoring; 10.2.5.1 Change in Risk of Mortality or Injury; 12.2 Follow-up and Monitoring; 13.2 Summary of Mitigation, Monitoring and Follow-up Commitments

Context and Rationale: In sections 7.4.8.2, 10.2.5.1 and 13.2, the EIS states that “Routine checks for stranded birds will be conducted...” on the MODU and PSVs, and that “...appropriate procedures for release will be implemented. If stranded birds are found during routine inspections, they will be handled using the protocol outlined in *The Leach’s Storm Petrel: General Information and Handling Instructions* (Williams and Chardine 1999), including obtaining the associated permit from CWS. Activities will comply with the requirements for documenting and reporting any stranded birds (or mortalities) to CWS during the drilling program.” The “Williams and Chardine protocol” is also mentioned in section 7.4.10. The carrying out of routine checks for stranded birds or bird mortality on the MODU and PSVs in mentioned in Table 12.2.1.

Williams and Chardine (1999) is specific to storm-petrels, and due to a better understanding of bird strandings at sea since 1999, ECCC now expects such protocols to be applicable for other species of seabirds and for other bird groups. It has advised that the proponent should develop a similar-type protocol for birds other than storm-petrels which may become stranded on vessels. ECCC has further advised that the proponent should be prepared to conduct systematic checks for stranded birds, rather than only checking birds found when conducting routine checks for facility operations.

ECCC has been preparing a protocol for handling stranded birds that expands on Williams and Chardine (1999) and that includes all bird groups. ECCC is prepared to provide its draft for use by the proponent upon request.

Specific Question or Request: Based on the advice from ECCC, advise whether a protocol for handling stranded birds that expands on Williams and Chardine (1999) and includes all bird groups would be developed. Clarify if the protocol would be based on ECCC’s draft protocol, and whether ECCC would be consulted in its development. Clarify if and how this would be implemented as mitigation.

IR 043 (ECCC-IR-03)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.1.4 Migratory birds and their habitat; 6.3.5 Migratory birds; 6.4 Mitigation; 6.6.1 Effects of potential accidents or malfunctions; 6.6.3 Cumulative effects; 8.2 Monitoring

EIS Reference: 5.2.8 Migratory Birds; 7.4 Migratory Birds; 8.5.3 Migratory Birds; 10.0 Cumulative Effects; 12.2 Follow-up and Monitoring

Context and Rationale: Two species of Globally Endangered (IUCN Red List) seabirds, the Bermuda Petrel and Black-capped Petrel, both protected under the *Migratory Birds Convention Act*, have been observed in slope waters off Nova Scotia. Both species have very small global population sizes and restricted ranges, so are extremely vulnerable; however, neither species is mentioned in the EIS.

Specific Question or Request: Describe the use of the assessment area by migratory birds with IUCN Red List rarity ranks. Describe the potential effects of the Project on these species, including effects of accidents and cumulative effects, as well as measures to mitigate effects, and any follow-up monitoring proposed.

IR 044 (ECCC-IR-04)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds; SARA 79(2) Species at risk

EIS Guidelines Reference: Part 2, 6.1.5 Species at risk and species of conservation concern; 6.3.6 Federal species at risk; 6.4 Mitigation; 6.6.1 Effects of potential accidents or malfunctions; 6.6.3 Cumulative effects assessment; 8.2 Monitoring

EIS Reference: 6.0 Environmental Effects Assessment and Methods; 7.0 Environmental Effects Assessment; 8.0 Accidental Events; 10.0 Cumulative Effects; 12.2 Follow-up and Monitoring

Context and Rationale: Under sub-section 79(2) of the *Species at Risk Act* (SARA), the Agency must ensure that adverse effects on all listed species are identified. This includes species of special concern and the critical habitat of extirpated, endangered and threatened species. If the Project is carried out, the Agency must ensure that measures are taken to avoid or lessen those effects and to monitor them. These measures must:

- be consistent with best available information including any Recovery Strategy, Action Plan or Management Plan in a final or proposed version; and
- respect the terms and conditions of the SARA regarding protection of individuals, residences, and critical habitat of extirpated, endangered, or threatened species.

The Agency relies on information from the proponent to carry out these responsibilities.

For species which are not yet listed under SARA, but have been assessed and designated by COSEWIC, it is best practice to consider these species in EA as though they were listed under SARA.

ECCC has advised that Eastern Lilaopsis (SARA-listed, Special Concern), Buff-breasted Sandpiper (COSEWIC, Special Concern), Bank Swallow (COSEWIC, Threatened), Sable Island Sweat Bee (COSEWIC, Threatened), and Eastern Baccharis (COSEWIC, Threatened) are not assessed in the EIS, but require consideration.

Specific Question or Request: Describe the use of the assessment area by Buff-breasted Sandpiper and Bank Swallow, and the presence in the assessment area of Eastern Lilaopsis, Sable Island Sweat Bee, and Eastern Baccharis. Identify the potential effects of the Project on these species, including effects of accidents and cumulative effects, as well as measures to mitigate effects, and any follow-up monitoring proposed.

IR 045 (ECCC-IR-08)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects

EIS Reference: 7.4.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance

Context and Rationale: The EIS states that “for the purposes of this effects assessment, a significant adverse residual environmental effect on Migratory Birds is defined as a project-related environmental effect that:

- causes a decline in abundance or change in distribution of migratory birds, within the RAA, such that natural recruitment may not re-establish the population(s) to its original level within one generation;
- jeopardized the achievement of self-sustaining population objectives or recovery goals for listed (SAR) species; or
- results in permanent and irreversible loss of critical habitat as defined in a recovery plan or an action strategy for a listed (SAR) species.”

Additional information on the choice of thresholds is required.

Specific Question or Request: Provide a rationale for the use of these significance thresholds for Migratory Birds proposed in the EIS, including information on why effects less than the threshold described would not be considered significant by the proponent.

For the third bullet, clarify what is meant by “permanent and irreversible loss of critical habitat”.

Describe how an effect that resulted in the abandonment or nesting failure of a migratory bird species at risk or seabird or waterbird colony would be considered in light of these significance thresholds.

IR 046 (ECCC-IR-09)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects

EIS Reference: 6.2.5 Assessment of Project-Related Environmental Effects; 7.4.8.3 Characterization of Residual Project-Related Environmental Effects; 7.4.9 Determination of Significance; 8.5.3.3 Characterization of Residual Project-Related Environmental Effects; 8.5.3.4 Determination of Significance; 8.5.4.3 Characterization of Residual Project-Related Environmental Effects; 8.5.4.4 Determination of Significance; 10.2.5.1 Change in Risk of Mortality or Injury; 10.2.5.3 Summary of Cumulative Environmental Effects on Migratory Birds

Context and Rationale: In Table 6.2.2, the EIS states that reversibility of residual environmental effects “Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases”. It then defines “Reversible” as “will recover to baseline conditions before or after project completion (well abandonment).”

Based on this definition, ECCC has advised that it is not clear how the proponent then comes to conclusions regarding reversibility of residual environmental effects and cumulative effects on birds and special areas.

The proponent states that the effects on migratory birds due to the presence and operation of the MODU, waste management, and supply and service operations would be reversible.

The proponent states that the effects on migratory birds and special areas of each of its modelled spill scenarios (i.e. 10-barrel diesel spill, 100-barrel diesel spill, PSV diesel spill, well blowout incident, SBM spill) would be reversible.

The proponent states that the cumulative effects on migratory birds due to a change in risk of mortality or physical injury would be reversible.

Seabirds have long life spans and low reproductive rates. For instance, Leach's Storm-Petrels may be one of the most numerous seabirds in the Northwest Atlantic; however, concern has been raised recently as to the species' status in Eastern Canada. Specifically, many of the largest colonies are showing substantial population declines (Wilhelm et al. 2015; CWS, unpublished data). In addition, recent studies are revealing that adult survival is low for Leach's Storm-Petrels at breeding colonies in both Nova Scotia and Newfoundland (Fife et al. 2015; A. Hedd, unpublished data) which is also alarming as Leach's Storm-Petrels have long life spans but low reproductive rates, resulting in slow population recoveries.

Globally Endangered (IUCN Red List) seabirds, the Bermuda Petrel and Black-capped Petrel, both protected under the *Migratory Birds Convention Act*, have been observed in slope waters off Nova Scotia. Both species have very small global population sizes and restricted ranges, so are extremely vulnerable.

Specific Question or Request: Clarify whether and how the conclusions described above considered the life history of seabirds. Explain how effects of spills on migratory birds, including bird species at risk and their critical habitat, and special areas, including important bird areas, would be reversible (i.e. would "recover to baseline conditions before or after project completion (well abandonment)").

IR 047 (ECCC-IR-10)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.5.3.1 Project Pathways for Effects

Context and Rationale: As stated in the subsection on effects of SBM spills, O'Hara and Morandin (2010) showed effects of sub-visible sheens on the microstructure of feathers of pelagic seabirds. ECCC has advised that this provides a plausible link between operational discharges of hydrocarbons and increased seabird mortality.

Specific Question or Request: Clarify if the results of O'Hara and Morandin (2010) were considered in the analysis of effects of hydrocarbons on migratory birds. If not, provide updated analysis as necessary.

IR 048 (ECCC-IR-13)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.1.4 Migratory birds and their habitat

EIS Reference: 5.2.8.2 Seasonal Distribution of Migratory Birds in Association with the Scotian Shelf and Slope

Context and Rationale: The EIS states that “information on the distribution and abundance of marine birds in association with the Scotian Shelf and Slope was primarily obtained from the PIROP (Programme Intégré de recherches sur les oiseaux pélagiques) and ECSAS (Eastern Canada Seabirds at Sea) databases.” Because the ECSAS program is ongoing, it is not clear what years were included in the data summary.

Note that Environment and Climate Change Canada’s Canadian Wildlife Service (CWS) should be referenced as the source for these databases.

Specific Question or Request: Clarify the years encompassed in the data summary, and when the ECSAS data was accessed.

Special Areas

IR 049

Applicable CEAA 2012 effect(s): 5(1)(a), 5(1)(b), 5(2)(a)

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects

EIS Reference: 7.5.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance

Context and Rationale: The EIS states that “A significant adverse residual environmental effect on special areas is defined as a project-related environmental effect that:

- alters the valued habitat physically, chemically or biologically, in quality or extent, to such a degree that there is a decline in abundance lasting more than one generation of key species (for which the Special Area was designated) or a change in community structure, beyond which natural recruitment (reproduction and immigration from unaffected areas) would not sustain the population or community in the special area and would not return to its original level within one generation; or
- results in permanent and irreversible loss of critical habitat as defined in a recovery plan or an action strategy.”

Additional information on the choice of thresholds is required.

Specific Question or Request: Provide a rationale for the use of these significance thresholds for special areas proposed in the EIS, including information on why effects less than the threshold described would not be considered significant by the proponent.

Species at Risk

IR 050

Applicable CEAA 2012 effect(s): 5(1); 79(2) - *Species at Risk Act*

EIS Guidelines Reference: Part 2, 6.3.6 Federal species at risk; 6.4 Mitigation

EIS Reference: Table 6.2.1 Selection of Valued Components

Context and Rationale: Effects on species at risk have been assessed by the proponent within other more general valued components. For example, effects on fish species at risk have been analyzed in the context of effects on fish in general, and likewise for marine mammals, sea turtles and migratory birds. There is no stand-alone section containing an analysis of species at risk.

The Agency is the responsible authority for the environmental assessment of the Project and therefore must identify the adverse effects of the Project on listed wildlife species and their critical habitat and, if the Project is carried out, and must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be consistent with any applicable recovery strategy and action plans. Furthermore, in recognition of the potential risks to COSEWIC species, the Agency requires the assessment of effects on these species as well, considering what adverse effects could occur and what measures could be taken to avoid or lessen effects.

Specific Question or Request: Provide a stand-alone assessment of effects on species at risk and species listed by COWESIC, drawing on information regarding these species included in the fish and fish habitat, marine mammals and sea turtles, and migratory birds valued component assessments. The analysis must:

- identify the adverse effects of the Project on species and their critical habitat;
- describe measures that would be taken to avoid or lessen effects; and
- describe measures to monitor effects, including whether adjustments would be made to mitigation measures, if needed.

The summary should clearly identify for which species there exist recovery strategies or action plans, including critical habitat and how these have been incorporated into the assessment. A summary table should also be provided, similar to what has been provided for valued components (e.g. Table 7.2.6).

IR 051 (DFO-10)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.4 Mitigation

EIS Reference: 5.2.6.4 Species at Risk and Species of Conservation Concern, p.5.140

Context and Rationale: DFO has noted that habitat in the project area is important to the Northern Bottlenose Whale. Specifically, DFO has advised with increasing confidence that Logan Canyon on the east side of the project area is important to Northern Bottlenose Whales.

Specific Question or Request: Taking into consideration the advice from DFO, describe whether additional mitigation measures for the Bottlenose Whale should be applied in Logan Canyon. Update the effects assessment as appropriate.

Commercial Fisheries

IR 052

Applicable CEAA 2012 effect(s): 5(1)(c), 5(2)(b)

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects

EIS Reference: 7.5.5 Criteria for Characterizing Residual Environmental Effects and Determining Significance

Context and Rationale: The EIS states that “For the purposes of this effects assessment, a significant adverse residual environmental effect on Commercial Fisheries is defined as a project-related environmental effect that results in one or more of the following outcomes:

- local fishers being displaced or unable to use substantial portions of the areas currently fished for all or most of a fishing season;
- local fishers experiencing a change in the availability of fisheries resources (e.g. fish mortality and/or dispersion of stocks) such that resources cannot continue to be used at current levels within the RAA for more than one fishing season; or
- unmitigated damage to fishing gear.”

Additional information on the choice of thresholds is required.

Specific Question or Request: Provide a rationale for the use of these significance thresholds for Commercial Fisheries proposed in the EIS, including information on why effects less than the threshold described would not be considered significant by the proponent.

IR 053

Applicable CEAA 2012 effect(s): 5(1)(a)(i); 5(1)(a)(ii)

EIS Guidelines Reference: Part 2, 6.3.9 Commercial Fisheries

EIS Reference: Table 3.4.1 Summary of Key Issues Raised During Public Stakeholder Engagement, p. 3.12

Context and Rationale: The response to concerns raised about possible effects on the fishing industry includes the statement that “For the most part, effects on the fishery will be limited to a 500-metre safety (exclusion) zone from the MODU.....”

Specific Question or Request: Explain why the qualifier “for the most part” was used. Are there effects that may extend beyond the safety zone?

IR 054

Applicable CEAA 2012 effect(s): 5(1)(b)(i); 5(1)(c); 5(2)(a)

EIS Guidelines Reference: Part 2, 6.3.9 Commercial Fisheries - “The proponent is to assess the environmental effects of the Project from routine operations and accidents and malfunctions on... commercial fisheries, including.....effects from subsea infrastructure that could be left in place (e.g. wellheads) following abandonment”.

EIS Reference: 2.4.4 Well Abandonment; Table 3.4.1, page 3.17; page 7.42 Well Abandonment; 2.4.4 Well Abandonment; 7.5.8.3 Characterization of Residual Project-Related Environmental Effects

Context and Rationale: The EIS (page 7.115) states “...all wells drilled as part of the Project will be abandoned.” This implies that there is no possibility that a well could be suspended for later re-entry. Furthermore, the EIS states (section 2.4.4) “It is possible that subsea infrastructure could be removed... Alternatively, approval may be sought to leave the wellhead in place.” The EIS (page 7.43) states that “following abandonment of the drill site, it is anticipated that the wellhead (if left in place), will provide hard substrate suitable for recolonization by benthic communities.” In Table 3.4.1 it is stated that “inspection and monitoring of abandoned wellheads will be conducted according to CNSOPB requirements.”

It is unclear what subsea infrastructure would remain after decommissioning, and how that could affect commercial fisheries.

Specific Question or Request: Confirm whether or not all wells will be abandoned (and not suspended) at the end of drilling or testing operations and whether or not abandoned wells are monitored. Describe potential effects on commercial fisheries (e.g. risk of fishing gear damage). Clarify what would be the worst-case scenario for effects of sub-sea infrastructure (e.g. all seven wells drilled, and then abandoned with wellheads left in place) and discuss whether or not this would change the analysis of potential effects on commercial fisheries. Provide updated analysis of effects on commercial fishing, as necessary.

Special Areas

IR 055 (DFO-03)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.1.8 Special areas

EIS Reference: 5.2.10 Special Areas, p.5.207

Context and Rationale: Special areas within an approximate 300-kilometre radius are described in the EIS but do not include two new areas that were recently established. Under federal objectives, additional protected areas such as fishery closure areas, Critical Habitat, Marine Protected Areas or related Areas of Interest may be identified during the life of the Project. Two new Sensitive Benthic Areas, the Corsair and Georges Canyons Conservation Area (9106 square kilometres) and the Jordan Basin Conservation Area (49 square kilometres), have recently been established and are closed to

bottom contact fishing. These coral communities qualify for protection under DFO's *Policy for Managing the Impact of Fishing on Sensitive Benthic Areas*. DFO has advised that there will likely be other special areas identified over the life of the Project.

Specific Question or Request: Assess potential effects of the Project on Corsair and Georges Canyons Conservation Area and the Jordan Basin Conservation Area and describe any measures that would be implemented to mitigate these effects. Should new special areas be identified during the lifetime of the Project, describe how potential effects of the Project on these areas would be considered and mitigated, as appropriate.

IR 056 (ECCC-IR-12)

Applicable CEAA 2012 effect(s): 5(1)(a)(iii) Migratory Birds

EIS Guidelines Reference: Part 2, 6.1.8 Special areas

EIS Reference: 5.2.8.3 Areas of Significance to Migratory Birds

Context and Rationale: The EIS guidelines require that the EIS describes special areas, including Migratory Bird Sanctuaries, "at the project site and within areas that could be affected by routine operations or accidents and malfunctions", as well as describe the distances between the edge of the project and special areas, and provide the rationale for the designation of the area as "special".

While Sable Island Migratory Bird Sanctuary is mentioned, other Migratory Bird Sanctuaries that may be affected in the event of accidents or malfunctions are not included in the EIS.

Specific Question or Request: Describe all Migratory Bird Sanctuary that could be affected by the Project, and the potential associated effects.

Cumulative Effects

IR 057

Applicable CEAA 2012 effect(s): 5(2)(a); 5(2)(b)(i)

EIS Guidelines Reference: Part 2, Cumulative effects assessment

EIS Reference: 10.2.7.1 Change in Availability of Fisheries Resources

Context and Rationale: When considering the cumulative effects on commercial fisheries, the EIS (section 10.2.7.1) describes how platform supply vessels (PSVs) will use existing shipping routes when travelling between the MODU and the supply base in Halifax Harbour, and how the project supply vessels are a minor component of the total marine traffic in the RAA. Although it is clear that the PSVs will make two or three round trips per week between the MODU and the supply base, it is not clear how much traffic there is currently in the shipping routes and in the LAA.

Specific Question or Request: Generally estimate the quantity of marine traffic currently using the shipping routes and marine areas in the LAA, further refining the description of the PSVs as a minor contribution.

Provide a map or maps showing relevant existing shipping routes in the project area, indicating which ones will be used by project vessels. Explain if and how these routes are regulated.

IR 058

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat

EIS Guidelines Reference: 6.6.3 Cumulative effects assessment

EIS Reference: 10.2.4 Assessment of Cumulative Environmental Effects on Marine Mammals and Sea Turtles; 10.2.6 Assessment of Cumulative Environmental Effects on Special Areas

Context and Rationale: Further information is required to support the assessment of cumulative effects on marine mammals due to underwater noise.

To describe the environmental effects of mortality or injury from underwater sound on marine mammals, the EIS (section 10.2.4.1) refers to the cumulative effects assessment for underwater sound for fish. To describe the environmental effects on habitat quality and use from underwater sound on marine mammals, the EIS (section 10.2.4.2) describes how in the winter the underwater noise from the MODU could exceed the behaviour threshold for continuous noise at distances of up to 150 kilometres, and that this noise could interact cumulatively with noise from other projects and activities. The EIS (section 10.2.6.1) also describes how the frequency of the noise from the Project only partially overlaps with the range of hearing frequencies for northern bottlenose whale (and other odontocetes), suggesting effects of masking from the Project may be of lesser concern when compared to baleen whales, but may still cause a reaction.

However, there does not seem to be an analysis of the effects of noise on the different types of marine mammals (e.g. mysticetes, odontocetes), including species at risk, that could occur in the area that would be affected by the Project, or information about the underwater noise injury thresholds most appropriate for those species, the areas over which those thresholds may be exceeded, for how long, and the importance of the timing of any such exceedances.

Specific Question or Request: Please augment the assessment of cumulative effects of underwater noise to marine mammals by considering:

- the marine mammal types expected to occur in the area to be affected by the Project, including species at risk;
- estimations of the cumulative underwater noise, considering how different noise sources may act additively;
- estimations of the frequency (Hz) of that noise, comparison with the hearing ranges of marine mammals expected in the area to be affected by the Project;

- the underwater noise injury, behaviour change, and masking thresholds for those mammals, where available;
- the areas over which those thresholds may be exceeded including any critical habitats and migratory routes;
- for how long those thresholds may be exceeded;
- the importance of the timing of any such exceedances relative to marine mammal and turtle use of affected areas;
- the availability of suitable alternative habitat; and
- mitigation measures that could reduce the cumulative effect.

IR 059 (CNSOPB-4)

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.6.3 Cumulative effects assessment

EIS Reference: 10 Cumulative Effects

Context and Rationale: Consideration of the decommissioning of the Sable Offshore Energy Project (SOEP) in the cumulative effects section of the EIS is limited. The EIS states that the effects of decommissioning will be similar to those generated by current production activities; however, the activities and equipment associated with plugging and abandoning of wells is more like exploratory drilling. Furthermore, plugging and abandonment activities may overlap temporally with continued operation of the SOEP and the Project.

Specific Question or Request: Update the cumulative environmental effects analysis to consider SOEP decommissioning activities in light of the above comments.

Accidents and Malfunctions

IR 060 (DFO-06)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects; 6.6.1 Effects of potential accidents and malfunctions

EIS Reference: 8.5.1.1 Project Pathways for Effects; 8.1.5.3 Characterization of Project Related Environmental Effects, p.8.99; 11.4 Summary, p.11.14; 8.5.1.4 Determination of Significance

Context and Rationale: DFO has advised the Agency that there are many unknown or poorly understood variables in assessing effects on fish and fish habitat from a spill event, including exact drilling location, species impacted, trajectory of oil, etc. There are also a number of species at risk that are known to occur in the area; for some species, the death of one individual could cause a population level effect.

Specific Question or Request: In light of advice from DFO, reconsider the assessment of effects on fish and fish habitat from a blowout, taking into consideration proximity of the Haddock Box and other spawning areas in the RAA and the adverse impacts of major releases on fish eggs and larvae.

IR 061

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.5 Significance of residual effects; 6.6.1 Effects of potential accidents and malfunctions

EIS Reference: 8.5.1.1 Project Pathways for Effects; 8.1.5.3 Characterization of Project Related Environmental Effects, p.8.99; 11.4 Summary, p.11.14; 8.5.1.4 Determination of Significance

Context and Rationale: The EIS describes the potential effect of a well blowout incident on fish and fish habitat as a moderate magnitude effect (sections 8.5.1.3, 8.5.1.4). A moderate magnitude effect is defined (Table 7.2.2) as a measurable change in marine species populations that does not pose a risk to population viability. The residual effect is described as not significant (section 8.5.1.4) as it does not exceed the proponent's significance thresholds:

- an effect that causes a significant decline in abundance or change in distribution of fish populations with the RAA, such that natural recruitment may not re-establish the population(s) to its original level within one generation.
- an effect that results in permanent and irreversible loss of critical habitat as defined in a recovery plan or an action strategy.

The EIS does not consider the residual effects of an accidental event in relation to the third significance threshold identified by the proponent: an effect that jeopardizes the achievement of self-sustaining population objectives or recovery goals for listed species.

Specific Question or Request: For fish and fish habitat, marine mammals and turtles, including species at risk and species of conservation concern, describe the magnitude and significance of residual environmental effects of a blowout, taking into consideration population viabilities and whether such events may or may not jeopardize the achievement of a self-sustaining population objectives or recovery goals.

IR 062 (CNSOPB-5)

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: Table 8.4.2 Modelled Scenarios; 8.5 Environmental Effects Assessment

Context and Rationale: Table 8.4.2 of the EIS notes that the modelled flow rate of oil released to the marine environment during the blowout scenarios would decline over the duration of the 30-day

release. There was no rationale provided for the declining flow rate in either the main EIS document or the corresponding technical report included as Appendix H. Although the decline is not necessarily significant, please provide a rationale for the decline, particularly given that the EIS states that the flow rates used were the worst-case credible discharge (section 8.5).

Specific Question or Request: Provide rationale for using a declining flow rate in the modelling of the two blowout scenarios, or update the analysis to reflect how using a constant flow rate would alter spill modelling results.

IR 063 (ECCC-IR-19)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species; 5(1)(a)(iii) Migratory Birds; 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 6.6 Other effects to consider; 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.0 Accidental Events; 8.3.1 Incident Management Plan and Spill Response Plan; 8.3.3 Response Strategies

Context and Rationale: The *Canadian Environmental Assessment Act, 2012* requires that all designated projects consider “the environmental effects of the designated project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project” (subsection 19(1)(a)). ECCC’s Environmental Emergencies Program assists EA reviews by providing preparedness and response planning advice in relation to federal interests under the *Canadian Environmental Protection Act* (CEPA 1999), the pollution prevention provisions of the *Fisheries Act*, and the *Migratory Birds Convention Act 1994* (MBCA). Questions, comments and recommendations are developed with a view to optimizing Emergency Response and Spill Contingency Plans for plausible accidents and malfunctions to help ensure that preparedness planning abilities and response capabilities are commensurate with the project’s environmental risks. Preparedness for environmental emergencies (including spills) is a critical pre-requisite to rapid and effective response to an incident.

The EIS Guidelines state: “the EIS will describe the safeguards that have been established to protect against such occurrences and the contingency and emergency response procedures in place if such events do occur.” The Guidelines also state that: “based on the results of the spill modelling and analysis in the EIS, an emergency response plan for spills (small and large) and blowouts will be required. At a minimum, an outline of the emergency response plan along with key commitments is required in the EIS.”

Section 8.0 of the EIS, however, provides: “details about environmental management measures which will be put in place will be submitted in the Environmental Protection Plan (EPP). The Safety Plan, Incident Management Plan (IMP), Spill Response Plan (SRP) and EPP will be submitted to the CNSOPB as part of the Operations Authorization (OA) process.” Section 8.3.1 also provides: “the Project will operate under an IMP to define the response to incidents. The IMP will be a comprehensive document including

practices and procedures for responding to an emergency event. The IMP will include, or reference, a number of specific contingency plans for responding to specific emergency events, including potential spill or well control events. The IMP and supporting specific contingency plans, such as the SRP will be aligned with applicable regulations, industry practice and BP standards and will include response scenarios, strategies and capabilities. These plans will be submitted to the CNSOPB prior to the start of any drilling activity as part of the OA process.”

Section 8.3.3 of the EIS states: “the IMP and SRP will include information about well control response strategies to set out measures to stop the flow of oil, and spill response tactics to manage any released oil.” It is understood that the IMP and the SRP will also include a description of the proponent’s Incident Command System (ICS) structure as well as management details respecting recovered oil spill response waste.

Although the IMP, SRP and EPP may not yet be fully developed, outlines of the IMP, SRP, and EPP, as well as an accounting of key commitments, is required to inform the effects assessment.

Specific Question or Request: Provide outlines of each of the IMP, SRP, and EPP and an accounting of key commitments, including those related to incident prevention, emergency preparedness, mitigation, and follow-up. Include the following, as applicable:

- a commitment for a quantitative hazard identification and risk assessment that would address the full range of hazards;
- a commitment to account for plausible worst-case spill scenarios in plans and to include placeholders for detailed spill response strategies for each accident and malfunction type;
- plans to identify and consider contributing and complicating factors such as weather conditions and sea states;
- a commitment to identify other site-specific conditions and sensitivities (e.g. special areas);
- a commitment to identify oil spill response equipment, their locations, including resource mobilization procedures and estimated response times;
- a commitment to include subsea well head blowout counter measures such as the utilization of a capping stack, the drilling of a relief well and the use of dispersants, including their respective probabilities of success;
- a commitment to develop an oil spill response waste management plan and consider associated handling capacities;
- a commitment to identify oil spill response personnel, their roles and responsibilities, including response training and exercise regimes;
- a commitment to identify mutual aid agreements with other operators;
- a commitment to identify and describe the Incident Command System (ICS) structure including alignment with federal and provincial level regulators; and
- a commitment to identify reporting procedures to regulators and alerting procedures for affected stakeholders.
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IR 064

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.0 Accidental Events

Context and Rationale: It is not clear whether and how federal experts would be involved in developing and implementing emergency preparedness and response plans.

Specific Question or Request: Describe if, when, and under what circumstances the proponent may consult with experts in Environment and Climate Change Canada (including the Canada Wildlife Service), Fisheries and Oceans Canada, Transport Canada, and Health Canada in developing and implementing emergency preparedness and response plans, including both prior to and during an incident. Describe the subject areas where expertise from these departments would be sought.

IR 065

Applicable CEAA 2012 effect(s): 5(1)(a); 5(1)(b)(i); 5(1)(c); 5(2)(a); 5(2)(b)

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: Table 1.5.2 Summary of Key Relevant Federal Legislation

Context and Rationale: Table 1.5.2 provides a summary of key relevant federal legislation. The final row of the table discusses the use of spill-treating agents in the context of the proposed *Regulations Establishing a List of Spill-treating Agents*, and indicates that “upon the coming into force of the Regulations, the CNSOPB will be able to authorize the use of one or more of the spill-treating agent products listed in the proposed Regulations under the conditions described above to respond to an oil spill” (underlining added). However, it is unclear where those conditions are described.

Specific Question or Request: Describe the conditions under which the spill-treating agents specified in the proposed regulations might be used.

IR 066 (DFO-26)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.4 Spill Fate and Behaviour, p.8.44; Appendix H Oil Spill Trajectory Modelling

Context and Rationale: Subsea oil release fate and behaviour may be influenced by chemical dispersants.

Specific Question or Request: Taking into consideration the spill fate and behaviour modelling results described in the EIS (section 8.4), discuss how the potential use of dispersants may change how far oil may travel from a blowout location, how oil would move in the water column, or could affect shorelines.

If dispersants were employed to mitigate a subsea spill, discuss how these might influence the fate and behaviour of the subsea oil. Discuss if there are past examples of when dispersants have been used to mitigate a subsea spill and how these examples would be used in the analysis.

IR 067

Applicable CEAA 2012 effect(s): 5(1)(a); 5(1)(b)(i); 5(1)(c); 5(2)(a); 5(2)(b)

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.1.3.2 Dropped Objects

Context and Rationale: The section on potential accidental risk scenarios describes the marine riser-loss incident at Shell's Cheshire L-97 well site, stating that no drilling fluid was released during the incident. A report by the Canada-Nova Scotia Offshore Petroleum Board states that BOP control fluid was released (<http://www.cnsopb.ns.ca/sites/default/files/pdfs/droppedriserreportssummary.pdf>).

It is not clear that the potential spill scenarios described in 8.2 included the possibility of a marine riser-loss and associated effects.

Specific Question or Request: Comment on the probability for a marine riser-loss as part of the Project and assess the potential for associated environmental effects (e.g. release of BOP control fluid).

IR 068

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.2.3 Well Blowout Incident

Context and Rationale: This section, on page 8.18, discusses the Uniacke G-72 incident that occurred in the Nova Scotia offshore in 1984. However, there was also a subsurface blowout that occurred at Mobil's West Venture N-91 exploratory gas well in April 1985. The Agency understands that the N-91 incident did not lead to the release of any hydrocarbons to the marine or atmospheric environment because it was contained underground, but it nonetheless provides historical context.

Specific Question or Request: Comment on the possibility of an incident similar to the April 1985 subsurface blowout that occurred at Mobil's West Venture N-91 exploratory gas well occurring during the Project and the likelihood of it leading to a spill or other release.

IR 069

Applicable CEAA 2012 effect(s): 5(1)

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.4.7.2 Oil Fate Results, Figures showing dispersed and dissolved oil concentration in water column.

Context and Rationale: The EIS (section 8.4.6) identifies thresholds that were used in describing the extent of surface oil (0.04 micrometers), shoreline oil (1.0 grams per square metre), and water column oil (58 parts per billion) effects from a potential well blowout scenario. The in-water oil concentration threshold was chosen drawing on studies of the "no observed effect threshold" for acute exposure developed by the Norwegian Oil Industry Association. It is not clear the 58 parts-per-billion threshold is relevant to species that could be affected by the Project off the coast of Nova Scotia, or how it relates to potential chronic effects following a well blowout scenario. Table 8.4.7 refers to this threshold as "In-Water Concentration (dissolved and entrained, top 100 metres);" it is not clear if the modelling results reflect exceedances of 58 parts per billion only in the top 100 metres or throughout the water column.

The EIS (section 8.4.8) also provides the outputs of deterministic modelling work done to estimate the mass balance distribution of oil following a well blowout scenario, and how the oil would change phases over time (e.g. more evaporates, biodegrades, lands as sediment with time; less on surface or dispersed with time). Although potential effects from surface oil, water column oil, and shoreline are discussed, it is not clear what the potential effects would be to benthic communities in areas potentially affected by a well blowout.

Specific Question or Request: Discuss how the 58 parts per billion in-water concentration threshold developed in Norway is relevant in assessing potential effects on fish in the areas potentially affected by a well blowout. Discuss how this threshold relates to potential chronic effects. Explain how the threshold does or does not apply for only the top 100 metres of the water column, and whether potential effects throughout the water column have been illustrated in the figures provided.

Provide an assessment of the potential effects on benthic communities – the extent, magnitude, timing, frequency, duration, and reversibility of the effect.

IR 070

Applicable CEAA 2012 effect(s): 5(1)

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: Figures 8.4.17 and 8.4.19

Context and Rationale: These figures are difficult to understand. Many of the dots showing shoreline oiling are located in the ocean, far from shore.

Specific Question or Request: Provide text to explain Figures 8.4.17 and 8.4.19 (e.g. why dots showing shoreline oiling are located in the ocean, far from shore) and/or provide revised or additional figures, as appropriate.

IR 071

Applicable CEAA 2012 effect(s): 5(1)

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.4.10 SBM spill

Context and Rationale: It is noted here that the synthetic-based mud (SBM) dispersion modeling that was done for the Shelburne Basin Venture Exploration Drilling Project is “considered valid to inform the assessment for the Project.” Therefore, project-specific dispersion modeling was not conducted.

Specific Question or Request: Provide further rationale that the modelling of an SBM full riser spill done for the Shelburne project is an adequate proxy for the Scotian Basin project, considering similarities or differences in site morphologies, prevailing ocean current speeds and directions in both locations, and similarities or differences in the type of SBM modelled and the SBM likely to be used for the Scotian Basin project.

IR 072

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.3.3.3 Oil Spill Tactical Response Methods

Context and Rationale: The EIS Guidelines (6.6.1) require that the environmental effects from emergency response burns should be considered in the assessment of effects from potential oil spills and blowouts.

In the EIS (section 8.3.3.3), the controlled in-situ burning of oil on the water surface is identified as a possible response to an oil spill. The proponent commits to not do in-situ burning without prior regulatory approval. However, the environmental effects described do not include the effects from potential burning.

Specific Question or Request: If in-situ burns of oil on the water surface is under consideration as a possible response to an oil spill, then describe the potential for associated environmental effects on valued components. Clarify how potential residual environmental effects are considered in the overall characterization of residual effects (magnitude, duration, timing, reversibility, etc.) and significance determinations.

IR 073

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.4 Mitigation

EIS Reference: 8.3.3.3 Oil Spill Tactical Response Methods; 8.5.3 Migratory Birds

Context and Rationale: The EIS Guidelines (section 6.4) require that where mitigation measures are proposed with which there is little experience, or for which there is some question as to their effectiveness, the potential risks and effects on the environment should those measures not be effective be clearly and concisely described, and the extent to which the measure would help mitigate environmental effects be identified.

The EIS (section 8.3.3.3) describes the recent (2016) listing under the *Canada Oil and Gas Operations Act* of several dispersants as acceptable for use in Canada's offshore. The EIS further describes how authorization for the use of dispersants as part of emergency response measures is currently being reviewed by the Canada-Nova Scotia Offshore Petroleum Board as part of the Accords Acts. As part of the requirements for a Spill Response Plan for the Board, the proponent will undertake a Net Environmental Benefits Analysis (NEBA) that includes consideration of the use of dispersants.

With regard to migratory birds, the EIS (section 8.5.3.1) describes how the effects of oil-dispersant mixtures may be similar to or more harmful than untreated oil considering effects on thermoregulation and buoyancy. With regard to fish and fish habitat, the EIS (section 8.3.3.3) describes how the use of dispersants could result in a temporary, localized increase in risk of adverse environmental effects on invertebrates and plankton in the water column in the vicinity of the application, with the effect of concern being toxicity. Section 8.5.3.1 of the EIS describes how the use of dispersants could cause a short term increase in exposure to dispersed oil to organisms in the water column, such as corals and shellfish. However, it is not clear what the potential adverse effects would be to fish other than general toxicity.

Specific Question or Request: With the exception of migratory birds, describe more fully the potential adverse environmental effects from the use of dispersants on VCs. Consider acute and chronic toxicity, bioaccumulation through the food chain, and the duration of the toxic effect. Consider the Royal Society of Canada's report "Behaviour and Environmental Impacts of Crude Oil Released into Aqueous Environments," in the effects analysis, as applicable.

IR 074

Applicable CEAA 2012 effect(s): All

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.0 Accidental Events

Context and Rationale: The EIS Guidelines (6.6.1) require the assessment of potential worst-case oil spill scenarios, including when species at risk and high concentrations of fish are present, including a

discussion on water depth and its effect on blow-out rate and spill trajectory modelling assumptions. The EIS Guidelines indicate that where well locations have not yet been identified, points of origin selected for spill trajectory models should be conservative (e.g., selecting a potential location within the proposed drilling area that is closest to a sensitive feature or that could result in greatest effects).

The EIS (section 8.4.3) describes how two tentative locations for potential well blowout modelling scenarios were selected based on preliminary seismic data processing and interpretation; both locations represent viable drilling prospects. They are located in different water depths (2104 metres and 2652 metres) and at varying distances from sensitive receptors (105 kilometres and 170 kilometres from Sable Island). However, it is not clear that the modelling using these two locations adequately describes the possible range of effects from a well blowout from drilling anywhere in the ELs. The EIS describes the water depths in the ELs as ranging from 100 - 3000+ metres (section 2.2), the closest distance to Sable Island is 48 kilometres (section 5.2.10), and 153 hectares of one of the ELs overlaps with the Haddock Box (Table 5.2.20).

Specific Question or Request: Explain whether the modelling locations included in the EIS are considered conservative with respect to the potential for associated environmental effects, as required by the EIS Guidelines. Describe whether the potential effects of spills on VCs could vary from predications in the EIS through consideration of other sites where drilling could occur, including: the most shallow and deepest parts of the ELs, areas immediately adjacent to the Haddock box; and the closest location to Sable Island. Provide a rationale to support to effects assessment and determinations of significance included in the EIS, or update the effects assessment accordingly.

IR 075 (ECCC-IR-20)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species; 5(1)(a)(iii) Migratory Birds; 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 3.2 Project activities; 6.1.1 Atmospheric environment and climate; 6.6.2 Effects of the environment on the Project

EIS Reference: 8.0 Accidental Events; 8.1.3.4 Loss of Well Control during Well Construction and Well Testing

Context and Rationale: Section 8.1.3.4 of the EIS states: “the crew on the rig will be supported with an additional level of monitoring for well control situations from BP’s monitoring center in Houston.”

The EIS also indicates that: “agreed shut in procedures define what the rig crew must do in the event of a “kick” (i.e., a sudden influx of formation fluids in the wellbore).” However, no standard operating procedures or incident threshold triggers have been provided to define or govern shut in escalation procedures.

ECCC has advised that it is unclear whether or not the monitoring team in Houston would have the ability to take operational control and/or over-ride drill rig control in the event a catastrophic incident is encountered on the rig.

Specific Question or Request: Advise whether the monitoring team in Houston would have the ability to control drilling and testing operations remotely. Explain whether set standard operating procedures or incident threshold triggers exist for the “agreed shut in procedures” or whether these procedures are decided by drilling crews based on their well control training certification.

IR 076 (DFO-25)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.6.1 Effects of potential accidents or malfunctions

EIS Reference: 8.4.8 Deterministic Modelling Results, p.8.78; Figure 8.4.16

Context and Rationale: In Figure 8.4.16, the mass balance resulting from an unmitigated blowout shows that a portion of the oil is expected to be contained in the sediments. However, the explanation of the mass balance on p. 8.75 does not provide information on these sediment impacts.

Specific Question or Request: Discuss whether nearshore or offshore sediments would be impacted in the case of an unmitigated blowout, the processes that would transfer oil from the surface and water column to sediments, and oil-sediment interactions as well as flocculation and oiled marine snow.

Effects of the Environment on the Project

IR 077 (ECCC-IR-15)

Applicable CEAA 2012 effect(s): section 5 generally

EIS Guidelines Reference: Part 2, 3.2 Project activities; 6.1.1 Atmospheric environment and climate; 6.6.2 Effects of the environment on the Project

EIS Reference: 5.1.2.3 Wind Climate

Context and Rationale: The EIS states "This wave hindcast includes the effects of shallow water physics, sea ice information, large-scale weather patterns, as well as storm track information, and predicts hourly wind and wave conditions at 0.1 degree grid points for the entire northwest Atlantic."

ECCC advised the Agency that the MSC50 grid has a 0.1 degree resolution covering the Maritimes (including the proposed project area) as well as waters offshore of Newfoundland. This limited 0.1 grid, however, is nested inside a coarser 0.5 degree grid that covers the remaining Northwest Atlantic basin (<http://oceanweather.net/MS50WaveAtlas/>).

Specific Question or Request: In light of the comments from ECCC above, describe if there are any change to the assessment of environmental effects.

IR 078 (ECCC-IR-16 and ECCC-IR-17)

Applicable CEAA 2012 effect(s): section 5 generally

EIS Guidelines Reference: Part 2, 3.2 Project activities; 6.1.1 Atmospheric environment and climate; 6.6.2 Effects of the environment on the Project

EIS Reference: 9.1.2 Extreme Weather Conditions

Context and Rationale: Section 9.1.2 of the EIS includes a description of the annual average wind speed range for the project area, "Average wind speeds on the Scotian Shelf range from 4.9 metres per second to 8.8 metres per second (17.5 kilometres to 31.5 kilometres per hour) in September and January, respectively." The proponent references the *Strategic Environmental Assessment for the Eastern Half of Scotian Slope and Laurentian Fan* for the values; however, the proposed project study area is located west of the SEA study area. Based on the wind statistics provided in section 5 of the EIS (Tables 5.1.4, 5.1.5 and 5.1.6) the upper range of the mean wind speed of 8.8 metres per second for January appears to be understated. For example, the 10-minute average wind speed is 11.3 metres per second at the MSC50 grid point 3551 and 9.6 metres per second for the East Scotian Slope buoy (C44137) for January. The EIS describes the average daily forecast winds used for the 2006-2010 period for the NS-1 and NS-2 well locations combined. The following description is given for the maximum daily wind speeds, "However, maximum wind speeds were much higher, with a maximum daily average wind speed of 19.5 metres per second (38 knots) in the summer and 25.5 metres per second (57 knots) in the winter". These values are too high to represent a daily average maximum wind speed. The values presented are more representative of a monthly maximum wind speed similar to those shown in Figure 5.1.6 for the MSC50 grid point and nearby moored buoys.

Specific Question or Request: In light of the comments from ECCC above, explain how the annual range of average wind speeds and upper range of the mean wind speed were determined. Revise the calculations for the average daily maximum winds for Summer and Winter and clarify what these winds represent. Describe any change to the assessment of effects arising from the ECCC comments.

IR 079 (ECCC-IR-18)

Applicable CEAA 2012 effect(s): 19(1)(h) section 5 generally

EIS Guidelines Reference: Part 2, 3.2 Project activities; 6.1.1 Atmospheric environment and climate; 6.6.2 Effects of the environment on the Project

EIS Reference: Appendix 2

Context and Rationale: Figure A2.7 is a time series of maximum and daily average wave heights for Sites 1 and 2 during the period 2006-10 as calculated by OSCAR. The maximum daily wave height values as plotted do not reflect the wave conditions that occurred during this time period. When comparing the values of wave height in Figure A2.7 against the MSC50 hindcast and the ECCC moored buoy data (C44137), for the same time period, there were a considerable number of high wave events not captured by the plot. For example, the MSC50 data for grid point 3551 has roughly 1300 hourly values where the significant wave heights ranged between 6 to 12 metres and at the East Scotian Slope buoy (C44137) about 940 hourly observations were recorded of significant wave heights ranging between 6 to

14 metres. In Figure A2.7, there are no daily wave heights exceeding 4.5 metres during the same five-year period.

Specific Question or Request: Explain why Figure A2.7 shows no maximum significant wave heights exceeding 5 metres for the period 2006-2010 when both MSC50 and buoy observations within or near the project area show a large number of hourly significant wave heights exceeding 6 metres during the same time period. Describe any change to the assessment of effects arising from the ECCC comments.

IR 080 (ECCC-IR-24)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species; 5(1)(a)(iii) Migratory Birds; 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 6.1.2 Marine environment

EIS Reference: 9.0 Effects of the Environment on the Project; 9.1.5 Seismic Events and Tsunamis

Context and Rationale: The EIS Guideline state: “The EIS will take into account how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events could adversely affect the Project and how this in turn could result in impacts to the environment (e.g. extreme environmental conditions result in malfunctions and accidental events). These events will be considered in different probability patterns (i.e. 5-year event vs. 100-year event).”

A threshold magnitude for a damaging vs. non-damaging seismic event has not been provided, nor have probability patterns been provided for damaging seismic events and tsunamis.

Specific Question or Request: Provide a threshold magnitude for a damaging seismic event, including the associated probability pattern.

Discuss potential impacts that ‘damaging’ seismic activity could have on both actively drilled wells and on the integrity of abandoned wells that have been plugged or otherwise suspended.

IR 081 (ECCC-IR-25)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species; 5(1)(a)(iii) Migratory Birds; 5(1)(b) Federal Lands or Transboundary

EIS Guidelines Reference: Part 2, 6.6.2 Effects of the environment on the Project

EIS Reference: 9.1.6 Sediment and Seafloor Instability and Other Geohazards

Context and Rationale: Section 9.1.6 of the EIS states: “Sediment scour, liquefaction of sediments from seismic events, and slope failure on the seafloor are geohazards that could adversely affect exploration drilling activities (Stantec 2014b). Canyons in and around the project area (e.g. Dawson and Verrill Canyons) represent possible areas of slope instability as they create steep banks, and provide avenues for sediment transport between the Shelf and the Slope into the deep ocean (Stantec 2013a). Section

9.1.6 also states that “Avoidance of geohazards associated with sediment and seafloor instability is critical to the success of drilling programs and to reduce the risk of accidental events.”

The probabilities of the various risks, what effect would they have, and how the hazards described would be managed are not clear.

Specific Question or Request: More fully describe possible effects of sediment scour, liquefaction of sediments from seismic events, and slope failure on the integrity of abandoned wells that have been plugged and where the wellheads have not been removed, as well as how potential risks are mitigated.

Follow-Up and Monitoring

IR 082

Applicable CEAA 2012 effect(s): 5(1)(a)(i)

EIS Guidelines Reference: Part 2, 6.3.1 Fish and fish habitat; 8 Follow-up and Monitoring Programs

EIS Reference: 7.2.10 Follow-up and Monitoring, p. 7.45

Context and Rationale: The proponent indicates that it “will conduct a visual survey (using an ROV) of the seafloor during and after drilling activities to assess the extent of sediment dispersion” (underlining added). DFO has requested that it be provided with copies of the reports prepared for the sediment survey to assess the extent of sediment dispersion when they are provided to the CNSOPB.

Specific Question or Request: Provide further information of proposed monitoring, including: at what point(s) during drilling activities a visual survey would be conducted; how long it would take; how results would be recorded, analyzed and reported; and to whom results would be reported. Describe the procedure and any limitations, such as maximum range of the ROV from the drilling site, compared to predicted extent of dispersion.

Clarify what the reference to monitoring “after drilling activities” means, e.g. immediately after, before the drilling unit leaves the drilling location, or at a later time?

IR 083

Applicable CEAA 2012 effect(s): 5(1)(a)(i)

EIS Guidelines Reference: Part 2, 6.3.3 Marine mammals; 8 Follow-up and Monitoring Programs

EIS Reference: 7.3.10 Follow-up and Monitoring, p. 7.80

Context and Rationale: The EIS states that “in the event that a vessel collision with a marine mammal or sea turtle occurs, BP will contact the Marine Animal Response Society or the Canadian Coast Guard to relay incident information.”

Specific Question or Request: Provide additional information about the roles and mandates of the Animal Response Society and Canadian Coast Guard for marine mammal or sea turtle collisions. Explain

what procedures are in place for notifications of other organizations such as DFO in case of a vessel collision with a marine mammal or sea turtle. Explain what types of responses could be expected and who would undertake them. As part of a follow-up program, explain how this information would be used to verify effects predictions or test mitigation effectiveness.

IR 084

Applicable CEAA 2012 effect(s):

EIS Guidelines Reference: Part 2, 8 Follow-up and Monitoring Programs

EIS Reference: 12.2 Follow-up and Monitoring

Context and Rationale: On page 12.4, it is stated that the proponent would submit a Well Termination Report (within 30 days of well termination date). Well termination is not described as a project activity in section 2.4.

Specific Question or Request: Explain the term “well termination.” How does it relate to well abandonment? What would the Well Termination report include? Who would have access to this report, would it be publicly available?

IR 085 (DFO-01)

Applicable CEAA 2012 effect(s): 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species

EIS Guidelines Reference: Part 2, 6.3.1 Fish and fish habitat; 8.1 Follow-up Program

EIS Reference: 7.2.8.2 Mitigation of Project-Related Environmental Effects; 7.3.8.2 Mitigation of Project-Related Environmental Effects; 12.2 Follow-up and Monitoring

Context and Rationale: Additional information on follow-up program elements pertaining to underwater noise is required.

The EIS Guidelines (section 8.1) require that a preliminary follow-up program be included in the EIS, in particular for areas where scientific uncertainty exists in the prediction of effects. For fish and fish habitat specifically, the EIS Guidelines (6.3.1) require that the EIS describe how acoustic monitoring data would be collected during and after drilling operations and how this would be used to verify effects predictions. The EIS Guidelines (section 8.1) require the follow-up program include the parameters to be measured, intervention mechanisms to be used in the event that an unexpected deterioration of the environment is observed, accessibility of the data for the general population, opportunities for participation by Aboriginal groups and interested stakeholders, and involvement of and communication with local and regional organizations in the design, implementation and evaluation of follow-up results.

The EIS (section 7.2.8.2 and 7.3.8.2) describes a number of mitigation measures to reduce the potential environmental effect of the Project on fish and fish habitat, and on marine mammals and turtles.

The EIS (section 12.2) proposes an Acoustic Monitoring Program, where the proponent would assess the potential for undertaking an acoustic monitoring program during the first phase of the drilling program to collect field measurements to verify predicted underwater sound levels. The objectives of such a program would be identified in collaboration with DFO and the CNSOPB and in consideration of lessons learned from the underwater sound monitoring program that will be undertaken for the Shelburne Basin Venture Exploration Drilling Project. From the information provided in the EIS, it is not clear when this monitoring program would be carried out (i.e. during and after drilling). It is also not clear whether the monitoring is intended to monitor effects on species at risk and how this would be achieved.

The EIS (section 12.2) also proposes a Marine Mammal and Sea Turtle Monitoring Program, which would monitor and report on sightings of marine mammals and sea turtles during VSP surveys. Resulting information would be used to delay or shutdown VSP operations when baleen whales, sea turtles, or SARA-listed species are detected within 650 metres. Additional information on this follow-up program is needed to satisfy the requirements of EIS Guidelines (e.g. if and how the proponent would involve and communicate with local and regional organizations in the design, implementation, and evaluation of follow-up results).

Specific Question or Request: Provide additional information on proposed follow-up to satisfy information requirements set out section 8 of the EIS Guidelines, as applicable.

Appendix A - CEAA 2012 Environmental Effects

5 (1) For the purposes of this Act, the environmental effects that are to be taken into account in relation to an act or thing, a physical activity, a designated project or a project are

(a) a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:

- (i) fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act*,
- (ii) aquatic species as defined in subsection 2(1) of the *Species at Risk Act*,
- (iii) migratory birds as defined in subsection 2(1) of the *Migratory Birds Convention Act, 1994*, and
- (iv) any other component of the environment that is set out in Schedule 2;

(b) a change that may be caused to the environment that would occur

- (i) on federal lands,
- (ii) in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out, or
- (iii) outside Canada; and

(c) with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on

- (i) health and socio-economic conditions,
- (ii) physical and cultural heritage,
- (iii) the current use of lands and resources for traditional purposes, or
- (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

5 (2) However, if the carrying out of the physical activity, the designated project or the project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than this Act, the following environmental effects are also to be taken into account:

(a) a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project; and

(b) an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on

- (i) health and socio-economic conditions,
- (ii) physical and cultural heritage, or
- (iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.