Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

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March 13, 2018

Sent by E-mail

Terry Forkheim
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Dear Mr. Forkheim,

SUBJECT: Flemish Pass Exploration Drilling Project – Information Requirements (Part I)

The Canadian Environmental Assessment Agency (Agency) has completed its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Flemish Pass Exploration Drilling Project. The Agency also received submissions from government experts, the public and Indigenous groups and has analyzed their comments. The Agency determined that additional information is required, as per the information requirements (IRs) attached. This submission contains IRs common to the Flemish Pass Exploration Drilling Project EIS and the Eastern Newfoundland Offshore Exploration Drilling Project EIS, as well as a separate submission with IRs addressed specifically to Statoil Canada Ltd. on its Flemish Pass Offshore Exploration Drilling Project EIS. In addition to IRs, a list of clarifications that are required to ensure correct interpretation of project information and effects analysis is attached.

The Agency has not yet received comments from all participating Indigenous groups and expects to submit additional IRs once the comments are received and reviewed. Additional IRs would likely focus on the integration of Indigenous knowledge into the environmental assessment, effects of changes to the environment on health and socio-economic conditions of Indigenous people, and effects of the Project on fish and fish habitat/marine mammals and sea turtles. However, as the nature and content of these comments are unknown, there could be additional IRs related to other valued components.

With the issuance of these IRs, the federal timeline within which the Minister of Environment and Climate Change's decision must be made is paused as of March 13, 2018. Once you have submitted complete responses to all IRs, the Agency will take a period of up to 15 days to evaluate if the information provided is complete. 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. For further information, please consult the

Agency document Information Requests and Timelines: https://www.canada.ca/en/environmental-assessment-agency/news/media-room/media-room-2016/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. Working directly with government experts in this manner will help to ensure that IRs are responded to satisfactorily. The Agency can assist in arranging meetings with government experts, at your request.

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.

Sincerely,

<Original signed by>

Shauna O'Brien

Project Manager – Atlantic Region

Canadian Environmental Assessment Agency

Cc: Elizabeth Young, Canada – Newfoundland Labrador Offshore Petroleum Board
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Flemish Pass Exploration Drilling Project

Information Requirements (IRs) from Environmental Impact Statement Review:

January 5 to February 12, 2018

March 13, 2018

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 Flemish Pass Exploration Drilling Project. The Agency also received submissions from government experts, the public and Indigenous groups and has analyzed their comments. The Agency determined that additional information is required, as per the information requirements (IRs) below. This submission contains IRs common to the Flemish Pass Exploration Drilling Project EIS and the Eastern Newfoundland Offshore Exploration Drilling Project EIS, as well as a separate submission with IRs addressed specifically to Statoil Canada Ltd. on its Flemish Pass Offshore Exploration Drilling Project EIS. In addition to IRs, a list of clarifications that are required to ensure correct interpretation of project information and effects analysis is attached. The Agency is currently analyzing additional submissions and will make further information requirements as required after it completes that analysis.

ACRONYMS AND SHORT FORMS

CAC	criteria air contaminants
CAPP	Canadian Association of Petroleum Producers
CO	carbon monoxide
CEAA	Canadian Environmental Assessment Agency
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EIS	Environmental Impact Statement
EL	exploration licence
ECCC	Environment and Climate Change Canada

2D	two dimensional
3D	three dimensional
GHG	greenhouse gas
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
LSA	local study area
MODU	mobile offshore drilling unit
MTI	Mi'gmawe'l Tplu'taqnn Incorporated
NOx	nitrogen oxide
OSRL	Oil Spill Response Limited
PM	particulate matter
ROV	remotely operated vehicle
RSA	regional study area
SIRT	Subsea Incident Response Toolkit
SWIS	Subsea Well Intervention Service
VC	valued component
VSP	vertical seismic profiling
WBM	water-based mud

INFORMATION REQUIREMENTS (IRs) COMMON TO FLEMISH PASS EXPLORATION DRILL PROJECT EIS AND EASTERN NEWFOUNDLAND OFFSHORE EXPLORATION DRILLING PROJECT EIS

Project Description

IR-1 (KMKNO-3)

Project Effects Link to CEAA 2012: All –project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3, Project Description.

Reference to EIS: Section 1.2.2, Key Project Components and Activities; 2.5.2.3, Offshore Well Drilling; 2.10.1.2, Drilling Installation Selection; 8.3.3, Presence and Operation of Drilling Installations; 13.3.3, Presence and Operation of Drilling Installation (Including Drilling and Associated Marine Discharge).

Context and Rationale: The EIS states that the Project may at times have multiple drilling units operating simultaneously (Sections 2.10.1.2 and 8.3.3) and that the effects assessment considers the operation of up to two drilling installations actively engaged in drilling activities in the Project Area at any one time (Section 2.5.1). It is unclear throughout the effects analysis how simultaneous drilling was considered, as potential overlapping effects of dual sources of noise, sediment deposition, light and other environmental disturbances are not discussed in the analysis of effects.

The EIS states that batch drilling, which is the process of consecutively drilling the top hole portions of a well for multiple wells, may occur (e.g. Sections 1.2.2, 2.5.2.3, 13.3.3). No further information is provided, nor does the effects analysis consider project effects from batch drilling, other than a brief mention of increased frequency of drilling installation movements as compared to drilling a single well at a time (Section 13.3.3).

Specific Question/Information Requirement: Provide the following information on the proposed project and associated environmental effects:

- Clarify circumstances under which simultaneous drilling and batch drilling could occur.
- Provide additional information on how batch drilling is undertaken, including an explanation of how the integrity of the wellbore is secured prior to moving to the next well.

- Assess the environmental effects of simultaneous drilling and batch drilling on relevant valued components (VCs).

Update proposed mitigation and follow-up, as well as significance predictions, as applicable.

IR-2

Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3.2, Project Activities.

Reference to EIS: Section 2.5.2.3 Project Activities.

Context and Rationale: Section 2.5.2.3, and elsewhere in the EIS, indicates that drilling time is anticipated to be in the range of 35 to 65 days. It is understood that other activities (e.g. well site survey, pre-drill coral survey, demobilization) would require additional time beyond the 35 to 65 days.

It is noted that recent wells offshore of Nova Scotia were estimated to require 120 days of drilling.

Specific Question/Information Requirement: Provide clarification on the 35 to 65 day time frame for drilling:

- Confirm that 65 days is the maximum time potentially required to drill a well.
- Explain how batch drilling may affect drilling timelines.

IR-3 (C-NLOPB 1: Conformity Review, Statoil and Exxon)

Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components.

Reference to EIS: Section 1.2.2, Key Project Components and Activities.

Context and Rationale: Cutting of well heads by other means of internal cutting using a drill rig has been described in the EIS but has not been included in the description of project components

(Section 1.2.2). The EIS states that Construction/Light intervention vessels for wellhead decommissioning activities may be used (p. 49). A full description of proposed activities is required in order to understand the associated potential for environmental effects. In addition, the C-NLOPB has advised that if a particular activity is not described and assessed as part of the environmental assessment, then an application for authorization of that particular activity may not be considered.

Specific Question/Information Requirement: Provide a full description of any project components or activities that are not currently fully described in Section 1.2.2, including a complete listing of all well decommissioning components, and consideration of all phases of the Project.

Update the effects analysis as appropriate.

IR-4 (NunatuKavut-16, MMS-1)
Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3.2.3, Decommissioning, Suspension or Abandonment of Wells.

Reference to EIS: Section 2.5.2.7, Well Suspension, Abandonment, Decommissioning and Demobilization.

Context and Rationale: Section 2.5.2.7 of the EIS states that wells will be inspected at the time of decommissioning. There is no information provided regarding whether follow-up inspections will be undertaken following well abandonment.

NunatuKavut Community Council has suggested that to ensure safety and protection of the marine environment, there must be frequent monitoring and inspection after the decommissioning occurs. Similarly, Mi'gmawei Mawiomi Secretariat indicated the need to ensure that the techniques used for well decommissioning or suspension are sustainable over time.

Specific Question/Information Requirement: Specify the lifespan of the well decommissioning or suspension techniques. Explain whether they would they be sustainable to ensure the long-term

protection of the environment. Provide information on inspection of abandoned wells, including the frequency of inspection, if applicable.

IR-5 (C-NLOPB-1 and -2)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species; 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components.

Reference to EIS: Section 8.3.7.1, Geophysical, Geohazard, Wellsite, Seabed and Vertical Seismic Profiling (VSP) Surveys.

Context and Rationale: Section 2 of the EIS refers to wellsite surveys that may be conducted to identify unstable areas beneath the seafloor and VSP surveys to further define the depth of geological features and potential petroleum reserves. In Section 2.5.2.5, the EIS states that geophysical/geohazard/wellsite and seabed surveys typically take between 5 to 21 days to complete but can be shorter (i.e. coral surveys) or longer depending on the area to be surveyed and weather/operational delays. Surveys can involve the mapping of the seabed through the use of seismic sound sources, multi-beam echo sounder, side scan sonar, and sub-bottom and other non-invasive equipment (p. 46).

EIS Guidelines define the Designated Project as including VSP surveys and in-water works (e.g. wellsite surveys) to support the specific exploration wells under consideration, but excluding surveys potentially required to support conduct of the EA (e.g. environmental baseline surveys) and surveys related to the broader delineation of resources.

Section 8 of the EIS states that that wellsite surveys in the area may involve one to four streamers (Section 8.3.7.1). The C-NLOPB has advised that it is typical for a wellsite survey to be two-dimensional (2D) high resolution, implying that there would be one streamer only. It further advised that the length of any VSP or wellsite surveys is typically limited to two to four days. Three dimensional (3D) seismic surveys are typically conducted to enable general understanding of petroleum resources prior to the identification of exploration well locations and are not associated with exploration drilling.

Section 8.3.7.1 of the EIS compares a "single air source array" to an "air source array". Is it not clear whether the latter is meant to read "double air source array", which the C-NLOPB has advised is not typically part of activities associated with exploration drilling.

Specific Question/Information Requirement: Clarify the nature, scope, and length of proposed VSP surveys and all other in-water work that are part of the designated project (i.e. are incidental to exploration drilling on exploration licences (ELs) included in the environmental assessment under CEAA 2012).

Clearly identify any components or activities that have been included in Section 2 of the EIS but that would not form part of the designated project under CEAA 2012 (e.g. 3D high resolution survey).

Alternative Means

IR-6 (NunatuKavut-15)
Project Effects Link to CEAA 2012: All –project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 2.2, Alternative Means of Carrying Out the Project.

Reference to EIS: Section 2.10, Alternative Means of Carrying Out the Project.

Context and Rationale: Section 2.10 identifies formation testing while tripping as one of two preferred options for formation flow testing. No further information is provided about this approach other than that it avoids flaring.

NunatuKavut Community Council has recommended use of alternatives with less environmental effects if they are available for testing with flaring.

Specific Question/Information Requirement: In accordance with Agency guidance on evaluation of alternative means, provide additional information on the alternative means of formation testing while tripping: how it is carried out, how it might interact with the environment, and any potential environmental effects.

Provide further information on when formation testing while tripping might be used instead of formation flow testing with flaring.

IR-7 (C-NLOPB-2: Conformity; KMKNO-9)
Project Effects Link to CEAA 2012: All - project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 2.2, Alternative Means of Carrying Out the Project.

Reference to EIS: Section 2.5.1.1, Drilling Installation Selection and Regulatory Approval Process; 2.9.4, Liquid Wastes; 2.10.1, Identification and Evaluation of Alternatives.

Context and Rationale: The EIS Guidelines indicate that the EIS should describe the management or disposal of wastes (e.g. type and constituents of waste, quantity, treatment, and method of disposal). The EIS refers to storage capacity needed for drilling materials and equipment, as well as reagents used for drilling; however, there is no information on the constituents of these reagents or associated volumes. Likewise, the composition and quantity of liquid wastes such as fire control water, produced water, bilge and deck drainage water, ballast water, grey/black water, cooling water, food waste, testing fluids and liquid wastes such as waste chemicals, cooking oils or lubricating oils, are not discussed.

The EIS Guidelines also state that the proponent should include a discussion on how wastes and potential associated toxic substances would be minimized, and any alternatives that would enable the proponent to achieve waste management objectives, and adopt best practices in waste management and treatment. Section 2.10 discusses how the waste will be treated in order to comply with guidelines and/or requirements, but provides no clear discussion of how the Proponent would minimize waste or possible alternatives that would allow achievement of defined objectives.

Specific Question/Information Requirement: With respect to waste generated and disposed of from the exploration activity:

- clarify the agents that may be used as part of the Project and assess associated environmental effects, including accidents and malfunctions, as applicable;

- clarify the volumes of liquid waste that may be generated, as well as the constituents of the waste;
- provide additional information on the alternatives that may have been examined with respect to waste management, and the measures that were considered with respect to minimizing waste generated;
- provide additional information on the treatment process prior to ocean discharge. Explain whether treatment to acceptable levels for ocean discharge can be accomplished on the drilling installation and how it would be determined that all wastes meet guidelines before discharge.

Air Quality

IR-8 (ECCC-1; KMKNO-6)

Project Effects Link to CEAA 2012: Air Quality CEAA 5; 5(1)(b) Federal Lands/Transboundary.

Reference to EIS Guidelines: Part 2, Section 6.3.8.1, Air Quality and Greenhouse Gas (GHG) Emissions.

Reference to EIS: Section 2.9.1, Air Emissions; and Section 2.9.1.2, Greenhouse Gas Emissions.

Context and Rationale: GHGs are discussed in Section 2.9.1 (Air Emissions) and Section 5.4 (Air Quality) of the EIS. In Section 2.9.1.2, the daily GHG emissions of the Project (646 to 928 tonnes of CO2) are compared with Newfoundland and Labrador's average daily GHG emissions (13.5 kilotonnes) and with Canada's average daily GHG emissions (723 kilotonnes).

- Environment and Climate Change Canada (ECCC) has advised that the estimated GHG numbers are incorrect using the numbers presented in the EIS. The reference provided (ECCC 2017, full citation provided in Section 5.9 of EIS) appears to cover only the facility reported data and not overall provincial and national data; but even when overall numbers are used, the math does not work out.

- The analysis for GHG emissions associated with flaring is completed separately from other operations estimates; thus the comparison of emissions to the provincial and national averages does not seem to be based on total GHG emissions estimates.

- While information is provided, as required by the EIS Guidelines, on the direct and indirect sources of GHGs, and composition and quantity of GHGs, current provincial and national targets for GHG emissions are not provided. Rather, predicted emissions are compared to 2015 reported levels of GHG emissions.

Mitigation measures proposed to minimize GHG emissions are not discussed.

Specific Question/Information Requirement:

- Update GHG emissions and provide total potential emissions from all components and activities associated with the Project (i.e. including operational flaring). Provide the references noted as the source of the data.
- Compare total potential GHG emissions estimates (including operational flaring) to:
    - Newfoundland and Labrador's average daily GHG emissions;
    - Canada's average daily GHG emissions; and
    - current emission targets for Newfoundland and Labrador and for Canada.
- Discuss proposed measures to reduce or minimize GHG emissions including use of best available technologies or provide rationale for not including the use of best available technologies, as applicable.

IR-9 (ECCC-2)

Project Effects Link to CEAA 2012: Air Quality CEAA 5; 5(1)(b) Federal Lands/Transboundary.

Reference to EIS Guidelines: Part 2, Section 6.3.8.1, Air Quality and Greenhouse Gas (GHG) Emissions.

Reference to EIS: Sections 1 to 5; 2.9.1.1, Criteria Air Contaminants; and 2.9.1.2, GHG Emissions.

Context and Rationale: Under Section 3.1 of the EIS Guidelines, the proponent is required to describe "energy supply (source, quantity)". There appears to be some significant discrepancies in the sulphur dioxide emissions estimates provided in Table 2.15 (i.e. it is not reasonable that the daily estimates from the helicopter are significantly higher than those of the other components).

Specific Question/Information Requirement: Review air emissions calculations and provide the estimated sulphur content of the various fuels expected to be used in the operation. Update emissions calculations and effects predictions accordingly.

IR-10 (NRCanIR-2)
Project Effects Link to CEAA 2012: 5(1)(b) Federal Lands/Transboundary 5(2) (C-NLOPB).

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and Testing Activities.

Reference to EIS: Section 2.5.2.4, Formation Flow Testing with Flaring.

Context and Rationale: The EIS notes the use of high-efficiency burners for flaring the gas. The flare efficiency would impact the presented GHG emissions but also would determine the validity of the emission factors used to estimate criteria air contaminant (CAC) emissions.

Specific Question/Information Requirement: Provide clarification on the efficiency rating of the high-efficiency burner given that this information affects overall emissions estimates.

IR-11 (NRCanIR-3)
Project Effects Link to CEAA 2012: 5(1)(b) Federal Lands/Transboundary 5(2) (C-NLOPB).

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and Testing Activities.

Reference to EIS: Section 2.9.1.1.2, Supply Vessels.

Context and Rationale: Nitrogen oxide (NO_X), carbon monoxide (CO), and particulate matter (PM) emission factors for offshore supply vessels are presented in Table 2.12. However, the Sulphur dioxide (SO_2) emission factor is blank yet the emission rate summary in Table 2.15 (p. 60) includes SO_2 emissions for supply vessels.

Specific Question/Information Requirement: Provide clarification on the blank SO_2 emission factor for offshore supply vessels.

IR-12 (NRCanIR-1 and -4)

Project Effects Link to CEAA 2012: 5(1)(b) Federal Lands/Transboundary 5(2) (C-NLOPB).

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components; and3.2.1, Drilling and Testing Activities.

Reference to EIS: Section 8.3.5, Formation Flow Testing with Flaring; and 2.5.2.4, Formation Flow Testing with Flaring.

Context and Rationale: The EIS states that if a large amount of water is produced from the formation, then the water will be treated and disposed of rather than flared.

Specific Question/Information Requirement: Explain what is considered to be a *large* amount of produced water from formation flow testing and under what circumstances it would be treated, shipped to shore, or flared.

Describe the potential effects of flaring produced water.

Fish and Fish Habitat/Marine Mammals and Sea Turtles

IR-13

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 8.3.8, Supply and Servicing.

Context and Rationale: The EIS states that "(a)t the drill sites, the noise associated with stationed supply vessels and their use of dynamic positioning is generally lower than the underwater noise produced by drilling activities (700-1400 Hz, 184 dB re 1 uPa at 1 m) and therefore will not be in addition to existing noise levels in these areas".

Specific Question/Information Requirement: Provide further explanation/justification for the assertion that vessel noise would not add to noise from the drilling activities.

IR-14(KMKNO-30, MMS-5)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.4, Mitigation Measures.

Reference to EIS: Section 8.3.2, Summary of Key Mitigation; and 10.3.2, Summary of Key Mitigation.

Context and Rationale: The EIS does not propose passive acoustic monitoring for detecting marine mammals in the vicinity of the Project during vertical seismic profiling and geophysical surveys. Visual monitoring only has been proposed. Deep-diving odontocete species spend most of their time underwater, and may be quite difficult to detect when at the surface. The concurrent use of visual and passive acoustic monitoring can increase the likelihood of detecting deep-diving cetaceans. 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 should be considered.

Specific Question/Information Requirement: Review the recommendations identified for passive acoustic monitoring and a longer ramp-up observation period, and describe whether and how such recommendations would be included in the mitigation measures for the Project. If the proponent does not believe additional mitigation is required, provide associated rationale.

IR-15(MMS-5 and -9)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.
Reference to EIS Guidelines: Part 2, Section 8, Follow up and Monitoring Programs.
Reference to EIS: Section 8.6, Environmental Monitoring and Follow-up; 10.6 Environmental Monitoring and Follow-up; and 17.4.1 Follow-up Programs.

Context and Rationale: Sections 8.3.3, 8.3.7.1, 10.3.3, and 10.3.7 of the EIS state that noise from the Project may affect marine species; however, there is no discussion in the EIS on noise follow-up programs to determine the accuracy of effects predictions.

Specific Question/Information Requirement: State whether the proponent intends to verify noise predictions through a follow-up program. If follow-up is not proposed, provide a rationale, including consideration of the potential for underwater noise to have adverse effects on marine species and certainty/uncertainty related to effects predictions.

IR-16 (KMKNO Letter 2, KMKNO-1, KMKNO-2, MTI-2, MTI-3 & MTI-11, DFO-7)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 8.4.4, Atlantic Salmon; 6.1.7.4, Migratory Atlantic Salmon; 8.5.1, Residual Environmental Effects Summary; and 12.3.2.2.3, Atlantic Salmon; 17.2, Summary of Mitigation and Commitments.

Context and Rationale: Section 12.3.2.2.3 of the EIS states that Atlantic salmon have a preferred sea surface temperature range of 4°C to 8°C, and that mean sea surface temperature values greater than 3°C occur between July and November and the preferred range (4°C–8°C) can occur between July and October in the Project area.

KMKNO has requested consideration of additional published research regarding the timing of Atlantic salmon presence in the Project area. Reddin (1985) indicated that "favourable conditions (sea surface temperature of 4°C to 8°C) persist in January to April, implying that the eastern and southern Grand Bank region may represent not only the route by which maturing salmon migrate from the Labrador Sea to their home rivers in eastern Canada and northeastern United States but also a major feeding and overwintering area." The EIS does not provide information regarding the return migration of adult Atlantic salmon to feeding areas as post-spawning adults (kelts). In addition, Lacroix (2013) describes habitat utilization by Atlantic salmon kelts in May and June off Newfoundland and the Grand Banks, and July and August around the Project area.

KMKNO indicated that immature post-smolts that will return to natal rivers as mature sea winter salmon (referred to as grilse) will stay local to the Project area and not migrate to the Labrador Sea; use of the Project area by post-smolts to maturing grilse is therefore probable between June and August to the spring of the following year (June to May). KMKNO has further indicated that mature adult salmon would be least likely to be present in the Project area between October and November, when adult salmon are spawning in their natal streams.

Mi'gmawe'l Tplu'taqnn Incorporated (MTI) has expressed concern that the data provided within the EIS to support Atlantic salmon distribution is from dated sources, specifically that the data does not fully encapsulate impacts that have occurred over time, particularly with population declines and shifting range distributions due to climate change.

The Department of Fisheries and Oceans (DFO) has suggested some recent papers discussing the origin of salmon at the Faroe Islands, where there seem to be more North American fish present than previously thought (Gilbey et al. 2017), and the origin of salmon at west Greenland, Labrador coast and south coast of Newfoundland (Bradbury et al. 2014, 2015).

Regarding the Inner Bay of Fundy population of Atlantic salmon, the EIS notes that "interaction with the Project Area does not occur". While the Inner Bay of Fundy population would not be expected to occur within the Project area, it is not correct to say with certainty that they will "not occur".

Comments from MTI state that Atlantic salmon are known to exhibit avoidance behaviours to light exposure, infrasound, and surface disturbance. In addition, light and sound stimuli can influence swimming depth and speed. MTI stated that researchers have recommended avoiding abrupt changes to visual environment/light exposure, and that salmonids swim with elevated activity (a flight response) after transitions from light-to-dark or dark-to-light environments. MTI further noted that salmon are sensitive to acoustic particle motion at frequencies below 200 hertz (Hz). Infrasound disturbance has short-term effects on fish behaviours and fish typically return to pre-stimulus states. This may cause flight behaviour to lessen over time to all stimuli, so repeated/extensive exposure can lead to habituation (Bui et al., 2013).1 The EIS provides little

[1] Bui, S., Oppedal, F., Korsøen, Ø. J., Sonny, D., & Dempster, T. (2013). Group behavioural responses of Atlantic Salmon (Salmo salar L.) to light, infrasound and sound stimuli. *PloS one*, 8(5), e63696.

analyses on the behavioural response effects to migrating salmon due to light and sound effects of the Project

KMKNO has suggested that drilling activities be avoided when Atlantic salmon are in the area (i.e. between the months of January to August). KMKNO has further advised caution during all drilling activities to avoid effects on maturing post-smolts, which may be present year-round owing to remaining in the Project area for their first winter at sea.

Specific Question/Information Requirement: Update the analysis of effects on Atlantic salmon, taking into consideration:

- timing of their presence in the Project area as well as probability based on the information provided in Lacroix (2013) and Reddin (1985);
- clarification on the certainty regarding the presence of Atlantic salmon from the Inner Bay of Fundy population in the Project area;
- consideration of the impacts that climate change may have had on the distribution of Atlantic salmon, and whether the Project could potentially contribute to or exacerbate an already declining population of salmon in the region;
- published research on biological and behavioural responses of Atlantic salmon to light and noise, as available; and
- recent papers on Atlantic salmon, including those suggested by DFO.

Update the proposed mitigation and follow-up, as well as effects predictions, accordingly.

Based on the potential for effects on Atlantic salmon, provide a rationale related to the need for additional mitigation measures to avoid or minimize potential effects on adults and mature post-smolts that may overwinter and feed in the area.

IR-17 (KMKNO-3)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 8.4.4, Atlantic Salmon and American Eel.

Context and Rationale: The EIS indicates that migration routes for American eel do not reside wholly within the Project area and can be variable based on environmental conditions such as sea-surface temperatures. The EIS further states that interactions may be limited and overall risk is considered low to this species, and that Project-related disturbances are also localized and short-term with mitigation measures implemented to reduce potential effects.

Comments from KMKNO state that it is probable that the American eel would be in the exploration areas during migration, and would likely be affected by exploration activities.

Specific Question/Information Requirement: Provide additional information on potential avoidance and mitigation measures for the American eel.

IR-18 (MTI-4 and -5)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 8, Marine Fish and Fish Habitat: Environmental Effects Assessment, and 6.1.7.3, Flemish Cap and Grand Banks Slope (Project Area – Northern and Southern Sections).

Context and Rationale: Section 6.1.7.3 of the EIS states that during their northern migrations, swordfish are likely to remain in areas under the influence of the Gulf Stream and therefore are expected to be at relatively low abundance in the Project area as it is exposed to the Labrador Current. Although the EIS acknowledges the potential presence of swordfish, they have not been included in the list of species known to occur in the Project area.

Comments from MTI state that swordfish are known to only tolerate small environmental changes. Offshore activities have greater detrimental effects on populations when compared to other species (de Sylva et al., 2000).[2]

Specific Question/Information Requirement: Provide additional existing baseline information and a robust effects assessment of potential effects to swordfish, including any existing published research on biological and behavioural responses of swordfish to noise and light. Update the proposed mitigation and follow-up, as well as effects predictions, accordingly.

IR-19 (WM-EM-18)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 8.5.1, Residual Effects Summary.

Context and Rationale: Section 8.5.1 of the EIS indicates that subsea infrastructure may provide opportunities for colonization and increased distribution of benthic species that have pelagic eggs or larvae. While the effect would be temporary for the length of drill operations, increased colonization opportunities may support faster recovery in an otherwise slow recovering environment.

Concern was raised that the introduction of infrastructure that may help colonize the area, and then removing it, may cause further damage to the distribution of benthic species (Wolfson et al. 1979).

Specific Question/Information Requirement: Provide further rationale and evidence for the conclusion that temporary introduction of infrastructure could have positive effects on benthic habitat recovery.

[2] D. P. de Sylva, W. J. Richards, T. R. Capo and J. E. Serafy. 2000. Potential Effects of Human Activities on Billfishes (*Istophoridae* and *Xiphiidae*) in the Western Atlantic Ocean. *Bulletin of Marine Science*, 66(1): 187–198.

IR-20

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 8.3.4.1, Water-based Drilling Mud.

Context and Rationale: The EIS states that "the likely distance between individual wells that will be drilled as part of this Project means that there is also little or no potential for these environmental releases [drilling muds and cuttings] from individual wells to interact or accumulate in the LSA".

Specific Question/Information Requirement: Indicate the "likely distance" between individual wells assumed in making the determination that there is no potential for overlap. Clarify what is the closest distance that wells could occur to each other, including exploration and associated delineation wells. Update effects predictions, proposed mitigation, and follow-up accordingly, if applicable.

IR-21 (CNLOPB-3: ExxonMobil and Statoil, DFO-1)

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat, and 6.4, Mitigation.

Reference to EIS: Table 8.1 Potential Project-Related Environmental Changes and Potential Effects: Marine Fish and Fish Habitat; Section 8.3.3.3, Interaction with Benthic Environment; 8.3.4.4, Project-Specific Modelling of Drilling Discharges; 8.3.4.5, Potential Biological Effects of Drill Cuttings Deposition; 8.5.1, Residual Environmental Effects Summary; and Appendix G Flemish Pass Exploration Drilling Program, Drill Cuttings Modelling (Amec Foster Wheeler, 2017).

Context and Rationale: Appendix G and Section 8.3.4.4 provide predicted mean and maximum thickness for cuttings deposition at various distances from each modelled wellsite. Section 8.3.4.5 identifies two predicted no effect thresholds for burial depths: 6.5 mm, as well as a more conservative 1.5 mm, indicated to coincide with assessments on more sensitive coral species.

Results of deposition modelling are compared to both thresholds, but there is no estimate provided for the potential total area of habitat affected by deposition above the identified thresholds. Furthermore, expected distances above thresholds are predicted based on mean deposition thicknesses, rather than maximums. It is unclear whether this is representative of the worst-case scenario.

Section 8.3.3.3 of the EIS indicates that "where there is a predicted deposition greater than/equal to 6.5 mm, and healthy coral colonies are present, a setback of the predicted distance to this threshold value will be maintained, as described in greater detail in Section 8.3.4". However, Section 8.3.4 of the EIS does not contain any further discussion of thresholds and resulting setbacks.

It is unclear how thresholds would be applied when determining mitigation requirements. Section 8.3.3.3 suggests that the 6.5 mm threshold will define setback distances; there is no indication whether the 1.5 mm conservative threshold would be considered. The EIS does not provide sufficient rationale for the use of 6.5 mm as the threshold for deposition of drill cuttings on sensitive benthic coral and sponge species.

Section 8.5.1 indicates that pre-drill coral surveys would be undertaken and the anchor set with a set-back distance of 50 m, where applicable. This is the first reference of this particular set-back distance; Section 2.5.2.1 indicates 50 m as the survey radius around potential anchor points but does not commit to a set-back distance.

Setting back anchors 50 m from corals may not be sufficient as the cables or chains also need to be considered. If corals are in the area where an anchor is to be set, would the anchor be offset so that the anchor and its cable or chain would not come in contact with the corals?

Specific Question/Information Requirement: For a typical well, provide an estimate of the maximum area that could be affected by sediment deposition thicknesses above each of the stated thresholds. Ensure the rationale for selecting representative worst-case data is clearly explained.

Provide more information on how setback distances would be determined for both anchored/moored and dynamic positioned drilling installations, including:

- A rationale for the use of 6.5 millimetres as the threshold for effects on sensitive benthic species given that the reported burial depth of 1.5 millimetres has been suggested as a conservative value for assessing effects related to drilling discharges.
- Additional information on how/if two different thresholds may be used to determine required setback distances. For example, could selection of threshold be dependent on the sensitivity of species identified during the pre-drill survey? If a species could not be identified definitively, would a precautionary approach be taken?
- An explanation of whether distances to threshold would be defined based on average thickness or on maximum thicknesses. If based on average thickness, provide a rationale for how this is protective of benthic habitat.

Consider potential effects of anchors and associated moorings on benthos, including corals and sponges.

Discuss whether following anchor deployment, the anchor placement would be verified with an remotely operated vehicle (ROV) video survey prior to tensioning, and whether anchors would be repositioned via ROV in instances where they have settled on sensitive habitat.

Update proposed mitigation and follow-up and associated effects predictions, as applicable.

IR-22 (KMKNO-17)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Section 6.1.3, Fish and Fish Habitat, and 8.1, Follow-up.

Reference to EIS: Section 17.4.1, Follow-up Programs.

Context and Rationale: The EIS proposes that a follow-up program to validate and verify cuttings dispersion modelling would only be conducted under specific circumstances, such as the presence of sensitive habitat (Section 17.4.1).

Specific Question/Information Requirement: Explain whether drill cuttings modelling predictions would be verified through a follow-up program in circumstances other than if drilling

would occur in the presence of sensitive habitat. Define sensitive habitat that would qualify for follow-up (e.g. species types, abundance, distance from drilling unit).

IR-23 (WM-STAT5, DFO-1 KMKNO–1, KMKNO-31)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Section 6.1.3, Fish and Fish Habitat, and 6.4, Mitigation Measures.

Reference to EIS: Section 2.5.2.1, Wellsite Surveys – Drill Planning; 6.1.1.4, Use and Adequacy of Existing Environmental Information for EIS Purposes; 8.3.2, Summary of Key Mitigation; 8.3.3.3, Interaction with Benthic Environment; and Table 17.2 Summary of Mitigation and Commitments.

Context and Rationale: There is inconsistent information in the EIS on the circumstances under which a pre-drill coral survey would be conducted. Section 6.1.1.4 of the EIS indicates that the pre-drill coral survey would be carried out at *all* wells drilled as part of the Project, while Section 8.3.3.3 indicates that surveys would occur where coral colonies are likely to be present.

Section 2.5.2.1 outlines proposed pre-drill surveys, which would be based on the Norwegian Oil and Gas Authority guidelines for drilling activities in areas with the presence of cold water corals.

Table 17.2 (item 14) implies that a well would be relocated and/or water-based mud (WBM) cuttings discharge would be redirected to protect sensitive benthic habitat (i.e. corals and sponges). It is not clear whether the mitigation measures proposed to be implemented apply to all sensitive marine benthic habitats, or just if coral and sponge habitat is detected.

Section 8.3.2 of the EIS indicates that, in the event of a discovery of sensitive benthic habitat during the pre-drill coral survey, cuttings discharge may be relocated using a subsea cuttings transport system. This potential alternative means of carrying out the Project, including potential environmental effects, is not addressed in Section 2.10 of the EIS. As required by the EIS Guidelines and the Agency guidance document *Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012*, if more than one alternative means may be used to carry out the designated project, the consideration of effects of multiple alternative means should be brought forward through the environmental assessment.

Specific Question/Information Requirement: Clarify the commitments related to when coral surveys following the Norwegian protocol would be undertaken (i.e. would these be undertaken at all well sites?). If coral surveys are not proposed at all well sites, state if other measures are proposed to mitigate potential effects on sensitive benthic organisms.

Provide further information on the Norwegian survey protocol, specifically methodology that would be followed as well as any potential adaptations that might be incorporated into the approach for the Project.

Clarify whether the surveys would seek to identify only corals and sponges, or whether other habitat features would be included in the definition of sensitive marine habitat. Specify whether the pre-drill survey could be modified to also include species at risk.

Indicate the criteria that would be used to determine selection of mitigation measures. For example, what criteria would guide the decision to move a wellsite versus redirecting cuttings discharge location? Explain whether mitigation would be implemented for all coral and sponge species and abundances.

Provide additional information on the potential mitigations that the proponent would implement if other sensitive marine benthic habitat is detected.

Provide additional information on the subsea cuttings transport system and potential environmental effects of this mitigation measure in the consideration of alternative means of carrying out the Project.

Explain whether a pre-drill coral survey would be conducted if a drill ship is used to account for dynamic positioning (DP) requiring the placement of an array of transponder beacons directly on the seabed.

State whether the proponent intends to share seabed survey footage or results.

IR-24 (KMKNO-20, WM-EM-13 and -34)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat.

Reference to EIS: Section 6.1.7.1 Grand Bank Shelf and Slope (Project Area – Northern and Southern Sections).

Context and Rationale: The EIS Guidelines require that the assessment considers effects on primary and secondary productivity of water bodies and how Project-related effects may affect fish food sources.

The EIS provided limited information as to how the Project may affect food sources. While there is some reference to phytoplankton (primary production), the assessment is insufficient regarding potential effects to zooplankton (secondary production), and how this may affect fish.

Section 6.1.7.1 of the EIS indicates that densities of capelin, a key prey source for many other marine fish, bird and mammal species, are at regionally high levels in the Project area. Section 8.0 of the EIS presents some references specific to capelin, but the analysis of effects is general to fish and fish habitat. Detailed analysis on important indicator species/species groups, such as forage fish, is not provided.

Specific Question/Information Requirement: Discuss how the Project could affect the distribution, abundance or quality of zooplankton, including during regular operations and as a result of accidents and malfunctions. Discuss how such changes could affect marine mammals and sea turtles that rely on this food source, with specific consideration of potential effects on species at risk.

Provide a focused analysis specific to the effects of the Project on forage fish species, such as capelin and herring, with particular consideration of effects of waste discharge, vertical seismic surveys, and accidental events. Update the proposed mitigation and follow-up, as well as effects predictions, accordingly.

IR-25 (KMKNO–28 and -38, MTI-12 and -13, MMS-4)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, 6.3.3 Marine Mammals; and 6.3.4, Marine Turtles.

Reference to EIS: Section 10.0, Marine Mammals and Sea Turtles: Environmental Effects Assessment.

Context and Rationale: The Agency received comments from Indigenous groups about mitigation of effects on marine mammals.

KMKNO has commented that vessels should be required to reduce speeds (10-knot limit) when not in existing shipping lanes and/or whenever a marine mammal or sea turtle is observed or reported in the vicinity. This is particularly important given the recent deaths of North Atlantic right whales attributable to blunt force trauma. It is possible that North Atlantic right whales would occur in the Project area.

Potential Project vessel traffic routes are illustrated on Figure 2-3 (ExxonMobil) and Figure 2-5 (Statoil) as direct lines between the drilling installations and the supply base, only linking up with existing vessel traffic routes where these happen to intersect. KMKNO has recommended that to minimize the risk of collision with marine mammals and sea turtles and to minimize the potential for interference with commercial fisheries, Project vessel traffic routes link up with existing shipping lanes at the earliest practicable opportunity, even where this may result in moderately decreased efficiency.

To reduce the adverse effects of drilling activities on marine mammals, MTI has suggested that additional mitigation measures should be considered. MTI suggested that drilling be avoided during the period in which North Atlantic right whales are more likely to be present in the Project area (May 1 – September 1), as well as that if observations of individual North Atlantic right whales are made within close proximity during drilling activities, drilling should be put on hold.

Specific Question/Information Requirement: Define speed limits that supply vessels operating outside of shipping lanes would adhere to and consider the associated potential for effects on marine mammals.

Discuss where project vessel traffic routes would link up with existing shipping lanes.

Advise whether additional mitigation or follow-up measures are under consideration and would be implemented given the potential effects of the Project on marine mammals.

IR-26

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, 6.3.3, Marine Mammals; 6.3.4, Marine Turtles; and 6.3.6, Federal Species at Risk.

Reference to EIS: Section 10.3.8, Supply and Servicing and 10.5, Significance of Residual Environmental Effects.

Context and Rationale: The EIS states that vessel transits will "add a small amount of additional vessel traffic and an associated increase in vessel strike risk when travelling through the RSA". The EIS does not discuss how these vessel strikes would be reported to the authorities (e.g. DFO).

Specific Question/Information Requirement: Explain what procedures are in place for notifications of organizations such as DFO and the Canadian Coast Guard 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 should a vessel strike occur. As part of a follow-up program, explain how this information would be used to verify effects predictions or test mitigation effectiveness.

Migratory Birds

IR-27 (MTI-14 and -17, KMKNO-25, ECCC-6 and -7)

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Part 2, Section 6.3.5, Migratory Birds; and 6.6.3, Cumulative Effects Assessment.

Reference to EIS: Section 9.3.3, Presence and Operation of Drilling Installation.

Context and Rationale: Table 14.6 (Cumulative Effects) states that the interactions between the oil platform and migratory birds are anticipated to be confined to within 5 kilometres of the source of lighting, based on Poot et al. (2008). However, Poot et al. (2008) state that their study design could not rule out that birds were attracted to fully lit oil platforms at much greater distances. Environment and Climate Change Canada (ECCC) has advised that the EIS overstates the result of the cited paper, which states: "The impression that we derived from our observations on oil platforms leading up to this study was that birds could be attracted from up to 5 km distance with full lighting (30 kW)… We cannot rule out the possibility that the birds that passed by in this study were already attracted to the experimental lamps from a much greater distance."

The EIS states that "[o]verall… the planned presence and operation for the drilling installation… is anticipated to be a negligible addition to the total amount of lighting in the overall offshore area…". ECCC has advised that drilling operations emit considerable amounts of light and would be detectable to the birds in the area, especially storm-petrels, regardless of the other light sources in the area. Each additional platform would emit lights that would attract birds and should therefore not be considered "a negligible addition". Additionally, the Northern Section of the Project area currently has less light pollution than the more active Southern Section, due to the lack of presence of active oil activity. The Northern Section is largely located in deep waters (greater than 1 kilometre in depth) beyond the continental shelf, and therefore is not as disturbed by other offshore activities (e.g. fishing) to the extent of the Southern Section. The proposed new light source(s) in the Northern Section of the Project area as a result of the Project may have a comparatively larger direct and/or cumulative effect in what is currently a darker environment, compared to a new light source in the Southern Section.

The EIS recognizes the potential effect of lighting on migratory birds, and Section 9.3.3 indicates that the colour of lighting, light intensity, and shielding lights downward have been shown to reduce attraction risks. However, specific mitigation measures related to lighting and bird attraction are not provided.

Section 2.10.1.5 presents alternatives for offshore drilling installation lighting. While standard lighting is shown to be the preferred option over spectral lighting and no lighting, there is no discussion of measures that may be taken to minimize the effects of lighting while using standard lighting.

Specific Question/Information Requirement: Update the assessment of effects of light on migratory birds taking into consideration differences in existing/proposed background lighting in ELs in the two areas.

Provide evidence to support the statement that bird attraction is limited to five kilometers given that the Poot et al. 2008 study could not eliminate the possibility that birds are attracted at greater distances. If birds could be attracted beyond 5 km, discuss implications for the assessment of associated effects.

Describe measures to minimize the effects of lighting from the Project on migratory birds. Include considerations of lighting intensity, colour of lighting and shielding light downward. Consider potential need for additional follow-up related effects on migratory birds.

Update proposed mitigation, follow-up and significance predictions accordingly.

IR-28 (ECCC-9, MTI-17, KMKNO-25)
Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Section 6.3.5, Predicted Effects on Valued Components – Migratory Birds.

Reference to EIS: Section 9.3.5 Effects Assessment: Formation Flow Testing with Flaring – Flares.

Context and Rationale: The EIS states that the few studies to date have seen little or no bird mortality at flares (p. 897), but the discussion fails to mention how episodic in nature such mortality can be. The studies that have tried to examine mortality at flares may not have documented much mortality because the events are infrequent. The Canaport liquid natural gas facility in 2013 had a flare mortality event where 7,500 birds were estimated to be killed in one flaring event, illustrating episodic mass mortality at flares.

The discussion of potential measures to mitigate effects of flaring is limited.

Specific Question/Information Requirement: Discuss the potential effects for large-scale, episodic mortality in flaring events. The discussion should include consideration of mass mortality events which may occur, albeit infrequently, making them difficult to measure.

Discuss potential measures that could mitigate the effects of flaring on migratory birds, including use of a water curtain around the flare during flaring, minimizing night-time flaring and/or not flaring during periods of bird vulnerability.

IR-29

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Part 2, Section 6.3.5, Migratory Birds.

Reference to EIS: Section 9.3.3, Presence and Operation of Drilling Installation.

Context and Rationale: Section 9.3.3 provides results of bird searches on board offshore platforms and vessels, over non-continuous timelines between 1998 and 2015. However, more information is required to determine the relevance to the current project's effects assessment.

Specific Question/Information Requirement: With respect to the data provided on the bird searches carried out on Statoil facilities and vessels, between 2012 and 2015:

- Confirm the geographic location of the Statoil facilities: were they located in the region of the Project area under consideration?

- Were bird searches conducted on exploration platforms, or both exploration and production, and did they cover the full range of activity (i.e. periods of flaring)?
- What are the species of birds that did not survive?
- Provide additional information on the time of year that the bird searches were conducted, as it states that most of the strandings occurred in the summer months (June to August), but that the searches were not consistent throughout the year. The time of year that searches were conducted may influence the results with respect to the species of birds stranded and the statement that most strandings occurred in the summer months.
- Provide a reference for the Statoil data.

With regards to the information reported by Husky Energy (2000):

- Is there any additional information available from the Terra Nova vessel that may be relevant?
- The EIS states that Husky Energy reported 52 Leach's storm-petrels were recovered over a three-week period. Were there other species recovered during that time or was the survey focused only on reporting numbers of Leach's storm-petrel? In relation to operations, was the three-week period representative (i.e. how long was the vessel actively drilling? Was the majority of drilling in the summer, or did it span spring and fall?)?

Provide additional information and context on the Baillie et al. (2005) reference, which is quoted in the EIS to have reported 469 stranded birds (mostly Leach's storm-petrels) at offshore installations and vessels off Newfoundland between 1998 and 2002. Additional information should include other species found, time of year covered during the period during which information was collected, and if there was any noted differences in numbers or species composition of birds collected on platforms versus support vessels. Further, provide support for the use of this reference, as the fate of more than half of the birds was not recorded.

With respect to information on bird strandings referred to in the EIS from Ellis et al. (2013) and Environment Canada (2015), confirm if these results were specific to vessels used by the offshore oil and gas industry or were results from monitoring of various vessel types (offshore oil and gas, fishing, research, military vessels, etc.).

Based on the additional information, update the effects analysis, conclusions and proposed mitigation and follow-up, as applicable.

IR-30 (ECCC-4 and -11, WM-EM-17 and -38, WM-Stat-8, -9 and -19, MTI-18)
Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Section 6.3.5, Predicted Effects on Valued Components – Migratory Birds; Section 8, Follow-up and Monitoring Programs.

Reference to EIS: Section 9.2, Summary of Potential Effects, Table 9.1; 9.3.3, Effects Assessment – Presence and Operation of the Drilling Installation;9.3.5, Effects Assessment – Formation Flow Testing with Flaring;9.3.8, Supply and Servicing; 9.5.1, Residual Environmental Effects Summary, Table 9.4 Environmental Effects Assessment Summary: Marine and Migratory Birds – Overall Project; and 9.6, Environmental Monitoring and Follow-up.

Context and Rationale: While the proponent has committed to using the Canadian Wildlife Service's guidance for handling and documenting stranded birds, the document does not outline methods for conducting the searches.

The EIS refers to protocols for handling stranded birds, but handling protocols are distinct from systematic searching protocols. Searching protocols which document searching effort need to be developed by the proponent. ECCC has advised that systematic deck searches for stranded birds conducted by trained observers should be undertaken instead of opportunistic searches. These systematic searches should occur at least daily, and have search effort documented and observations recorded (including notes of effort when no birds are found). ECCC should be consulted in the development of systematic monitoring protocols.

It is indicated that a trained environmental observer will be on board. It is not clear who would deliver training for the environmental observer or what this training would comprise. ECCC has advised that it should conduct training for seabird observations

ECCC has advised that until an adequate estimate of strandings and mortality at offshore infrastructure is obtained, there is uncertainty as to the level of effect. There cannot be a *moderate*

to *high* level of certainty that the Project is not likely to result in significant adverse environmental effects on the Leach's storm-petrel, whose populations are in decline.

Specific Question/Information Requirement: Consider whether the "certainty" of effects predictions related to migratory birds requires revision, taking into account advice from ECCC. Explain the associated rationale and update the effects predictions accordingly.

Discuss the follow-up program proposed by ECCC in relation to the potential effects of the Project, taking into consideration the certainty/uncertainty of predictions. Confirm whether the proponent intends to:

- implement a comprehensive, scientifically rigorous and systematic protocol to search for and document stranded birds on the drilling unit and the platform supply vessels for the duration of the drilling program; and
- have its environmental observers engaged in seabird observations trained by ECCC.

IR-31 (MTI-14 and -16, WM-EM-29,- 43,-32, and -50, WM-Stat-8, -9 and -19)
Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Part 2, Section 6.3.5, Migratory Birds.

Reference to EIS: Section 9.3.2, Summary of Key Mitigations.

Context and Rationale: MTI has recommended that onsite observers and/or automated sensors on platforms be utilized to reduce uncertainty related to seabird attraction to platforms, mortality events, and chronic spills and discharges. They reference a paper, which makes further suggestions for monitoring (Fraser and Racine, 2016: https://nlenvironmentnetwork.files.wordpress.com/2016/05/fraser_racine_spills_seabirds-2016.pdf).

Specific Question/Information Requirement: Take into consideration MTI's recommendations, review and provide a rationale related to the potential need for implementation of additional measures to monitor potential effects of the Project on migratory birds and associated economic/technical feasibility of these measures.

IR-32 (ECCC-8, WM-EM-31)

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Section 6.3.5, Predicted Effects on Valued Components – Migratory Birds.

Reference to EIS: Section 9.3.3, Effects Assessment – Presence and Operation of the Drilling Installation.

Context and Rationale: The EIS states that "… potential disturbance will be short term … between 35 and 65 days …".

ECCC has advised that Leach's storm-petrels breeding on both Gull Island and Baccalieu Island forage in the proposed area during the breeding season. Therefore, effects on breeding birds could be high. Depending on the timing of the disturbance, the potential effects of light attraction caused by the Project has the potential to effect significant numbers of Leach's storm-petrel. For example, if activities take place during the autumn when young birds have left the colonies, numbers would be especially high.

The EIS states that "(t)he drilling installation will be situated several hundred kilometres offshore, which is far from coastal breeding sites and IBAs, and well beyond the foraging range of almost all species that nest in Newfoundland other than the Leach's storm-petrel, which is known to make foraging trips of thousands of kilometres during the breeding season (Pollet et al., 2014). Therefore, effects on most breeding birds will be low" (pp. 893–894).

The EIS has concluded that the effects of the Project on most breeding birds would be low. ECCC has advised that insufficient information has been provided to provide confidence in that conclusion. ECCC has indicated that while the effects on most breeding bird species would be low, the number of individual birds potentially affected may be high. Most breeding birds in eastern Newfoundland are in fact Leach's storm-petrels, with Baccalieu Island alone hosting 4 million breeding individuals.

A submission from the public states that there is concern associated with the disappearance of 2.7 million Leach's storm-petrels and the role of light attraction, platform collision and oiling since offshore production came on line (Wiese et al., 2001). This decline represents 25 to 40 percent of the mature species population (Birdlife International, 2017).

Specific Question/Information Requirement: Taking into account the information provided about the Leach's storm-petrel, including the status of the species, provide further information and analysis on the potential effects of the Project on this species to support the prediction that negative effects on the population would be of low magnitude, and reversible. Update the analysis, potential mitigation, and follow-up, as well as significance predictions, as applicable.

IR-33 (WM-EM-27 and WM-STAT-22)
Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Section 6.1.5, Species at Risk.

Reference to EIS: Section 6.2, Marine and Migratory Birds.

Context and Rationale: The current EIS does not consider avian species listed on the *IUCN Red List of Threatened Species*, such as the Bermuda petrel (*Pterodroma cahow*), and white-tailed tropicbird (*Phaethon lepturus*).

The Bermudan white-tailed tropicbirds have been found in the Project area (Mejías et al., 2017) during the non-breeding season. They are one of the most endangered species of seabirds with a population of 146 mature individuals (BirdLife International, 2016).

Specific Question/Information Requirement: Include a list of bird species classified on the *IUCN Red List of Threatened Species*, which may be found in the Project area along with their status. Assess potential effects of the Project on these species, and update potential mitigation and follow-up, as well as effects predictions, as applicable.

IR-34 (ECCC-5)

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Section 6.3.5, Predicted effects on valued components – Migratory Birds.

Reference to EIS: Section 9.2, Potential Environmental Changes, Effects, and Associated Parameters, Table 9.2 Potential Project –VC Interactions: Marine and Migratory Birds.

Context and Rationale: ECCC has advised that the matrix of potential interactions should be updated. Some migratory birds are attracted to oil slicks, and oil has the potential to change habitat quality. Flaring affects behavioural patterns in migratory birds. Seismic surveys (as part of the geophysical surveys) may change food availability, due to prey being impacted by seismic activity.

Specific Question/Information Requirement: Update the effects analysis taking into account the following interactions or provide additional rationale to explain why they were excluded from consideration:

- drilling and associated discharges: avifauna presence and abundance;
- drilling and associated discharges: habitat quality;
- flaring: Behavioural effects; and
- geophysical Surveys: food availability.

Update the analysis of effects, proposed mitigation and follow-up, and significance predictions, as applicable.

IR-35 (WM-EM-35 and -38)

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Section 6.3.5, Predicted effects on valued components – Migratory Birds.

Reference to EIS: Section 15.5.2.3.2, Uncontrolled Well Event.

Context and Rationale: The EIS states that "based on vulnerability indices (French-McCay 2009) the mortality rate would range from 35 to 95 percent for birds that come in contact with the slick in the 0.01–0.1 mm thickness range. Murres and dovekies, which spend most of their time sitting on the water's surface, are most vulnerable (estimated 95 percent mortality), while species that dive or feed at the water's surface for their prey but otherwise spend little time on the water, including Leach's storm-petrels, great shearwaters, and great skuas, are predicted to have a lower mortality rate of 35 percent. Black-legged kittiwakes and Northern gannets, which do often sit on the water but spend more time in the air than Alcids (murres and dovekies), would be expected to have an intermediate mortality rate." It is not clear based on the information provided in the EIS how the vulnerability of various bird species was estimated based on French-McCay (2009) vulnerability indices.

Specific Question/Information Requirement: Provide the vulnerability indices relied upon for the above information and use these indices to provide further rationale that seabirds spending more time in the air are less likely to suffer from water contaminants and oil spills. In light of diving birds being susceptible to surface oil, explain how mortality rates were assumed from the literature. Describe any measures that would be put into place to prevent bird mortality from water contaminants and oils spills.

Species at Risk

IR-36 (DFO-25)

Project Effects Link to CEAA 2012: 5(1); 79(2) Species at Risk.

Reference to EIS Guidelines: Part 2, 6.3.6, Federal Species at Risk; 6.4, Mitigation; 8.0, Follow-up and Monitoring Programs.

Reference to EIS: Section 5.2, Identification and Selection of Valued Components.

Context and Rationale: 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 under the *Species at Risk Act* (SARA) and, if the Project is carried out, must ensure that specific 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 Committee on the Status of Endangered Wildlife in Canada (COSEWIC) species, the Agency requires an assessment of effects on these species as well as an account of measures that could be taken to avoid or lessen effects and to monitor them. The EIS Guidelines require direct and indirect effects on the survival or recovery of federally listed species to be described (Section 6.3.6).

While the EIS provides a description of most species at risk and considers potential effects of the Project on these within other more general valued components, in some cases the analysis pertaining to specific species is limited. For example, while Table 10.4 identifies a high or moderate potential for interaction between the Project and fin and Northern bottlenose whales and the harbour porpoise, no further effects analysis specific to these species is completed. It is not explained how the mitigation measures for general VCs are consistent with applicable recovery strategies and action plans. In some cases, action plans have not been referenced (e.g. bottlenose whale), while in other cases, references to management plans are outdated (e.g. fin whale, Sowerby's beaked whale).

DFO has advised that certain species designated by COSEWIC have not been included in the assessment (e.g. lumpfish [Threatened], white hake [Atlantic and Northern Gulf of St. Lawrence population; Threatened]). In addition, the EIS includes errors in risk categories for species at risk as well as inconsistencies in its descriptions between sections (Appendix A).

Specific Question/Information Requirement: Update information related to species at risk for those species that are predicted to interact with the Project, including:

- a listing of species for which there are recovery strategies or action plans;
- a description of key threats to species at risk as included in applicable recovery strategies and action plans as relevant to the Project, as well as the potential contribution of project activities to these threats.

In addition, with consideration of the high or moderate likelihood of interaction between the Project and the Fin- and Northern bottlenose whales and Harbour porpoise, provide an analysis of potential effects of the Project on these species.

Describe lumpfish and white hake (Atlantic and Northern Gulf of St. Lawrence population) and their habitat within areas that could be affected by the Project. Update the effects assessment, potential mitigation, and follow-up, as appropriate.

Resulting analysis should take into consideration clarifications and corrections described in Appendix A.

IR-37

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1, Fish and Fish Habitat; 6.3.6, Species at Risk.

Reference to EIS: Table 8.12

Context and Rationale: Table 8.12 indicates marine fish species at risk likely to be encountered within the Project area and summarizes potential interactions. All species are indicated as having a "limited potential for interaction" with the Project due to mobility of species, project mitigation, and absence of critical habitat. Species abundance and seasonal presence in the Project area does not appear to have been considered in assigning potential for interaction.

The table also identifies four species for which there is "potential for long term adverse effects with accidental events". There is no indication of why this potential has been identified for these four species, or why it has not been indicated for any of the other species.

Specific Question/Information Requirement: Provide additional rationale for the summary of potential interactions identified in Table 8.12, considering:

- How abundance, timing of presence (i.e. infrequent occurrence versus year-round presence), and life-cycle (i.e. spawning/presence of eggs/larvae/rearing) may be indicative of varying potential for interaction with the Project.
- Define the criteria used to determine which species have the potential for long-term adverse effects from accidental events, and ensure the criteria are consistently applied to each species listed in Table 8.12.

Update effects predictions accordingly, if applicable.

IR-38 (KMKNO-29)
Project Effects Link to CEAA 2012: 5(1); 79(2) Species at Risk.

Reference to EIS Guidelines: Part 2, Section 6.1.5, Species at Risk; 6.1.6, Marine Mammals; 6.1.7, Marine Turtles.

Reference to EIS: Table 17.2 Summary of Mitigation and Commitments; Section 10.3.2, Summary of Key Mitigation.

Context and Rationale: Table 17.2 of the EIS states that there will be "shut down of the seismic source array if a marine mammal or sea turtle listed as endangered or threatened on SARA Schedule 1 is sighted within the safety zone", while Section 10.3.2 of the EIS states that "MMOs will implement a pre-ramp up watch of 30 minutes prior to the start of the air source. Ramp-up will be delayed if marine mammal or sea turtle is sighted within the safety zone." It is unclear whether shutdown would occur if any marine mammal or sea turtle is sighted or only if endangered or threatened species are sighted.

KMKNO has asked about the feasibility of extending the safety zone during VSP (e.g. to a radius of 1 kilometre from the installation).

Specific Question/Information Requirement: Describe seismic source array shut down procedures should marine mammals or sea turtles be sighted during ramp up. Explain whether shut down would occur upon sighting of any marine mammal or sea turtle or only if they are a SARA listed species. Should shut down only occur on sighting of listed species, provide an explanation of how these species would be identified.

Discuss the need for and feasibility of extending the safety zone during VSP.

Special Areas

IR-39 (DFO-12, -16, -17 and -18)

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 1.1, Project Location.

Reference to EIS: Section 6.1.10, Special Areas of Importance to Marine Fish; 6.4.2.3, Fisheries Closure Areas within Canada's Exclusive Economic Zone.

Context and Rationale: There are inconsistencies between Tables 6.23, 6.46, and 6.48 and Figure 9-96; and some marine refuges and Ecologically and Biologically Significant Areas (EBSAs) were not included.

Gander Bay Lobster and Gooseberry Island Lobster Closures fall within the Regional Study Area, but are not addressed in the EIS (http://www.dfo-mpo.gc.ca/oceans/conservation/achievement-reussite-eng.html).

A new *Fisheries Act* closure, the Northeast Newfoundland Slope Closure/Marine Refuge area, has been established for sensitive benthic habitat. Bottom contact fishing is prohibited in this area, which overlaps with the Northern Section of the Project Area.

There are several additional EBSA identified by the Conference of the Parties to the United Nations Convention on Biological Diversity located outside Canada's exclusive economic zone in the Northwest Atlantic, some of which overlap the Regional Study Area and project area. These areas include: Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank; Slopes of the Flemish Cap and Grand Bank; Orphan Knoll; Seabird Foraging Zone in the Southern Labrador Sea; and Labrador Sea Deep Convection Area. Relevant documents can be found at:

- http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz/refuges/index-eng.html;
- http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz/refuges/northeastnewfoundlandslope-talusnordestdeterreneuve-eng.html;
- https://chm.cbd.int/database/record?documentID=204104;
- https://chm.cbd.int/database/record?documentID=204102;
- https://chm.cbd.int/database/record?documentID=204101.

Some areas are included in the analysis but their status requires further consideration (e.g. the Orphan Knoll EBSA https://chm.cbd.int/database/record?documentID=204103).

Specific Question/Information Requirement: Provide updated tables and related figure with listings of all special areas that could be affected by the Project. Indicate distance to ELs and potential for vessels to transect special areas. Where analysis in relation to specific special areas has not been included in the EIS (e.g. Gander Bay Lobster and Gooseberry Island Lobster Closure; Northeast Newfoundland Slope Closure Marine Refuge Area; Slopes of Flemish Cap and Grand Bank EBSA, Seabird Forage Zone in Southern Labrador Sea and the Labrador Sea Deep Convection Area EBSA), conduct an assessment of potential effects, proposed mitigation and follow-up, as well as effects predictions, for routine activities and accidental events.

IR-40

Project Effects Link to CEAA 2012: All – Special Areas.

Reference to EIS Guidelines: Part 2, Section 6.3.8.3, Special Areas.

Reference to EIS: Section 15.5.4.5, Determination of Significance.

Context and Rationale: Section 6.3.8.3 of the EIS Guidelines requires consideration of the effects of the Project on special areas, including, but not limited to the use of dispersants, and change to habitat quality (e.g. noise, light, water, sediment quality). The EIS identifies several special areas within the regional study area, but does not consider the effects of noise, light, or water, and sediment quality in relation to special areas as required by the EIS Guidelines. The EIS indicates that the analysis of effects on special areas is covered in other valued component sections; however, it is not clear where and how routine effects on special areas have been fully considered.

Section 15.5.4.5 of the EIS concludes that the effects of accidents on special areas will not be significant, but also states that "(i)n the extremely unlikely event of a subsurface blowout occurring within a Special Area, significant effects may result, depending on the nature of the Special Area, and the extent and duration of the spill event". The rationale for this apparent contradiction is not

clear; the worst-case scenario should be used to evaluate a single significance determination for special areas.

Specific Question/Information Requirement: Assess the potential environmental effects of routine Project operations (e.g. noise, light, water, sediment) on special areas that are both overlapping with the Project and on those to which potential effects may extend. Focus the assessment on the defining features of the special areas (e.g. components linked to "special" status).

Explain how significance criteria ratings were assigned to the potential for a worst-case accidental event on sensitive areas (including potential for accident to occur in a sensitive area). Provide a single determination of significance of effects of worst-case accidental events on special areas.

Commercial Fisheries

IR-41

Project Effects Link to CEAA 2012: 5(2)(b)(i) Health and Socio-economic Conditions.

Reference to EIS Guidelines: Part 2, Section 6.1.9.2, Human Environment.

Reference to EIS: Section 7.1.3.3, Potential Vessel and Aircraft Traffic Route.

Context and Rationale: Section 7.1.3.3 of the EIS states that while offshore fisheries are mainly snow crab, Northern shrimp, and some groundfish, there are other commercially important species within the vessel support transit routes (local study area (LSA) and/or regional study area (RSA)), including pelagic fisheries (capelin and herring) and coastal shellfish species (urchins, scallops, clams, and whelks). However, information on the value, location and size of harvest was not provided for these fisheries. As illustrated by Figure 7-27 (Fixed Gear Domestic Harvesting Locations, All Species, 2011–2015), and Figure 7-28 (Mobile Gear Domestic Harvesting Locations, All Species, 2011–2015), depending on locations of transit routes, there may be potential for interaction between support vessels and commercial fisheries.

Specific Question/Information Requirement: Conduct an assessment of potential interactions between commercial fisheries that may be operating within transit routes and vessel traffic. Update proposed mitigation and follow-up and effects predictions, as applicable.

IR-42

Project Effects Link to CEAA 2012: 5(2)(b)(i) Health and Socio-economic Conditions.

Reference to EIS Guidelines: Part 2, Section 6.3.8.2, Commercial Fisheries.

Reference to EIS: Section 13.3.5 Wellhead Decommissioning.

Context and Rationale: In the discussion of the wellhead decommissioning, the EIS states that in 2016, following consultation with fishery stakeholders, Statoil cut and removed four wellheads in the Project area; the height of the pipe remaining after wellhead removal ranged from 0.05 to 0.65 metres.

Section 13.3.5 indicates that planned wellhead removal in shallower areas, such as those found in the Project Area – Southern Section may take place within the safety zone, upon the completion of drilling and testing, and so no interactions with commercial fishing activity are expected. However, it also indicates that wellhead removal may take place at a later date, and would result in a short-term (i.e. few days) safety zone. It is unclear why the wellhead removal may occur later, and how much time could lapse before the wellhead is removed. Additional information is also required with respect to any concerns associated with commercial fisheries access if the wellhead is not removed immediately following drilling/testing.

Specific Question/Information Requirement: Provide clarification and additional information related to wellhead removal if it may be carried out at a later date. Describe possible timeline of wellhead removal if it is not completed immediately, the need for presence of a safety zone prior to wellhead removal, and potential reasons for delaying wellhead removal.

Provide an analysis of the potential effects of leaving wellheads in place for a period of time prior to removing them, with consideration of specific ELs under consideration and various water depths. The analysis should include information (statistics if available) on whether there has been damage to fishing gear in Atlantic Canada or elsewhere due to the presence of wellheads awaiting removal. It should also include information on whether there have previously been concerns raised by the fishing industry following the notification of the wellheads that were temporarily left in place.

IR-43 (DFO-10)

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes by Aboriginal Groups.

Reference to EIS Guidelines: Part 2, Section 6.1.8, Indigenous Peoples.

Reference to EIS: Section 7.3.1.5, Miawpukek First Nation.

Context and Rationale: The EIS Report notes that, "Miawpukek First Nation holds nine enterprises that permit access to 3KL. They hold three tuna commercial-communal licences that permit access to 3LN." DFO has advised that the Miawpukek First Nation holds fifteen enterprises that permit access to 3KL and six tuna commercial-communal licences that permit access to 3LN.

Specific Question/Information Requirement: Correct the information regarding the number of licences held by the Miawpukek First Nation.Based on the updated information provided by DFO, update the effects analysis, proposed mitigation and follow-up, as well as effects predictions accordingly.

Accidents and Malfunctions: Emergency Planning and Response

IR-44 (C-NLOPB-5: Statoil/-6: ExxonMobil)

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.4, Mitigation Measures.

Reference to EIS: Section 15.1.2.3.2 /15.1.2.2.2, Response Contractors and Agencies.

Context and Rationale: The EIS states that, in the event of a spill, the proponent may use Eastern Canada Response Corporation (ECRC) expertise and equipment. The C-NLOPB has advised that ECRC may be limited in their ability to respond outside the 200 nm Exclusive Economic Zone (EEZ).

Specific Question/Information Requirement: Confirm that organizations (such as ECRC) whose equipment and expertise may be used in case of a spill would have the ability to respond outside of

the 200 nm EEZ. Update the discussion of responses to accidental events, taking into account any potential situation in which ECRC or alternative contractor is not able to respond.

IR-45 (ECCC-12)
Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.1.2.3.6, Oiled Wildlife Response.

Context and Rationale: Though the suggested three-tiered oiled wildlife response approach is adequate, ECCC has recommended that it be expanded so that it can handle accidents broader than its current focus on oiled wildlife.

Specific Question/Information Requirement: In addition to current commitments, confirm the primary responses would include (i) surveillance to *identify migratory birds potentially at risk of being affected by incident*; and (ii) *removal of oil* (as well as deflecting it away from areas of high sensitivity).

In addition to current commitments, state whether tertiary response would also include: *removal and storage of deceased oiled wildlife*.

If these commitments would not be included in the oiled wildlife response approach provide a rational on why it is not deemed necessary.

IR-46 (C-NLOPB-7 and -8)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.3.2.2, Probability of Blowouts.

Context and Rationale: The EIS mentions two blowouts: the 1979 Ixtoc I well blowout and the DWH spill (2010 Macondo MC252 well blowout). The August 21, 2009 Montara blowout is not included.

Specific Question/Information Requirement: Provide a discussion of the August 21, 2009 Montara blowout and update the discussion of potential accidents and malfunctions accordingly.

Accidents and Malfunctions: Vessels, Synthetic-based Muds (SBMs), Riser and Equipment

IR-47 (NunatuKavut-7)

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Section 6.6.1, Effects of Potential Accidents or Malfunctions; Section 6.3.5 Migratory Birds.

Reference to EIS: Section 9.4, Species at Risk: Overview of Potential Effects and Key Mitigation; 15.2.2, Vessel Collision; 15.2.2.1, Transit to and from Project Area.

Context and Rationale: The EIS Guidelines state that there should be a consideration of effects of accidents in the near-shore environment, including effects on species at risk and their critical habitat, colonial nesters, and concentrations of birds and their habitat. Additionally, the EIS Guidelines require that direct and indirect adverse effects on migratory birds, that could result from project activities, including effects of spills in the nearshore (i.e. from vessel transit) or that reach land on land bird species, are discussed.

Section 15.2.2 of the EIS discusses the potential for vessel collisions and groundings on the transit route, and concludes that there is a very low potential for these events to occur, and that previous analysis indicated that a nearshore spill event would result in oil moving to the east and not contacting the shoreline; however, no further information on this is provided.

The EIS does not provide analysis of the effects of a nearshore spill from vessel traffic. The extent of oiling and time to reach shore from a nearshore spill along the transit route could have different environmental implications for coastal resources (e.g. bird colonies and other sensitive areas, coastal communities, nearshore fisheries) than from a spill originating offshore. There is also an

absence of information in the EIS of the effects of an accident or malfunction on nearshore and coastal birds.

Specific Question/Information Requirement:
(a) Provide a brief overview of the analysis that indicated that a nearshore spill event would result in oil moving to the east and not contacting the shoreline, including an explanation of how the analysis is applicable to the Project).
(b) Provide an assessment of the effects of accidents and malfunctions from a nearshore vessel spill on relevant valued components.

IR-48 (MTI-21)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.2, Potential Accidental Event Scenarios.

Context and Rationale: The EIS outlines the potential accidental event scenarios identified for the Project based on historic industry trends and incidents (Section 15.2). Spill scenarios identified for modelling were batch diesel spills and subsurface blowouts. Synthetic-based mud spills are identified in Section 15.2.6 as a potential accidental release, but were not modeled. Insufficient rationale and analysis is provided for this exclusion especially since the EIS reports that 95.5 percent of the volume of spills from exploration drilling in Newfoundland and Labrador between 1995 and 2015 were synthetic oils and fluids (Table 15.4 of EIS).

MTI has asked about the cumulative effects of multiple drilling fluid releases on species important to MTI, including swordfish, Atlantic salmon and Bluefin tuna.

Specific Question/Information Requirement: Provide additional rationale and analysis as to why modelling of a worst-case synthetic drilling fluid spill is not required to understand associated environmental effects, or consider this potential scenario in modelling. If modelling is conducted, ensure that the rationale for volume selected is clearly presented, taking into consideration

historical spills. Update the effects assessment accordingly, taking into account special areas and vulnerable species (e.g. corals and sponges).

IR-49 (CNLOPB Conformity)
Project Effects Link to CEAA 2012: Multiple VCs - Accidents and Malfunctions.

Reference to EIS Guidelines: Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.2, Potential Accidental Event Scenarios.

Context and Rationale: Section 15.2.3 of the EIS discusses the potential accidental event of dropped objects. The EIS concludes that the probability of such an occurrence is low, and that environmental effects would not be significant; however, there is no analysis describing what the potential environmental effects might be.

Section 8.3.7.2 of the EIS describes geological surveys that may be undertaken using a towed or ROV-mounted seabed camera / video system, grab samplers, gravity or piston core, box corer, and other sampling gear. There is no discussion in Section 15.2.3 of the EIS of the potential effects of accidental events associated with the loss of equipment, including if it is not recovered.

Specific Question/Information Requirement: Provide information on the potential environmental effects of a riser loss to substantiate the conclusion that associated effects would not be significant.

Provide an explanation of potential accidents and malfunctions that may occur as a result of the Project that were not identified or excluded. Comment on the probability for a marine riser-loss, and include an analysis of the potential environmental effects associated with the loss of equipment from geological surveys.

Accidents and Malfunctions: Model Inputs

IR-50 (ECCC-15)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.1.2.1.1, Source Control; 15.2.6.1, Subsurface Blowout; 15.3, Spill Risk and Probabilities; 15.4.1, Study Area and Scenarios; Appendix H Spill Prevention and Response; Section 1.2, Spill Response and Recovery; 2.1, Response Planning Basis.

In addition, in the Flemish Pass Exploration Drilling Project EIS: Section 15.1.2.2, Well Capping and Containment Plan; and Section 5.1, Relief Well Drilling Overview.

Context and Rationale: Statoil indicates the following metrics that are relevant to the scenario of a subsurface blowout:

- Water depths at drilling locations: 1100 metes and 2700 metres.
- Time to drill individual exploratory wells: 35 to 65 days.
- Estimated relief well drilling time: 100 to 113 days.

ExxonMobil indicates the following metrics that are relevant to the scenario of a subsurface blowout:

- Water depths at drilling locations: 89 metres and 362 metres.
- Time to drill individual exploratory wells: 35 to 65 days.
- Estimated relief well drilling time: 113 days.

Both EISs indicated that the estimated time to drill individual exploratory wells ranges from only 35 to 65 days.

Specific Question/Information Requirement: Provide a rationale as to why the estimated timeframe of 113 days to drill a relief well is up to three times longer than the indicated 35 to 65 days required to drill a typical exploratory well. Explain whether the mobile offshore drilling unit (MODU) used for exploration drilling could remain operational after a blowout and could therefore be utilized to drill a relief well.

IR-51 (NRCanIR-5)

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and Testing Activities.

Reference to EIS: Section 15.0, Accidental Events; and 15.4.3, Model Input Data.

Context and Rationale: The EIS shows the contents of crude oil "residuals" that are stated to be hydrocarbons that boil at temperatures >380°C and consist of aromatics ≥ 4 rings and aliphatics > C20 that are neither volatile nor soluble.

Specific Question/Information Requirement: This description of the crude oil heavy ends is not sufficient to predict the fate of the oil in terms of degradability and tendency to sink. Further explanation is needed to demonstrate why model outputs show oil degradability appearing to increase with increasing residuals contents when biodegradation studies demonstrate that oil degradability decreases with increasing residuals contents.

IR-52

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.0, Accidental Events.

Context and Rationale: There is no rationale provided for selection of 100 litres and 1000 litres as plausible "worst-case" scenarios for batch diesel spills, given the EIS states that average spills of this type have a volume less than 200 barrels (i.e. approximately 31,800 litres). Table 15.5 further indicates that 10 percent of diesel spills are in the range of 10 to 99 barrels (approximately 1590 litres to 15,740 litres).

Specific Question/Information Requirement: Update worst-case spill modelling and associated analysis for batch spills, taking into consideration the volume of diesel in past spills in offshore Newfoundland, or provide a robust rationale for the data inputs used in the oil spill models, including how they represent a worst-case scenario. Update the assessment of effects of accidents and malfunctions on relevant valued components, as applicable.

Accidents and Malfunctions: Dispersants

IR-53 (ECCC-13)

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.5.2.2.2, Effects of Dispersants on Marine and Migratory Birds (Flemish Pass Exploration Drilling Project); Section 15.5.1.2.2, Effects of Dispersants on Marine Fish and Fish Habitat (Eastern Newfoundland Offshore Exploration Drilling Project).

Context and Rationale: The EIS provides contradictory statements about the effectiveness of dispersants in oil degradation: the first paragraph of Section 15.5.2.2.2 states "(a)pplication of chemical dispersants reduces the risk of adverse effects on marine and migratory birds at the water's surface, and results in a far greater rate of biodegradation of oil to a matter of weeks rather than of years (Baelum et al, 2012)", while Section 15.5.1.2.2 states " (a)lthough it is generally agreed that dispersants increase the availability of the oil to the microbes in the water column by reducing the oil droplets size, there still remains some debate on the its effects on oil degradation rates (Brakstad et al., 2014, 2015; Kleindienst et al., 2015; Seidal et al., 2016)".

ECCC has offered a synthesis paper (Fingas, 2017) which summarizes more recent publications (from 2014–2017), wherein the authors found that "(t)he effect of dispersants on biodegradation is still a matter of dispute, however all but one study in the current series, showed dispersants inhibit biodegradation".

Specific Question/Information Requirement: Update the discussion of biodegradation of oil with and without chemical dispersants taking into consideration information from Fingas (2017).

Fingas, M. (2017) *A Review of Literature Related to Oil Spill Dispersants 2014-2017*. Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), Anchorage, Alaska. Pp. 264.

IR-54

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.5, Environmental Effects Assessment.

Context and Rationale: The use of dispersants to transform the surface oil to the water column for biodegradation is listed as a key mitigation measure. However, the effectiveness of dispersants in cold water may differ from those in warmer waters.

Specific Question/Information Requirement: Discuss the efficacy of dispersants in cold water.

IR-55 (KMKNO-54)

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.0, Accidental Events.

Context and Rationale: As described in the EIS (p. 1199), dispersants can be applied at surface (aerially or from vessels) or through subsea dispersant injection; however, the assessment of potential effects of dispersants on applicable VCs does not distinguish between these applications, which may present considerably different risks, effects, and benefits.

Specific Question/Information Requirement: Discuss differences in potential effects between subsea dispersant injection and surface dispersant application.

IR-56

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.5.1.5, Determination of Significance.

Context and Rationale: The EIS states "(a)s model predictions indicate minimal interactions with benthic habitats, it is expected there will be limited residual adverse effects on fish habitat and benthic species including sensitive coral and sponge species. However, eventual break down of oil material in marine environments may become transported to benthic habitats through microbial and plankton pathways through sinking and flocculation. In the context of applied mitigations, these adverse environmental effects are considered unlikely and therefore not predicted to have any significant effects on fish habitat."

However, the EIS does not consider the potential for chemical dispersants increasing the production of "marine snow" and increasing sedimentation of oil to the seafloor – potentially affecting benthic invertebrates and deep water coral. For example, it has been estimated that up to 14 percent of released oil from the Deepwater Horizon accident was settled on the seafloor due to marine snow sedimentation (Daley et al., 2016).

Specific Question/Information Requirement: Discuss the potential for chemical dispersants to increase 'marine snow' and sedimentation of oil to the seafloor, including how this could affect valued components, including benthic invertebrates and corals.

IR-57 (ECCC-13)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.5.2.2.2, Effects of Dispersants on Marine and Migratory Birds.

Context and Rationale: It is not known what the effects of dispersants alone may have on birds, and in particular on their plumage; dispersants are a surfactant and therefore may compromise the waterproofing of feathers in a similar manner to that of oil. The synthesis of the effects of dispersants on marine and migratory birds should be made more robust.

Specific Question/Information Requirement: Provide a thorough assessment of the effects of dispersants on migratory birds, including recent studies.

IR-58 (MMS-2)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15, Accidental Events.

Context and Rationale: Mi'gmawei Mawiomi Secretariat has asked about the probability that oil from a vessel spill or well blowout could reach the Gulf of St. Lawrence and the Gaspé Peninsula coast, even at concentrations below the ecological threshold.

Specific Question/Information Requirement: Discuss the probability that oil from a vessel spill or well blowout could reach the Gulf of St. Lawrence and the Gaspé Peninsula coast, and describe the potential environmental effects.

Accidents and Malfunctions: Capping Stack

IR-59 (KMKNO-)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Appendix H Capping Stack Technology Details; Section 3.1, Well Capping Overview; and 3.2.2, The Capping Stack System (CSS) (Flemish Pass Exploration Drilling Project).

Appendix H Spill Prevention and Response; Section 2.2.1, Well Intervention Options (Eastern Newfoundland Offshore Exploration Drilling Project).

Context and Rationale: The Newfoundland and Labrador government launched a plan to double offshore oil production by 2030 and the oil industry's target is to include more than 100 new exploration wells. A number of offshore exploration drilling projects are currently being proposed.

Specific Question/Information Requirement: Discuss the economic and technical feasibility of options for decreasing capping stack response times, taking into consideration: the potential to use other capping stacks, establishing a capping stack facility in eastern Canada, or having a capping stack available on a vessel for rapid deployment.

IR-60 (ECCC-17)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Appendix H Capping Stack Technology Details; Section 3.1, Well Capping Overview; 3.2.2, The Capping Stack System (CSS) (Flemish Pass Exploration Drilling Project).

Appendix H Spill Prevention and Response; Section 2.2.1, Well Intervention Options (Eastern Newfoundland Offshore Exploration Drilling Project).

Context and Rationale: The EIS states that a capping stack is a specialized piece of equipment used to "cap" (i.e. stop or divert) well flow while work is being undertaken to permanently kill the well (e.g. through relief well drilling). Both Statoil and ExxonMobil have provided technical details regarding the mobilization, deployment, and mechanics of capping stacks, but no information has been provided on their expected operational lifespan, the timing of decommissioning, or on any follow-up monitoring activities that would be required after a capping stack has been removed from a wellhead.

It is important to understand the lifespan and decommissioning implications for wells that may become compromised due to blowout events so as to better understand and characterize any longer-term environmental effects that may occur, and may therefore need to be monitored, at blowout-affected well sites.

Specific Question/Information Requirement: Given that a capping stack may have to remain affixed to a wellhead for an extended period of time should dynamic well kill measures prove unsuccessful, provide information on the operational lifespan of Oil Spill Response Limited's

(OSRL's) capping stacks and any contingencies in place to either extend their service or replace them.

Provide information on when a capping stack system may be decommissioned and describe any potential wellhead integrity monitoring efforts that would follow, including expected timeframes of such.

IR-61 (ECCC-16)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Appendix H, Capping Stack Technology Details; and Section 3.2.1, The Subsea Incident Response Toolkit (SIRT) (Flemish Pass Exploration Drilling Project).

Appendix H Spill Prevention and Response (Eastern Newfoundland Offshore Exploration Drilling Project).

Context and Rationale: Statoil's EIS indicates that, in preparation for the deployment of a capping stack, OSRL maintains the Subsea Well Intervention Service (SWIS)capping toolbox suite of equipment that includes the Subsea Incident Response Toolkit (SIRT), which is "stored in ready-for-shipment mode". However, no deployment timeframe has been provided. Likewise, there is no indication in the Eastern Newfoundland Offshore Exploration Drilling Project EIS of timelines related to the mobilization of the response toolkits.

It is important to understand the response measure timeframes involved with the deployment of all subsea incident response apparatus so that well control preparation activities and associated timeframes can be fully appreciated and the magnitude of environmental effects resulting from any extended timelines can be properly determined and characterized to the greatest extent possible in order to help inform a determination of significance of any residual effects.

Specific Question/Information Requirement: Provide the estimated timeframe for emergency deployment of the Subsea Incident Response Toolkit or alternate response toolkit to the Project

area in the event of an accidental event. Discuss implications of this timeframe for emergency response and effects predictions.

Accidents and Malfunctions: Effects

IR-62

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Section 6.6.1, Effects of Potential Accidents or Malfunctions; Section 6.3.5, Migratory Birds.

Reference to EIS: Section 15.4.4.5, Summary of Modelling Results; 15.5.2.3.2, Uncontrolled Well Event; 15.5.6.3.2, Uncontrolled Well Event.

Context and Rationale: Section 6.6.1 of the EIS Guidelines requires the proponent to identify areas that could potentially be affected by a worst-case scenario for each accident type. Section 15.4 of each EIS summarizes the potential for shoreline oiling as follows:

- For Flemish Pass Exploration Drilling Project: "If shoreline contact was predicted to occur, it would likely be localized to small portions of shoreline, but could occur from the Avalon Peninsula and the southeast coast of Newfoundland to the northern shores of Newfoundland, southeastern shores of Labrador and Sable Island, depending on the conditions."
- For Eastern Newfoundland Offshore Exploration Drilling Project: "If contact with shoreline did occur, it was predicted to be localized to regions of the Avalon Peninsula, southeast coast of Newfoundland, and Sable Island."

With the exception of some information on bird colonies and special areas in eastern Newfoundland and some marine mammal sightings on the eastern Avalon Peninsula, the EIS does not provide baseline data on the above identified areas, nor does Section 15.0 provide analysis of the effects of oil reaching these nearshore areas.

Section 15.5.2.3.2 notes that in a worst-case scenario, oil in concentrations between 100–500g/m2 could interact with areas of the Southern Avalon and south coast of the island near Burgeo. However, the EIS does not include any baseline information or effects analysis for piping plovers in

the Big Barasway Wildlife Reserve. While exposure is unlikely, it is noted that the exposure would be serious, particularly on the Avalon Peninsula. Table 9.3 states: "Piping plovers are unlikely to be affected by typical project activities due to their preference for coastal habitats, but accidental spills near breeding habitat could potentially be harmful." An effects analysis of nearshore spill for coastal seabird ecological reserves such as Baccalieu, Funk Island, Cape St. Mary's, and Witless Bay has not been included in the EIS.

Specific Question/Information Requirement: At a level commensurate with the potential for a spill to contact the shoreline, provide a general description of key valued components in nearshore areas potentially affected by a worst-case scenario spill, and a consideration of potential effects of worst-case shoreline oiling, including effects on applicable components (e.g. special areas, migratory birds, fish and fish habitat, socio-economic VCs).

IR-63 (NRCanIR-6)
Project Effects Link to CEAA 2012: Potential effects to 5(1)(b) Federal Lands /Transboundary.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.1.2.1, Contingency Planning; 15.1.2.3.3, Spill Response Tactics and Spill Impact Mitigation Assessment; Table 15.1 Spill Response Tactics.

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

In Section 15.1.2.1 of the EIS, controlled in-situ burning of thick oil on water surface is identified as a possible response to an oil spill. The EIS notes that authorization is required from the CNLOPB prior to implementing in-situ burning. Table 15.1 of the EIS identifies potential air quality effects of in-situ burning, but indicates that air quality monitoring is unlikely to be required due to the distance from human receptors. No further information on potential environmental effects is provided.

Natural Resources Canada has advised that in-situ burning of crude oils could result in incompletely combusted oil in the water.

Specific Question/Information Requirement: Provide a general discussion of the potential environmental effects of in situ burning on valued components.

Describe the potential for incomplete burning and resulting oil in the water and assess associated effects. Describe proposed mitigation and follow-up and update effects predictions, as applicable.

IR-64 (NRCanIR-7)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and testing activities.

Reference to EIS: Section 15.0, Accidental Events; 15.4.4.2.2, Water Column Exposure Cases.

Context and Rationale: The EIS states that the majority of the oil entrainment in the water column is due to wind-induced surface-breaking waves. There are multiple reasons for oil components to become suspended in the water column, and even sink. Crude oils are known to be persistent following a blowout scenario.

Specific Question/Information Requirement: Provide additional analysis of the portion of the crude oil that would persist in the environment, including an analysis of the effects of the persistent components on VCs, and possible follow up monitoring.

Mitigation

IR-65 (KMKNO-22, -23, -27 and -28, NunatuKavut-1)
Project Effects Link to CEAA 2012: All –Mitigation.

Reference to EIS Guidelines: Part 2, Section 6.3.8.3, Special Areas; Part 2, Section 6.4, Mitigation measures.

Reference to EIS: Section 4.3.3, Environmental Effects Assessment and Mitigation.

Context and Rationale: The EIS Guidelines 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 (Section 6.4). Mitigation measures are to be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation measure is designed to address.

Overall, the EIS does not explain how mitigation would be implemented and the specific environmental effects that each mitigation measure is meant to address. Section 4.3.3 of the EIS briefly explains how technically and economically feasible mitigation has been integrated into the effects assessment; however, it does not explain the effectiveness of mitigation in a clear and defined way.

Some specific examples are included below:

- The EIS provides a partial list of mitigation from the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* (SOCP) (DFO 2007). It is unclear why only a partial list is included and whether the proponent intends to implement all mitigation included in the document (Section 10.3.2).
- The EIS states that "project associated vessel traffic will be approximately eight to ten trips per month to service one drilling installation. Use of existing and common travel routes will be used where possible and practical. Vessels will maintain a steady course and safe vessel speed whenever possible." *Safe vessel speeds* are not defined and it is not explained under what circumstances vessels would have to deviate from existing travel routes.
- The EIS state that "low-level aircraft operations will be avoided where it is not required per Transport Canada protocols". Additional clarity is needed to better understand the potential for adverse effects arising from project- related helicopter traffic and how it is proposed to mitigate those effects.

Specific Question/Information Requirement: Review proposed mitigation measures in relation to all valued components and provide an updated list of mitigation measures that are specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent,

interpretation, and implementation. Ensure proposed mitigation measures are linked to the environmental effect(s) that they are meant to address and to proposed follow-up programs, as applicable.

In addition, address the specific questions below to enable a robust understanding of proposed commitments:

- Describe the specific mitigation measures that the proponent intends to implement that are described in the *Statement of Canadian Practice with respect to the Mitigation of Geophysical Sound in the Marine Environment* (DFO 2007).
- Define *safe vessel speed* and explain which environmental effects these speeds proposed to address (e.g. avoidance of marine mammals, fishers). Explain the location of *existing travel routes* and under what circumstances vessels may deviate from these travel routes. Explain under what circumstances it would not be possible to travel at the defined safe vessel speed.
- Provide additional information to explain how "low-level aircraft operations will be avoided where it is not required per Transport Canada protocols". Specify areas of 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/components cannot be avoided. Include information on specific altitude and lateral distance limits that would be used to avoid sensitive sites (e.g. bird colonies) and disturbance to marine mammals and sea turtles. Define "low-level aircraft operations".

Appendix A: Clarifications and Corrections Regarding Species at Risk

Reference to EIS: Section 6.3.7.1.8, Northern Bottlenose Whale.
Clarification/Correction Regarding Species at Risk: The 2017 Action Plan for the Northern bottlenose whale has not been referenced in the EIS http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Ap-Bottlenose-v00-2017Apr-Eng.pdf.

Reference to EIS: Section 6.3.7.1.4, Fin Whale; and 6.3.7.1.9, Sowerby's Beaked Whale.
Clarification/Correction Regarding Species at Risk: Outdated management plans have been referenced in the EIS for fin whale and Sowerby's beaked whale.

- Fin whale: http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Mp-FinWhaleAtlantic-v00-2017Jan24-Eng.pdf.
- Sowerby's beaked whale: http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Mp-Sowerbys-v00-2017Apr-Eng.pdf.

Reference to EIS: Section 6.1.8, Species at Risk, Table 6.20 Blue Shark and Shortfin Mako; 6.3.2, Overview, Table 6.37 Harp Seal; 10.4.1, Beluga Whale; 10.4, Species at Risk: Overview of Potential Effects and Key Mitigation, Table 10.4 Beluga Whale; 10.4, Species at Risk: Overview of Potential Effects and Key Mitigation, Table 10.4 Loggerhead Sea Turtle; and 10.4.11, Loggerhead Sea Turtle.
Clarification/Correction Regarding Species at Risk: Errors in risk categories for species at risk have been noted throughout the EIS Reports:

- For blue shark (Atlantic population), COSEWIC designation is Not at Risk.
- For shortfin mako (Atlantic population), COSEWIC designation is Special Concern.
- For Harp seal, COSEWIC designation is Not Listed.
- For beluga whale (St. Lawrence Estuary population), SARA Schedule 1 status is Endangered.
- For loggerhead sea turtle, SARA Schedule 1 status is Endangered.

Reference to EIS: Section 6.3.2, Overview, Table 6.37; and 6.3.8, Summary of Key Areas and Times, Table 6.43.
Clarification/Correction Regarding Species at Risk: There are several inconsistencies between the "Potential Timing of Presence" in Table 6.37 and information provided in Table 6.43. For example, Table 6.37 indicates unknown timing for the North Atlantic right whale, while Table 6.43 shows period of highest density from May to September.

Reference to EIS: Section 6.3.7.1.2, Blue Whale.

Clarification/Correction Regarding Species at Risk: The reference utilized for the blue whale population estimate is outdated. An updated population estimate is in the 2012 COSEWIC Status Appraisal Summary: https://www.registrelep-araregistry.gc.ca/default.asp?lang=En&n=F8E9653E-1.

Reference to EIS: Section 10.4.6, Killer Whale;10.4.8, Northern Bottlenose Whale; 10.4.10, Leatherback Sea Turtle; 10.4.11, Loggerhead Sea Turtle; 10.4, Species at Risk: Overview of Potential Effects and Key Mitigation, Table 10.4; 6.3.2, Overview, Table 6.37;6.3.2, Overview, Table 6.38; 6.3.7, Species at Risk, Table 6.41;6.3.6, Sea Turtles, Figure 6-84; 6.3.8, Summary of Key Areas and Times, Table 6.43; and 6.3.8, Summary of Key Areas and Times, Table 6.44.

Clarification/Correction Regarding Species at Risk: The following inconsistencies have been noted between baseline information (Chapter 6) and environmental effects assessment (Chapter 10) for species at risk with respect to sightings, timing, and potential of occurrence:

- Killer whale sightings: 10.4.6, Killer Whale (p. 969, sentence 4) vs Table 6.41.
- Northern bottlenose whale sightings: 10.4.8, Northern Bottlenose Whale (p. 969, sentence 5) vs Table 6.41.
- Leatherback sea turtle sightings: 10.4.10, Leatherback Sea Turtle (p. 970, final sentence) vs Figure 6-84.
- Loggerhead sea turtle timing: 10.4.11, Loggerhead Sea Turtle (p. 970, sentence 1) vs Table 6.44.
- Fin whale timing: Table 10.4 vs Tables 6.37 and 6.43.
- Harbour porpoise timing: Table 10.4 vs Table 6.37 and 6.43.
- Killer whale timing: Table 10.4 vs Table 6.37 and 6.43.
- Northern bottlenose whale timing: Table 10.4 vs Tables 6.37 and 6.43.
- Blue whale potential for occurrence: Table 10.4 vs Table 6.37.
- Loggerhead sea turtle potential for occurrence: Table 10.4 vs Table 6.38.

Reference to EIS: Section 6.3.2, Overview, Table 6.37 Harbour Porpoise;
Section 6.3.2, Overview, Table 6.37 Killer whale; Section 6.3.2, Overview, Table 6.37 Harbour seal; Section 6.3.7.1.2, Blue Whale; Section 6.3.7.1.4, Fin Whale; Section 8.4, Species at Risk: Overview of Potential Effects and Key Mitigation, Table 8.12 Spiny Dogfish; Section 10.4.1, Beluga Whale;

Section 10.4, Species at Risk: Overview of Potential Effects and Key Mitigation, Table 10.4 Leatherback Sea Turtle; Section 10.4.3, Bowhead Whale; Section 10.4.6, Killer Whale; and Section 10.4.8, Northern Bottlenose Whale; Section 14.4.5, Species at Risk Sowerby's Beaked Whale; and Section 14.4.5, Species at Risk Loggerhead Sea Turtle.

Clarification/Correction Regarding Species at Risk: The provision of population names is not consistent throughout the EIS Reports (e.g. blue whale (Atlantic population), fin whale (Atlantic population), spiny dogfish (Atlantic population), beluga whale (St. Lawrence Estuary population), leatherback sea turtle (Atlantic population), bowhead whale (Eastern Canada – West Greenland population), killer whale (Northwest Atlantic/Eastern Arctic population), Northern bottlenose whale (Scotian Shelf and Davis Strait-Baffin Bay-Labrador Sea populations)).

There are errors in names of populations and subspecies of SARA listed and COSEWIC designated species at risk.

- For the harbour porpoise, refer to the Northwest Atlantic population.
- For the killer whale, refer to the Northwest Atlantic/Eastern Arctic population.
- For the harbour seal, refer to the Atlantic and Eastern Arctic subspecies.
- For Sowerby's beaked whale and loggerhead sea turtle, remove reference to a population.

INFORMATION REQUIREMENTS AND REQUIRED CLARIFICATIONS SPECIFIC TO FLEMISH PASS EXPLORATION DRILLING PROJECT EIS

Project Description

IR-71

Project Effects Link to CEAA 2012: All - project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3 Project Description.

Reference to EIS: Section 2.1 Project Scope (Flemish Pass Exploration Drilling Project).

Context and Rationale: The EIS states that up to 30 exploration and delineation/appraisal wells could be drilled. It is not clear from the description how many exploration (versus appraisal/ delineation) wells specifically are anticipated and in which ELs they may be located.

Specific Question/Information Requirement: Clarify the following:

a) how many exploration wells could be drilled within Statoil-operated ELs 1139, 1140, 1141, and 1142 as part of the first drilling program on those ELs;
b) how many delineation/appraisal wells could be drilled within ELs 1139, 1140, 1141, and 1142 in relation to proposed exploration wells drilling as part of the first drilling program on those same licences; and
c) how many (if any) delineation and appraisal wells could be drilled outside ELs 1139, 1140, 1141, and 1142 in relation to exploration wells on ELs 1139, 1140, 1141, and 1142 drilled as part of the first drilling program.

Describe whether there are differences between the activities associated with exploration and delineation drilling and the associated environmental effects.

Fish and Fish Habitat/Marine Mammals and Sea Turtles

IR-72 (KIMNO-19)

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.3.1 Fish and Fish Habitat and 6.6.3 Cumulative Effects Assessment.

Reference to EIS: Section 2.9.5.2 Sound Emissions, 10.3.1 Approach and Methods, 10.3.3 Presence and Operation of Drilling Installation, 10.3.7 Project Related Surveys, Appendix C.

Context and Rationale: The EIS Guidelines require a description, assessment, and determination of the significance of potential effects from underwater noise on fish and marine mammals (Part 2, Section 6.3.1 and Section 6.6.3).

The EIS states that the acoustic modeling conducted for the Scotian Basin Exploration Drilling Project (in Nova Scotia) was used to support to the effects assessment for the Project, given similarities in project components and activities, locations, and relevancy of recent data, and directs the reader to Appendix C for more information on comparability of the projects (Section 10.3.1).

It is noted that the Scotian Basin model was conducted in relation to operation of a single drilling unit, while two drilling units may be operating simultaneously for the Project. The effects of noise from two drilling units operating simultaneously is not addressed in Appendix C, nor carried through the effects assessment.

Specific Question/Information Requirement: Assess the effects of noise from operating multiple drilling units simultaneously, as proposed for the Project.

Update the effects assessment, as applicable.

Accidents and Malfunctions

IR-73 (KMKNO-47 and 48)

Project Effects Link to CEAA 2012: Multiple VCs- Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.0 Accidental events; 15.3 Spill Risk and Probabilities; Appendix E Trajectory Modelling (Flemish Pass Exploration Drilling Project).

Context and Rationale: The EIS guidelines require the EIS to identify plausible worst case scenarios for each accident and malfunction type, describing the quantity, mechanism, rate, form and characteristics of the contaminants likely to be released into the environment during the accident or malfunction.

The EIS blowout model scenarios consisted of two sites:

1) Eastern Project Area at 1100m depth; release duration of 113 days; release rate of 15,000 m^3/day.
2) Northern Project Area at 2700m depth; release duration of 36 days at a release rate of 4,980 m^3/day.

However, no rationale was provided in the EIS for not modeling both sites for the same release durations (i.e. 113 days).

Specific Question/Information Requirement: Provide rationale for why modelling of the 113 day release was not warranted for the Northern Project Area site or re-analyze fate and behaviour modelling to reflect the longest estimated flow duration (113 days).

IR-74 (C-NLOPB)

Project Effects Link to CEAA 2012: Multiple VCs- Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, 6.6.1. Effects of Potential Accidents or Malfunctions.

Reference to EIS: 15.4.1 Study Area and Scenarios (Flemish Pass Exploration Drilling Project).

Context and Rationale: The water depths at which potential blowouts are modelled are 1100 m and 2700 m. However, the water depths within the Flemish Pass Exploration Drilling Project ELs range from 1000 m to 3500 m. It is not clear why the deepest depth was not modelled as representative of the worst-case scenario.

Specific Question/Information Requirement: If drilling could occur in deeper water (>2700 m) provide a rationale as to how the 2700 m blowout modeling site represents a worst-case scenario and why associated effects analysis can be applied to depths of up 3500 m.

IR-75

Project Effects Link to CEAA 2012: Multiple VCs- Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.5.4.3.2 Uncontrolled Well Event (Flemish Pass Exploration Drilling Project).

Context and Rationale: The EIS states that "(t)his modelled blowout scenario involved a 113-day partially unmitigated 15,000 m^3/day release…" . Partially unmitigated has not been defined and it is a different scenario than has been modelled in other Sections, which are unmitigated releases.

Specific Question/Information Requirement: Clarify what "partially unmitigated" entails. Describe which mitigations were considered in the modelling. Explain whether "partially unmitigated" represents a worst-case analysis and its potential influence on effects predictions.

IR-76

Project Effects Link to CEAA 2012: Multiple VCs- Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.1.2.2. Well Capping and Containment Plan (Flemish Pass Exploration Drilling Project).

Context and Rationale: Statoil's EIS indicates that capping stacks are located at four strategic locations around the world, and that it is anticipated that if needed a capping stack would be sourced from Norway and/or Brazil. Statoil's EIS indicates that the capping of a well is estimated to take between 18 and 36 days.

Specific Question/Information Requirement: Confirm the timeline associated with the mobilization of the capping stack, in particular if mobilization would occur immediately following a blowout or at a later time.

IR-77 (KMKNO-52)

Project Effects Link to CEAA 2012: Multiple VCs- Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 2.5.2.3 Offshore Well Drilling; 15.0 Accidental Events (Flemish Pass Exploration Drilling Project).

Context and Rationale: The water depth in two of Statoil's ELs (1139 and 1140) ranges from 3 000 m to 3 500 m. It is not clear whether capping stacks are currently rated to a maximum water depth.

Specific Question/Information Requirement: Provide information on capping stack limitations in deep water environments and how those limitations would affect the length of time it may take to stop the flow from a well in case of a blowout.

Based on these additional considerations, re-visit the assumptions for worst-case scenarios considered in Section 15 of the EIS, and update the effects assessment, as required.

Required Clarifications

CL-22 (ECCC-15)

Project Effects Link to CEAA 2012: Multiple VCs- Accidents and Malfunctions

Reference to EIS Guidelines: Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions

Reference to EIS: Section 15.0 Accidental Events (Flemish Pass Exploration Drilling Project)
Context and Rationale: It is important to understand the logistical and operational constraints involved with drilling a relief well so that well control timeframes can be fully appreciated and the magnitude of environmental effects resulting from such delays can be properly determined and characterized to the greatest extent possible so as to help inform a determination of significance of any residual effects.

Required Clarification: Provide information on any mutual aid agreements in place with other operators in the region and describe any limitations to such agreement(s).

Provide information specific to potential drill rig assistance to other mutual aid agreement operators in the region that may require the emergency drilling of a relief well.

CL-23

Project Effects Link to CEAA 2012: All

Reference to EIS Guidelines: Section 6.6.1 Effects of Potential Accidents or Malfunctions
Reference to EIS: Section 15.5.2.3.2 Uncontrolled Well Event (Flemish Pass Exploration Drilling Project)

Context and Rationale: The EIS states that "(t)he likelihood, however, of a subsurface blowout occurring with the relevant mitigations in place has been calculated to be extremely low, with a single event once in 37,000 years (Section 15.3.3; Table 15.12). It is not clear how the likelihood stated has been derived from the probability table referenced.

Required Clarification: Provide additional information to show how the likelihood stated was derived from the probabilities listed in Table 15.12.

REQUIRED CLARIFICATIONS COMMON TO EASTERN NEWFOUNDLAND OFFSHORE EXPLORATION DRILLING PROJECT EIS AND FLEMISH PASS EXPLORATION DRILL PROJECT EIS

Project Description

CL-01

Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3, Project Description.

Reference to EIS: Section 2.2.5 (Environmental Impact Statement – Summary); Section 2.5.2.6.2, Offshore Supply Vessels; 5.3, Climatology; and 5.5, Oceanography.

Context and Rationale: Section 2.2.5 of the EIS Summary states "[s]upporting vessels that are involved in project activities will travel in an essentially straight line between the drilling installation in the Project Area and an established port facility in Eastern Newfoundland, a practice which is common in the oil and gas industry that has been active in this region for several decades".

Elsewhere, the EIS illustrates or refers to transit routes specifically from St. John's (e.g. Figure 2-5, Sections 2.5.2.6.2, 5.3, and 5.5).

Required Clarification: Confirm that potential transit routes would originate only in St. John's, not in other ports in Eastern Newfoundland.

CL-02

Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 2, Section 3, Project Description.

Reference to EIS: Section 2.1, Project Scope.

Context and Rationale: The EIS refers to delineation and appraisal wells.

Required Clarification: Confirm that the terms delineation and appraisal wells are used interchangeably and intended to refer to the same activity. If there are differences between the two activities, describe the differences and associated environmental effects.

CL-03

Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 1, Section 3.1, Project Components; Part 2, Section 3, Project Description.

Reference to EIS: Section 2.3, Project Location and Designated Project Area.

Context and Rationale: The Project Area described in the EIS is a 100 800-square kilometre area that extends well beyond ELs that are part of the designated project(s), which are subject to environmental assessment under CEAA 2012.

Required Clarification: To enable reviewers to understand the Project subject to environmental assessment under CEAA 2012, provide a map and text describing a project area that is consistent with the designated project described in Part 1, Section 3.1 of the EIS Guidelines for the Project.

CL-04

Project Effects Link to CEAA 2012: All – project description relevant to all Section 5 effects.

Reference to EIS Guidelines: Part 1, Section 3.1, Project Components; Part 2, Section 3, Project Description.

Reference to EIS: Section 2, Project Description, Sections 8 to 13.

Context and Rationale: Boundaries of the Local Study Areas for valued components (VCs) do not match the predicted effects of the designated project subject to environmental assessment under CEAA 2012.

The EIS describes the local study area as the "predicted environmental zone of influence of the Project's planned components and activities, within which Project-related environmental changes to the VC (valued component) in question may occur and can be assessed and evaluated" (p. 156). For most VCs,[3] all routine effects are predicted to occur within 10 kilometres of Project activities and components (e.g. drilling unit, transportation corridor). However, the local study areas illustrated for VCs in Sections 8 to 13 include or exceed the Project Area illustrated in Figure 2-1, rather than 10 kilometres beyond ELs included as part of the Designated Project under CEAA 2012 and associated transportation corridors, within which routine Project effects are predicted to occur.

Required Clarification: Provide an updated definition of the local study area in accordance with the designated project under CEAA 2012.

CL-05 (DFO-02)

Project Effects Link to CEAA 2012: Multiple VCs –Regional Study Area (Accidents and Malfunctions).

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 4.3.1.1, Study Areas.

Context and Rationale: The EIS Guidelines require that the spatial boundaries will identify the areas that could potentially be affected by a worst-case scenario for each accident type. Figure 4-1 shows the boundaries of the RSA which should encompass the areas that could be affected by an accidental event. The EIS notes that, "the RSA also encompasses the predicted zone of influence of a potential oil spill event, as summarized in Section 15.4 and modelled in detail in Appendix E, and specifically, the maximum cumulative surface oil thickness for the 95th percentile surface oil exposure case." Based on information provided in Appendix E, Figure 4-20, the maximum cumulative surface oil for the 95th percentile extends beyond the boundaries depicted in Figure 4-1 (Regional Study Area).

Required Clarification: Update the map and text describing the Regional Study Area, taking into consideration spill modelling results..

[3] It is noted that effects on marine mammals are predicted to occur within 150 kilometres of ELs.

Fish and Fish Habitat

CL-06

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 6.1.3, Fish and Fish Habitat.

Reference to EIS: Section 6.1.6, Benthic Environment.

Context and Rationale: Table 6.10 – EL 1137 states that there are no sponges in this EL; however, Figure 6-14 clearly has two identified location of sponges.

Required Clarification: Update Table 6.10 to provide information on the sponge occurrences depicted for EL 1137 in Figure 6-14.

CL-07 (DFO-24)

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS Guidelines: Part 2, Section 6.1.5, Species at Risk.

Reference to EIS: Section 6.1.7.1, Grand Bank Shelf and Slope.

Context and Rationale: Section 6.1.7.1 of the EIS states that "[w]hile redfish is abundant relative to many species, they are not in high density in the region (Figure 6-19)" (p. 336).

This statement is contrary to Figure 6-19 (p. 341), which shows high density in the project area, in particular in EL 1135.

Required Clarification: Provide clarification on the presence and density of redfish.

CL-08 (DFO-24)

Project Effects Link to CEAA 2012: All.

Reference to EIS Guidelines: Section 6.6.1, Effects of potential accidents or malfunctions.

Reference to EIS: Section 15.5.5.2, Residual Environmental Effects Assessment and Evaluation.

Context and Rationale: The EIS states that "[i]n-situ experiments indicate that salmon in natural conditions (not in a lab or a cage) can likely detect hydrocarbons at concentrations approximately ten percent of those shown to cause mortality and avoid them".A specific reference is not provided for these experiments but if one looks through references provided in Section 15.5.5.2 only Weber et al. (1981) fits the description. More recent work is not cited.

Required Clarification: Provide the reference(s) for the in-situ experiments that indicate the level of hydrocarbon concentration that salmon can likely detect.

CL-09

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.5.1.3.2, Uncontrolled Well Event; 15.5.2.3.2, Uncontrolled Well Event; 15.5.3.3.2, Uncontrolled Well Event; 8.4, Species at Risk: Overview of Potential Effects and Key Mitigation.

Context and Rationale: On several occasions throughout Sections 8–17, the EIS refers to species as "... in LSA and/or RSA"; for example, p. 1273 states that there are "19 fish species in LSA and/or RSA". This may lead to confusion on potential effects as effects may be different depending on whether the species is in the LSA or the RSA.

Required Clarification: Clarify the number of fish species in the LSA, RSA, and two areas combined.

CL-10 (DFO-03)

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 6.1.2, Marine Environment.

Reference to EIS: Section 5.6.2, Soundscape by Band.

Context and Rationale: The EIS Guidelines require that the EIS describe the acoustic environment within areas that could be affected by the Project. The EIS statement that "[s]tation 5 could be considered an example of typical drilling installation sound levels for deep-water operations, with the highest sound pressure levels of 103 dB re 1 µPa …" (p. 238) is misleading as it under-represents the sound pressure levels that can be expected from typical drilling installations. The source sound pressure levels at 1 metre from typical drilling operations, as reported in Appendix C, are in the range of 188.6 to 196.7decibels re 1uPa. The sound pressure levels at the drilling installation should be described.

Required Clarification: Provide the sound pressure levels at the source to describe sound levels typical of drilling installations.

CL-11 (DFO-31)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 6.1.5, Species at Risk; and Section 6.1.6, Marine Mammals.

Reference to EIS: Section 10.5.1, Residual Environmental Effects Summary, Table 10.5; Section 6.3.2, Overview, Table 6.37.

Context and Rationale: The number of cetaceans, mysticetes, and odontocetes is not consistent between Tables 10.5 and 6.37.

Required Clarification: Confirm the number of cetaceans, mysticetes, and odontocetes referred to in the Summary of Existing Conditions and Ecological and Social Context: Project Area/LSA (Table 10.5) or provide clarification for discrepancies with Table 6.37.

CL-12 (DFO-28)
Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 6.1.5, Species at Risk.

Reference to EIS: Section 8.4, Species at Risk: Overview of Potential Effects and Key Mitigation.

Context and Rationale: In the last sentence, the EIS states that "[s]pecies that have been identified as being of special conservation concern by COSEWIC or under other processes that are not likely to overlap with the Project activities and are primarily concentrated outside the Project Area are not discussed".

Table 6.20 (pp. 375–377) lists marine fish species at risk that are known to or may occur within the project area. The ten species omitted in Section 8.4 were included in Table 6.20. Consequently, the justification to omit species based on potential for overlap with the Project is unclear.

Required Clarification: Explain the rationale for the omission of species.

Air Quality

CL-13 (NRCan 04)

Project Effects Link to CEAA 2012: 5(1)(b) Federal Lands/Transboundary 5(2) (C-NLOPB).

Reference to EIS Guidelines: Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and Testing Activities.

Reference to EIS: Section 8.3.5, Formation Flow Testing with Flaring; and 2.5.2.4, Formation Flow Testing with Flaring.

Context and Rationale: The EIS states that some produced water will be flared with the gas. Liquid loading could affect flaring performance and studies suggest that salts can affect the flame chemistry and potentially form chlorinated hydrocarbons.

Required Clarification: Clarify whether the potential flaring of produced water refers to liquid droplets entrained in the flare gas after a separator or does this mean that there will be no separation, and heavy liquid loading could occur.

Special Areas

CL-14

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(2)(b)(i) Health and Socio-economic Conditions.

Reference to EIS Guidelines: Part 2, Section 6.1.9.2, Human Environment.

Reference to EIS: Section 7.1.3, Current Domestic Fisheries (Flemish Pass Exploration Drilling Project).

Context and Rationale: Section 7.1.3.1 (Project Area – Northern Section) of the EIS states "… as noted in Figures 7-4 and 7.5 total weight of landings in the Project Area –Northern Section increased from 2,772 t in 2011 to 3,394t in 2015. Within the same timeframe, the value of landings increased from $13,140,355 to $18,483,487." However, Figure 7-4 (Quantity of Harvest by Year, Project Area and RSA, All Species, 2011–2015) shows that there was a decrease in the weight harvested between 2011 and 2015. Likewise, Figure 7-5 (Value of Harvest, Project Area and RSA, All Species, 2011–2015), shows a level or slightly decreasing trend for value of harvest in the Northern Project Area. The inconsistency between the text and the Figures leads to confusion within this section.

Required Clarification: Clarify harvest levels Project Area – Northern Section.

Accidents and Malfunctions

CL-15 (C-NLOPB-6: Statoil)

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.1.2.3.2, Response Contractors and Agencies Page(Flemish Pass Exploration Drilling Project). Section 15.1.2.2.2, Response Contractors and Agencies (Eastern Newfoundland Offshore Exploration Drilling Project).

Context and Rationale: The EIS discusses the C-NLOPB's interactions with other government agencies, which may provide science or other advice, in the event of a spill (e.g. Canadian Coast Guard, National Emergencies Centre).

Required Clarification: Provide a description of how advice and services required in case of a spill would be obtained without reliance on the C-NLOPB to provide advice or service.

CL-16 (ECCC-18)

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.4.3, Model Input Data, and Table 15.14 Physical Properties for the Two Oil Products Used in Modelling, and Table 15.15 Fraction of the Whole Oil Comprised of Different Distillation Cuts for the Two Oil Products.

Context and Rationale: With respect to the Bay du Nord (BdN) crude oil properties and composition, ECCC has advised that the assumptions and measurements of the model oil used by the proponent appear to be reasonable with historical data for Eastern Canada offshore oils, as taken from the ECCC oil property database. ECCC is generally satisfied with the choice of oil used for model inputs.

ECCC notes, as shown in the table below, that the properties of oil in the area change with both location and over the production life of a well, so it is helpful to maintain a dataset of the characteristics of any oils found in the area. For example, a data portal is maintained by the Canadian Association of Petroleum Producers (CAPP) for oils produced in Western Canada at CrudeMonitor.ca.

Please see attached Table 1 from ECCC which illustrates the relevance.

	Density (g/mL) @15 C	Dynamic Viscosity (cP) @15 C	TPAH (mg/g oil) Resolved compounds
Hebron (1999)	0.9189	154	8500
Hibernia (1999)	0.8504	35	13000

Terra Nova (1999)	0.8560	22	12000
White Rose (1999)	0.8738	30	14000
Scotia Light (1999)	0.7655	1	5200
Terra Nova (2011)	0.8624	17.5	11500
BdN (2016)	**0.8455***	**5****	**10000 (assumed)**

Required Clarification: Confirm whether samples/characteristics of any oil found for the purposes of emergency response and contingency planning would be made available to ECCC.

CL-17

Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.3.2, Probabilities of Spills from the Project.

Context and Rationale: Section 15.3.2 of the EIS provides a discussion of *probability* of various spill scenarios considered in the assessment but does not explain how probability was calculated. In some parts of the EIS and Summary, the terms *frequency* and *probabilit*y appear to be used interchangeably.

Required Clarification: Clarify how probability was calculated, and provide clarification on use of terms and units.

CL-18 (C-NLOPB-7: Exxon Mobil and Statoil).

Project Effects Link to CEAA 2012: Newfoundland Offshore Petroleum Drilling and Production Regulations SOR/2009, Sections 6 and 9.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions; 6.4, Mitigation Measures.

Reference to EIS: Section 15.3.1.2, Canada–Newfoundland and Labrador Offshore Spill Data.

Context and Rationale: Table 15.3 of the Statoil EIS indicates the number of oil spills between 1997 and 2015 in the Newfoundland and Labrador offshore during exploration and production. Table 15.3 in the ExxonMobil EIS has the same title, as well as text leading up to and following the table; however, the numbers in the tables are different. There are differences in the number of spills during exploration, development, and production, and total numbers. For example, for the total number of hydrocarbon spills, Statoil indicates that there were 517 total spills (465 hydrocarbon and 52 synthetic-based muds), whereas ExxonMobil has 519 spills (458 hydrocarbon and 61 synthetic-based mud). Likewise the total number of barrels spilled differs.

In addition, the EIS presents spill stats provided from the C-NLOPB up to 2015 although 2016 dates are available on the C-NLOPB's website.

Required Clarification: Provide updated spill statistics taking into consideration inconsistencies in the EISs related to 1997-2015 data. Update the spill statistics taking into consideration 2016 spill data.

Spill Modelling

CL-19 (ECCC-19 DFO Conformity)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.

Reference to EIS: Section 15.4.4, Model Input Data (Eastern Newfoundland Offshore Exploration Drilling Project). Section 15.4.3, Model Input Data (Flemish Pass Exploration Drilling Project).

Context and Rationale: The EIS does not provide sufficient rationale for the selection of the oceanographic inputs in the models used compared to other available datasets, including inputs employed for the spill trajectory model.

With respect to the use of data from the HYCOM circulation model, the EIS states that "[f]or this study, daily current data were obtained for the period January 2006 through December 2010 for the North Atlantic region". It further states that "[a]s with any hydrodynamic model, there is the potential that local currents may deviate from predictions based upon grid resolution and small

scale variability in ocean circulation dynamics. However, it is believed that the data that was used is sufficient for this type of modelling."

Required Clarification: Provide a robust rationale for the use of daily current data from January 2006 through December 2010 in the models, and whether they are best suited to modelling in the project area, with consideration of predicted future conditions in order to provide a degree of certainty or validation in the predictions made. Provide a margin of error associated with the predictions.

Clarify the statement: "However, it is believed that the data that was used is sufficient for this type of modelling."

Identify potential differences had a block of more recent current data been used in the modelling scenarios.

CL-20 (ECCC-20)
Project Effects Link to CEAA 2012: Multiple VCs – Accidents and Malfunctions.

Reference to EIS Guidelines: Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions

Reference to EIS: Appendix E Oil Spill Trajectory Modelling; Section 3.4, Wind Data; and Section 3.5, Currents.

Context and Rationale: In Section 3.4 of the EIS, the proponent notes the spatial and temporal resolution of the wind input used to force the oil spill model: "CFSR [Climate Forecast System Reanalysis] time series acquired for this study was available at 0.5° horizontal resolution at 6-hourly intervals". It also notes that the CFSR winds were used in the hydrodynamic modelling as described in Section 3.5. In Section 3.5 of the EIS, the proponent notes the forcing field used to drive the hydrodynamic model: "[s]urface forcing is derived from 1-hourly CFSR wind data with a horizontal resolution of 0.3125°". There was no rationale provided for why there were differences in the temporal and spatial resolution of the wind forcing used between the two different models.

Required Clarification: The proponent stated that the CFSR was the source of wind inputs for both the oil spill model and the hydrodynamic model (HYCOM). Provide the rationale as to why a lower resolution data set was used for the oil spill model versus a higher one for the HYCOM model when the apparent source of data (CFSR) was the same. Was it a limitation of the oil spill model? Or was the wind field used in the HYCOM model at a different reference height than that used in the oil spill model, which might account for the different resolutions of the CFSR data?