Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

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June 08, 2018

Sent by E-mail

Russell Morrison
Nexen Energy ULC
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Russell.Morrison@nexencnoocltd.com

Dear Mr. Morrison,

SUBJECT: Nexen Energy ULC Flemish Pass Exploration Drilling Project – Information Requirements

The Canadian Environmental Assessment Agency (Agency) has completed its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Nexen Energy ULC 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. In addition to IRs, a list of clarifications that are required to ensure correct interpretation of project information and effects analysis is attached.

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 June 08, 2018. Once you have submitted responses to all IRs, the Agency will take 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 on Information Requests and Timelines:
https://www.canada.ca/en/environmental-assessment-agency/news/media-room/media-room-2016/information-requests-timelines.html.

The responses to IRs 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 Internet site.

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

Sincerely,

<Original signed by>

Cheryl Benjamin
Project Manager – Atlantic Region
Canadian Environmental Assessment Agency

Cc: Elizabeth Young, Canada - Newfoundland Labrador Offshore Petroleum Board
Darren Hicks, Canada - Newfoundland Labrador Offshore Petroleum Board
Kim Keats, Fisheries and Oceans Canada
Glenn Troke, Environment and Climate Change Canada
Allison Denning, Health Canada
Jason Flanagan, Transport Canada
Veronica Mossop, Natural Resources Canada
Carla Stevens, Major Projects Management Office

Attachment:

Attachment 1 - Information Requirements and Required Clarifications for the Nexen Energy ULC Flemish Pass Exploration Drilling Project.

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Nexen Energy ULC Flemish Pass Exploration Drilling Project
Information Requirements and Required Clarifications from Environmental Impact Statement Review: June 8, 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 Nexen Energy ULC 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. In addition to IRs, a list of clarifications that are required to ensure correct interpretation of project information and effects analysis can be found below.

ACRONYMS AND SHORT FORMS

Agency	Canadian Environmental Assessment Agency
CO2	carbon dioxide
CEAA	Canadian Environmental Assessment Agency
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EL	exploration licence
EIS	Environmental Impact Statement
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
LSA	Local Study Area
MMS	Mi’gmawei Mawiomi Secretariat
MODU	mobile offshore drilling unit
MTI	Mi'gmawe'l Tplu'taqnn Incorporated
NAFO	Northwest Atlantic Fisheries Organization
NOx	nitrogen oxide
NRCan	Natural Resources Canada
ROV	remotely operated vehicle

RSA	Regional Study Area
SARA	Species at Risk Act
SBM	synthetic based mud
VC	valued component
VOC	volatile organic compounds

ATTACHEMENT 1: INFORMATION REQUIREMENTS AND REQUIRED CLARIFICATIONS FOR THE NEXEN ENERGY ULC FLEMISH PASS EXPLORATION DRILLING PROJECT

Information Requirements

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Project Description						
IR-01	KMKNO-02-Nx	Section 5 - All	Part 2, Section 3 Project Description	Section 2.1 Project Scope and Overview; Section 2.5.2.2 Offshore Well Drilling; Section 4.1 Scope of the Environmental Assessment and Factors Considered	The EIS states that the Project may at times have multiple drilling units operating simultaneously (Sections 2.1 and 4.1). It is unclear throughout the effects analysis how simultaneous drilling was considered. For example potential overlapping effects of dual sources of noise or light was not assessed in the analysis of effects; in contrast, Section 13.3.3 of the EIS provides an analysis of the maximum percentage of Project Area and RSA that would be excluded to commercial fisheries if up to three MODUS were operating at the same time. 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 2.5.2.2). No further information is provided, nor does the effects analysis consider project effects from batch drilling.	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. • Provide additional information assessing the environmental effects of simultaneous drilling and batch drilling on relevant VCs. Update proposed mitigation and follow-up, as well as significance predictions, as applicable.
IR-02		Section 5 - All	Part 2, Section 3.2 Project Activities	Section 2.7 Project Schedule	Section 2.7 of the EIS indicates that it will take 5 to 20 days for pre-drill site investigation and site preparation. Section 2.7 of the EIS indicates approximately 45 to 160 days will be required for drilling, evaluation (including sidetracking and potential well testing, if required) and well abandonment or suspension.	Provide a description of what is included in pre-drill site investigation and site preparation, including potential timeframes. Provide clarification on the 45 to 160 day time frame for each of drilling, evaluation, and well abandonment or suspension, including information on the minimum and maximum timeframes for each step (i.e. drilling, evaluation and well abandonment or suspension). Explain how batch drilling may affect drilling timelines.
IR-03	MMS-01-Nx; NunatuKavut-12-Nx	Section 5 - All	Part 2, Section 3.2.3 Decommissioning, Suspension or Abandonment of Wells	Section 2.5.2.5 Well Abandonment or Suspension	With respect to well abandonment and/or suspension, the EIS states that if removal of equipment extending above the mudline is required, the casing will be cut just below the mudline and upper sections of the casing and the wellhead will be recovered to the surface. Section 2.5.2.5 states that after removal of equipment, an ROV or other equipment will be used to inspect the seabed to ensure that no equipment or obstructions remain, however, Indigenous groups have noted that there is no information provided regarding whether ongoing	With respect to the activities associated with well abandonment and/or suspension, provide the following information: • Specify the lifespan of the well abandonment and suspension techniques. Explain whether they would be sustainable to ensure the long-term protection of the environment, describing how integrity of the abandoned or suspended well is ensured.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					follow-up inspections will be undertaken to ensure the integrity of the well abandonment and/or suspension. It is stated that well abandonment will adhere to the requirements set out in the Newfoundland Offshore Petroleum Drilling and Production Regulations, as well as Nexen's internal governance. In addition, Section 2.5.2.5 of the EIS states that "[i]n the event that planned, conventional well abandonment techniques such as those described above are ineffective for a particular well, alternative approaches may be required and will be investigated and implemented in consultation with relevant regulatory authorities and in compliance with applicable authorizations." However, the alternatives are not presented or discussed. The 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, the MMS indicated the need to ensure that the techniques used for well decommissioning or suspension are sustainable over time.	• Provide information on frequency of inspection. • Provide a description of Nexen's internal requirements for well abandonment that are additional to those required by the Newfoundland Offshore Petroleum Drilling and Production Regulations. • Provide a discussion on the alternative approaches that may be taken if conventional well abandonment techniques are not effective, including if there are potential environmental effects and applicable mitigation.
IR-04	C-NLOPB-1-Nx; Ekuan-07-nx; MFN-11-Nx; MFN-12-Nx; MFN-19-Nx	Section 5 - All	Part 2, Section 2.2 Alternative Means of Carrying Out the Project	Section 2.5.1 MODU Selection Process and Possible Drilling Units; Section 2.9.4 Other Liquid and Solid Waste Materials; 2.10 Identification and Evaluation of Alternatives; Section 2.9 Potential Environmental Emissions and Waste Management	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. The C-NLOPB stated that insufficient information on the volume of stored fluids and solids is provided, and it is not clear what the significance of the effects of stored agents could be without an adequate description. 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, 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	Provide a general description of the Waste Management Plan, including the nature and scope of the proposed plan. 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. 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 treatment process prior to ocean discharge and 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; and • provide further information on the types and amounts of biocides to be used., assessing the environmental effects of biocides on relevant VCs, and discussing potential effects of

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					would minimize waste or possible alternatives that would allow achievement of defined objectives. Furthermore, Section 2.9.4 of the EIS states that biocides may be used in cooling water to control growth of microorganisms in drilling machinery. Miawpukek First Nation has expressed concern that the EIS does not discuss the use of biocides in the effects analysis. It is unclear what biocides would be used and in what volumes. Section 2.9 of the EIS states that a comprehensive Waste Management Plan similar to those used by the other Operators for comparable activities would be developed and implemented for the Project.	routine use and discharge, as well as accidental spills. Update the effects analysis, proposed mitigation and follow-up, as well as significance predications, as applicable.
IR-05		Section 5 - All	Part 2, Section 3.1 Project Components	Section 2.5 Project Components and Activities; Section 2.9.4 Other Liquid and Solid Waste Materials; Section 2.1 Project Scope and Overview	Section 2.1 of the EIS states that up to 10 wells (exploration or delineation) could be drilled. It is not clear from the description that the delineation wells would be drilled in relation to the exploration wells in ELs 1144 and 1150. As well, the EIS does not describe if there are any differences between the environmental effects of delineation wells and exploration wells.	Clarify the following: • how many exploration wells could be drilled within Nexen-operated ELs 1144 and 1155; and • how many delineation/appraisal wells could be drilled within ELs 1144 and 1155 in relation to proposed exploration wells on those same licences. Describe whether there are differences between the activities associated with exploration and delineation drilling and the associated environmental effects
IR-06		Section 5 - All	Part 2, Section 3.1 Project Components	Section 1.2.2 Key Project Components and Activities; Section 2.9.4 Other Liquid and Solid Waste Materials	Section 1.2.2 of the EIS states sidetracking of the lower portions of the main wellbore may be required for geological or mechanical reasons. No further description is provided in the EIS. Section 2.9.4 of the EIS states that a well test could involve acid stimulation and that spent acid would be captured at surface and shipped to shore. There is no description provided of how this activity would be carried out, in what circumstances, reagent requirements, etc. A full description is required of proposed activities in order to understand the associated potential for environmental effects.	Provide a description of project components and activities, including acid stimulation and sidetracking. Update the effects analysis as appropriate.
IR-07	MFN-21-Nx	Section 5 - All	Part 2, Section 3.2. Project Activities	Section 2.5.2.6 Supply and Servicing	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	Confirm that potential transit routes would originate only in St. John's, not in other ports in Eastern Newfoundland. If other ports and transit routes are to be included, update the effects analysis and mitigation, as appropriate.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					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, Figure 5.3).	
Alternative Means						
IR-08	KMKNO-1-Nx; Nunatukavut-16-Nx	Section 5 - All	Part 2, Section 2.2 Alternative Means of Carrying Out the Project	Section 2.10 Alternative Means Carrying Out the Project,	Section 2.10.6 outlines alternatives to night time flaring during well testing. With respect to the "no flaring" alternative, the EIS states that flaring is a required activity during a formation flow test to safely and efficiently dispose of hydrocarbons that may come to surface, and thus the option of no flaring is not considered to be a feasible option. It is not clearly explained why flaring is the only option to safely and efficiently dispose of hydrocarbons that come to surface. Clarification is required on the technical feasibility of reduced flaring. Section 2.10.6 indicates that reduced flaring was considered as an alternative for night time flaring, and states that it is not technically feasible as testing can last several days so night time flaring cannot be avoided. EISs related to recent projects in the region and in the Nova Scotia offshore indicated, that while it is not the preferred option, reduced flaring is technically feasible, but has the potential to result in compromised data from formation flow testing and increased safety risk. Other offshore exploration projects within the region have identified (depending on the type of data required) formation testing while tripping as an alternative to well testing, which does not require flaring. This has not been presented by Nexen as an alternative. Section 2.5.2.4 of the EIS states that alternative well flow testing technologies such as a drill pipe conveyed test assembly, which would result in only a small volume of produced water being sent to flare, may also be proposed. These are not included in the Section 2.10.6 analysis. NunatuKavut Community Council has recommended use of alternatives with less environmental effects, if they are available, for testing with flaring.	In accordance with Agency guidance on evaluation of alternative means, provide the following: • clarification on the technical feasibility of reduced flaring; and • clarification if well testing while tripping or a drill pipe conveyed test assembly approach were considered as alternative means. If they were considered, provide additional information on the alternative means: how they are carried out, how they might interact with the environment, and potential environmental effects. If well testing while tripping and drill pipe conveyed test assembly approaches were not considered, provide a justification as to why they were not identified as an alternate to well testing with flaring.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Air Quality						
IR-09	NRCan-02-Nx; NRCan-08Nx	5(2)(b) Federal Lands/Transboundary 5(2) (C-NLOPB)	Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and Testing Activities	Section 14.3.2 Summary of Key Mitigations	The EIS notes that the use of high-efficiency burners for flaring the gas will be a key mitigation measure. The NRCan has indicated that the flare efficiency would impact the presented greenhouse gas emissions and would also determine the validity of the emission factors used to estimate criteria air contaminant emissions.	Provide the combustion efficiency rating of the high–efficiency burner given that this information affects overall emissions. Specifically, include procedures in place to ensure high efficiency of the burner.
IR-10	ECCC-01-Nx	5(1)(b) Federal Lands /Transboundary 5(2) (C-NLOPB)	Part 2, Section 3.1. Project Components; 3.2.1. Drilling and Testing Activities	Section 2.5.2.4 Well Testing; Section 2.10.6 Well Testing – Nighttime Flaring	Section 2.5.2.4 of the EIS states that if a significant amount of water is produced from the formation, then the water will be treated and disposed rather than flared.	Explain what is considered to be a significant 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.
IR-11	ECCC-27-Nx	Air Quality CEAA 5; 5(1)(b) Federal Lands/Transboundary.	Part 2, Section 6.3.8.1, Air Quality and Greenhouse Gas (GHG) Emissions	Section 14.3.3.1 Semi-Submersible MODU Option	The reported fuel usage for the MODU, 56 m^3/day, seems approximately 1/3 to 1/2 of what would be expected based on the engines' power output. Documentation indicates that the drill rig would be a 24 hour per day operation. For 8 x 6312 horsepower engines on the MODU (note this excludes the standby vessel – no horsepower was given for it), for a 24 hour operation, a fuel usage about double to three times the reported value would seem more reasonable. ECCC advised that if fuel consumption were double to three times the reported value (greater than that which was reported) there would be a difference between projected CO_2 emissions and actual CO_2 emissions of 137 kt for the 920 days of operation for the Project. The calculated greenhouse gas emissions from the MODU and supply vessels are approximately the same, although the MODU and supply vessel horsepower's are 50,496 and 16,665 respectively, so MODU greenhouse gas emissions would be expected to be higher for the MODU assuming similar operating periods.	Provide information and supporting evidence for the MODU fuel use calculation, indicating the average daily hours of MODU operation. Update the predicted greenhouse gas emissions, if appropriate.
Fish and Fish Habitat/Marine Mammals and Sea Turtles						
IR-12	QFN-01-Nx Elsipogtog-11-Nx, -01-Nx; DFO-15 (Annex 1), DFO-38 (Annex	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat `	Section 8.4.4 Atlantic Salmon	Section 8.4.4.2 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. The 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	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); • the certainty regarding the presence of Atlantic salmon from the Inner Bay of Fundy population in the Project Area; • the impacts that climate change may have had on the

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	3); MTI-03-Nx, -04-Nx, -23-Nx; WNNB-CRI-09-Nx; Nutash-18-Nx. -19-Nx, -38-Nx; MFN-01-Nx; MFN-06-Nx; MFN-07-Nx; KMKNO-50-Nx				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. The KMKNO indicated that immature post-smolts that will return to natal rivers as mature one 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). The 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. The 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 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, DFO has stated that it is not correct to say with certainty that they will "not occur." Comments from the 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	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 update to the assessment of potential for effects on Atlantic salmon, provide additional mitigation measures to avoid or minimize potential effects on adults and mature post-smolts that may overwinter and feed in the area.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					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 Hz. Infrasound disturbance has short term effects on fish behaviours and 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 analyses on the behavioural response effects to migrating salmon due to light and sound effects of the Project. WNNB expressed concerns related to changes in migratory routes and feeding grounds which it stated may occur. The KMKNO has suggested that drilling activities be avoided when Atlantic salmon are in the area (i.e. between the months of January to August). The 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.	
IR-13	Elsipogtog-04, 10, 11, 12, 14- Nx; WNNB-CRI-01-Nx, CRI-03-Nx, CRI-05-Nx, -CRI-06-Nx, -CRI-08-Nx, -CRI-09-Nx; WNNB-Letter-2-Nx; Nutash-	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat	Section 8.4.4 Atlantic Salmon	Several Indigenous groups have provided information on Atlantic salmon for consideration in the effects analysis. These submissions have been provided in full to the proponent and should be reviewed to ensure consideration of all comments/submissions related to Atlantic salmon. A short description of select information submitted by various Indigenous groups is provided below. As noted in IR-12, the KMKNO provided a stand-alone submission containing information on Atlantic salmon. The submission includes several additional references that should be considered in describing baseline conditions for Atlantic salmon and in the analysis of potential effects from the Project. Along with the references listed in IR-12, additional references provided by the KMKNO include: • Crossin, G., Hatcher, B. G., Denny, S., Whoriskey, K., Orr, M. Penney, A., and Whoriskey, F. G. (2016). Condition-dependent migratory behaviour of endangered Atlantic salmon smolts moving through an inland sea, Conservation Physiology, Volume 4, Issue 1, 1 January 2016, cow018, https://doi.org/10.1093/conphys/cow018;	Further to IR-12, provide a stand-alone assessment of the effects of the Project on Atlantic salmon using information from the EIS as well as additional references and other information from Indigenous communities, and information from DFO, as applicable. In the stand-alone assessment of the effects of the Project on Atlantic salmon: • Consider information about Atlantic salmon provided in submissions by Indigenous communities (including peer-reviewed references) and subsequent dialogue at April 2018 consultation meetings in St. John's, Moncton, and Quebec City. • Provide updated figures and tables, as applicable, to reflect the most recent peer-reviewed data, or provide a rationale for excluding information from newer, peer-reviewed references. • Include a discussion of the effects of accidental events and

[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.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	18-Nx, -50-Nx; MFN-02-Nx; MFN-03-Nx; MFN-04-Nx; MFN-08-Nx; MFN-09-Nx, KMKNO-50-Nx, MTI-04-Nx				• Reddin, D. G. (1986). Ocean Life of Atlantic salmon (Salmo salar L.) in the Northwest Atlantic. In: Atlantic Salmon: Planning for the Future. [Ed] D. Mills and D. Piggins. Portland: Timber Press, pp483-507. The Innu First Nation of Nutashkuan has advised that anything that risks adversely affecting the productivity of the salmon's diet, from small crustaceans up to capelin as prey, would likely adversely affect the salmon, and that leaks from drilling wells in particular need to be considered. Likewise the WNNB raised concerns about the potential adverse effect on quality and quantity of Atlantic salmon as a result of potential changes in the food-web. The WNNB and Woodstock First Nation indicated that a key finding of their technical review is that Atlantic salmon spend more time in the Project Area than indicated in the EIS, and it advised that the area is likely an important feeding ground for both one sea and multi-sea winter Atlantic salmon from the Outer Bay of Fundy Designatable Unit, not just a migration route. Research currently under peer review for publication was included in the WNNB and Woodstock First Nation submission for the proponent's consideration. The WNNB, Woodstock First Nation and Elsipogtog First Nation indicated that while the EIS is correct in stating that the Outer Bay of Fundy population has no status under the federal SARA (Section 12.3.3.2), the proponent should note that the population is under consideration for listing under SARA. The WNNB and Woodstock First Nation indicated that from a biological perspective, this population should be considered endangered for the purposes of effects analysis. The Agency notes that new data from salmon tagging studies, provided by the submission, could be the basis for an additional figure to overlay those data with the Project Area. The EIS states that "there have also been large declines in marine survival (for Atlantic salmon), but the mechanism for mortality is poorly understood" (Section 6.1.8.6). The WNNB and Woodstock First Nation indicated agreement that Atlantic salmon have issues with marine survival that are not well understood, and that this uncertainty makes it important to further consider the potential impacts of offshore development. Several Indigenous communities, including Miawpukek First Nation, Innu First Nation of Nutashkuan, Elsipogtog First Nation,	cumulative effects on Atlantic salmon. • Recognizing data gaps regarding the presence of Atlantic salmon in the Project Area, migration routes, and at-sea mortality, apply the precautionary approach in the updated effects analysis and in the discussion of proposed mitigation. • Taking into consideration any uncertainties regarding potential effects, discuss the need for follow-up related to project-specific or cumulative effects on Atlantic salmon, including participation in future regional initiatives and potential for collaboration with Indigenous communities.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					and NunatuKavut Community Council, expressed similar concerns related to uncertainty around the decline of Atlantic salmon populations in their traditional territories and provided supporting information. Concerns about the potential adverse effects of noise on Atlantic salmon behavior and migration patterns were described in IR-12, based on comments from MTI. Similar concerns have also been expressed by Miawupkek First Nation. Miawpukek First Nation's submission cited additional references for consideration by the proponent (e.g. Cairns, 2001, Friedland et al, 2000, Nedwell et al, 2007, O'Neil et al, 2000). Most Indigenous groups expressed concern about the effects of accidental spills on marine resources, including Atlantic salmon. Several also cited concerns about cumulative effects on declining salmon populations. Targeted baseline monitoring of salmon movement through the Project Area has not been conducted in support of the EIS, nor is this proposed for follow-up. Miawpukek First Nation and Elsipogtog First Nation have advised that additional baseline data on the migration and behaviour of Atlantic salmon while at sea would contribute to the assessment of the effects of the Project. They indicated that rather than initiating a new research project, providing funding to support on-going research projects or programs would allow the research protocol for any study to be designed by established organizations and integrated with existing research. Miawpukek First Nation indicated that organizations involved in the tracking of marine fishes include Miawpukek First Nation, the Atlantic Salmon Federation, the Ocean Tracking Network, and DFO. These organizations are already engaged in projects aimed at understanding the movements of Atlantic salmon while at sea.	
IR-14	QFN-01-Nx; KMKNO-17-Nx	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat	Section 8.4.5 American Eel	Section 8.4.5 of the EIS indicates that migration routes for American eel are possible through the Project Area but it is considered to be of low likelihood. 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. The Qalipu First Nation stated that potential changes in habitat and food availability and quality may interrupt migration patterns of American eel through the project site.	Taking into account comments from the KMKNO and Qalipu First Nation provide additional information on the American Eel, including the following: - a justification to support the assertion that it is unlikely that American Eel pass through the Project Area, and - identification of any mitigation measures required to address concerns with American Eel or a rationale as to why the current assessment and mitigation remain valid.

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					The referenced American eel migration routes studies were conducted within a corridor that stretched from Lake Ontario to the Cabot Strait and Sargasso Sea. The KMKNO advised that no study has been undertaken off the eastern coast of Newfoundland.	
IR-15	MTI-01-Nx;	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat	Section 8.3 Environmental Effects Assessment and Mitigation	Section 6.1.7.5 of the EIS states that Swordfish may migrate through the southern portion of the RSA during the summer. While MTI expects that swordfish are in low abundance in the Project Area, given the importance of the species, MTI raised concerns with the fact that a full assessment of environmental effects on Swordfish have not been provided within the effects assessment. 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].	Provide an assessment of the potential effects to Swordfish, including any existing published research on biological and behavioural responses of Swordfish to noise, spills and light. Update the proposed mitigation and follow-up, as well as effects predictions, accordingly.
IR-16		5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat	Section 8.3.4.2 Residual Environmental Effects Assessment	Section 8.3.4.2 of 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."	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, if applicable.
IR-17	C-NLOPB-11-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species 5(1)(a)(iii) Migratory Birds	Part 2 - Content of the Environmental Impact Statement - 6.6.1 Effects of potential accidents or malfunctions	Appendix D – Drill Cuttings Modelling, Section 3.2.2 Cuttings Particle Characterization	Table 3-3 of Appendix D includes information related to the samples used in the SBM cuttings modelling, indicating that the cuttings were representative of two wells, Tuckamore and Baccalieu. The C-NLOPB advised that while Tuckamore can be considered as an acceptable sample to use given that it was drilled in 2003, Bacccalieu was drilled in 1985 and that there is more recent information of cutting particle size that could have been used. A well drilled in 1985 has little relevance compared to more recently drilled wells given the changes in drilling fluids, techniques and treatments since that time.	Provide a rationale to support the decision to complete the modelling using information from a well drilled in 1985 when more recent well data exist.
IR-18	DFO-34 NX MFN-10-	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Section 6.1.3, Fish and Fish Habitat, and 6.4 Mitigation Measures	Section 8.3.2 Summary of Key Mitigation; Section 8.3.3.2 Residual Environmental Effects	There is inconsistent information in the EIS on the circumstances under which a seabed investigation would be conducted. Sections 8.3.2 and 18.2 of the EIS indicate that a seabed investigation would be carried out at <u>all</u> wells drilled as part of the Project, while Section 8.3.3.2 indicates	Clarify the commitments related to when and where seabed investigations would be undertaken (i.e. would these be undertaken at all well sites and/or anchors/moorings, or just where sensitive species are known or likely to be present?). If seabed

[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, 2000

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	Nx			Assessment; Section 18.2 Summary of Mitigation	that seabed investigation would occur where coral gardens or sponge grounds are known or likely to be present. The DFO has indicated that no encounters with living Lophelia have been documented in the Flemish Pass region; however, data are biased by substrate with hard bottom representation limited to sporadic ROV surveys. It is possible that living colonies exist based on sub-fossilized pieces of Lophelia documented on the northeast Flemish Cap (NEREDIA Survey 2009-2010). In addition, living colonies have been recorded in adjacent regions such as the Stone Fence (Nova Scotia, Canada) and southern tip of Greenland. Examples of coral gardens in the Flemish Pass include Sea Pen fields, Acanella meadows, Geodia sponge grounds, and bamboo and sponge thickets. For the latter, the composition of the community may change with depth. Section 8.3.2 of the EIS provides some information on how the seabed investigation surveys would be conducted (i.e. with a drop-camera / video system). Information such as the distance from the wellsite to be surveyed, and timing prior to drilling are not provided. The DFO has advised that that prior to any activity, the operator will be expected to develop a pre-drill survey plan for review and acceptance by the C-NLOPB and DFO, and that seabed surveys of the area surrounding the proposed well location and anchor moorings, if applicable, will be conducted using side-scan sonar and multibeam echosounder, and will include identification and mapping of deep-sea corals, sponges, and sea pens. Following analysis and interpretation of survey data, potential sensitive benthic organisms/habitat will be visually identified using high-definition images obtained by ROV/drop camera. If identified, a risk assessment approach (considering factors such as size, abundance, degree of exposure, and condition) should be incorporated to determine potential mitigation measures. The pre-drill coral survey and risk assessment report, with proposed mitigations, should be submitted to the C-NLOPB and DFO for review and acceptance prior to commencement of drilling. In the event that any sensitive benthic organisms/habitat are identified, there is the expectation that appropriate mitigation measures will be incorporated.	investigations are not proposed at all wellsites and anchors/moorings, explain how those areas where sensitive species may occur would be identified. Provide further information on the seabed investigation methodology that would be followed, including: • the distance from each wellsite and/or mooring to be surveyed and how the results of the drill cuttings dispersion modelling and water depth would be applied to determine the distance to be surveyed; • who would review the seabed investigation results; • who the seabed survey results, including footage, would be communicated to and in what manner; and • timing of the seabed investigation prior to drilling. In addition, clarify whether the surveys would seek to identify only coral colonies, as defined in Section 8.3.2 of the EIS, coral gardens, as defined in section 8.3.3.2, or whether they would also seek to identify other sensitive benthic organisms or habitats. Specify whether the seabed investigation could be modified to also include species at risk. Explain whether a seabed investigation would be conducted if a drill ship is used to account for dynamic positioning requiring the placement of an array of transponder beacons directly on the seabed.
IR-19	CNLOPB-4Nx, DFO 17 NX	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat, and	Section 8.3.4.2 Residual Environmental Effects Assessment; Section 8.3.2 Summary of Key Mitigation	Drill cuttings dispersion modelling results for both a deep water well (1,137 metres) and shallow water well (378 metres) were provided in the EIS. Tables 8.3 and 8.4 of Section 8.3.4.2 of the EIS provide predicted mean and maximum cuttings pile thicknesses for both water-	Discuss if and how completed drill cuttings dispersion modelling for water- and synthetic-based muds would inform mitigation measures, including: • A description of if and how dispersion modelling results would

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	KMKNO-12-Nx; -13-Nx DFO-04 Nx		Section 6.4 Mitigation		based muds and SBMs at distance intervals from the wellsite one to two kilometres away. These tables depict exceedances for the 1.5 mm and the 6.5 mm thresholds for up to 200 metres away from the wellsite for water-based muds and up to 1 kilometre away for SBMs. Section 8.3.4.1 of the EIS states that corals and sponges are particularly sensitive to sedimentation and burial in the marine environment. Section 8.3.4.2 of the EIS states the slopes of the Newfoundland Shelf, Flemish Pass and Flemish Cap are more likely to have higher densities of coral and sponge species as compared to other parts of the Project Area/ LSA and the Eastern Newfoundland Offshore Area in general, and that prior to the start of drilling activity at a wellsite, a seabed investigation will be undertaken to investigate the potential presence of aggregations of sensitive benthic organisms or habitats in the immediate area (such as coral gardens and sponge grounds). Should such organisms be observed within or in proximity to a planned wellsite location, Nexen states it will move the wellsite where possible to avoid or reduce the potential for direct interaction with them or other possible effects such as sedimentation or burial from drill cuttings disposal. Section 8.3.2 of the EIS states that if the seabed investigation observes coral colonies within or in proximity to a planned wellsite location and/or moorings, a 100 metre setback from these organisms will be applied, if feasible. The C-NLOPB has advised that setting back anchors 100 metres 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? The DFO also advised that alternatives to setback of operations (e.g. re-direction of cuttings) could also be considered. The EIS defines a coral colony as: • Lophelia pertusa reef complex or • Five or more large corals (larger than 30 centimetres in height or width) within a 100 square metre area. Section 8.3.2 of the EIS states that if moving the wellsite is not feasible, the C-NLOPB will be consulted to determine an appropriate course of	inform the calculation of appropriate setback distances of wellsites and anchors/moorings from sensitive environmental features, including whether the 1.5mm or 6.5 mm threshold would be used and in what circumstances. If a standard setback of 100 metres would be used, provide a rationale, taking into consideration modelling results. • Additional information on how/if two different thresholds may be used to determine required setback distances. For example, could the selection of a threshold be dependent on the sensitivity of the species identified during the seabed investigation? If a species could not be identified definitively, would a precautionary approach be taken? Consider the potential effects of anchors and moorings on benthos, including corals and sponges and identify if there would be mitigation measures to address effects of anchoring systems and moorings, including associated cables and chains. Include a discussion of whether the anchor system placement would be verified and whether anchors would be repositioned via ROV in instances where they have settled on sensitive habitat. Provide further information on mitigation measures, including: • what criteria would determine that moving a wellsite is not feasible; and • what mitigation would be used when a 100 metre setback from the wellsite is not feasible. Consider if there are alternatives to setback of operations for mitigation measures (e.g. redirection of cuttings) and describe applicability to the Project. Update proposed mitigation and follow-up and associated effects predictions, as applicable.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					action. The EIS does not describe mitigation measures related to sensitive benthic organisms or habitats, or corals, identified in the seabed investigation, other than those meeting the "coral colony" definition. The EIS does not identify mitigation measures or monitoring in the event that a wellsite cannot be moved. In addition, the KMKNO indicated that Section 2.5.2.1 of the EIS states "In preparation for MODU arrival at the well location, positioning transponders may be placed on the seabed and met ocean equipment (wave rider and current metres) may be deployed." Further, Section 8.3.3.2 states "In cases where dynamic positioning is used to position and stabilize the MODU and/or support vessels, the interactions with the benthic environment would be limited as mooring would not be required. Therefore, potential interactions with benthic habitats would be limited to the area of the well site itself". The KMKNO expressed concern that given dynamic positioning transponder beacons are placed directly on the seabed, seabed surveys should also be conducted so that they can be guided into place via ROV to avoid any sensitive locations. If this is not feasible, locations should be verified through ROV video survey and beacons repositioned to avoid coral, sponges and sensitive habitats.	
IR-20	DFO 5-NX KMKNO-14-Nx, -15-Nx; Nutash-50-Nx	5(1)(a)(i) Fish and Fish Habitat	Section 6.1.3, Fish and Fish Habitat, and 8.1 Follow-up	Section 8.6 Environmental Monitoring and Follow-up; Section 18.4.1 Follow-up	Section 8.6 and Section 18.14.1 of the EIS proposes that a follow-up program in consideration of sensitive benthic habitat would be conducted under specific circumstances (i.e. when a well site is located within an identified Fisheries Closure Area, or in an area where the results of the pre-drill seabed investigation and subsequent review by DFO and C-NLOPB indicate monitoring is required. (Section 18.4.1)). The KMKNO states that follow up studies should be completed, including a monitoring program via seabed video and/or benthic sampling to determine infaunal recolonization rates following drilling.	Provide clarification as to whether a follow-up program, should a wellsite be adjacent to or near a Fisheries Closure Area, such that drill cuttings deposition may occur within the Fisheries Closure Area at levels above the biological effects threshold, would be undertaken. Further discuss the need for follow-up depending on species types and assemblages as well as based on the mitigation implemented. Discuss the need for and feasibility of a seabed monitoring program to determine infaunal recolonization rates following drilling.
IR-21	KMKNO-16-Nx;	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat	Section 8.3 Environmental Effects Assessment and Mitigation	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	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, and birds that rely on this food source, with specific consideration of potential effects on species at risk.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					production), the assessment is insufficient regarding potential effects to zooplankton (secondary production), and how this may affect fish. 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.	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-22	DFO -35,-36,-37,-38, -39 Nx DFO 3, 30-31 Ax NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 1, Section 3.1 Project Components	Appendix D – Section 3.2.2 Cuttings Particle Characterization, 3.2.3 Ocean Currents	The DFO identified several issues with the cutting dispersion model inputs and design. Given that the results of modelling would be used in determining pre-drill coral survey areas, the resolution of modelling results is an important consideration. Model Inputs: The DFO indicated that the drift study uses CECOM and Webtide for the wind driven parts of ocean current (CECOM) and Webtide for the tides. The Flemish Pass has more flow components than just tidal and wind driven flow due to large scale oceanic and atmospheric changes over time. The momentum equation in CECOM is governed by wind driven flow as well as mean flow given by climatology. There are much better current descriptions now available for the area then CECOM that include assimilation of sea level, SST and in-situ Argo data to provide the best possible representation of ocean circulation throughout the water column, including: • the GOC CONCEPTS systems: see transect Hovmöller plot for Flemish Pass at surface and bottom (Appendix A below, Figures 2 and 3); • HYCOM (US Navy/NOAA); • FOAM (UK Metoffice); and • Altimetry derived currents (provide depth averaged 2D currents since 1992 in the area, (i.e. AVISO data base)). As seen from the GOC CONCEPTS RIOPS prediction system as well as Atlantic Zone Monitoring Program (AZMP) Acoustic Doppler Current Profile (ADCP) transects in the area, there is strong variability of current in the Flemish Pass (see Appendix A below, Figures 2 and 3) and currents as observed by ADCP may be higher than mean spring currents (see tel886 Flemish Cap line (Appendix A below, Figure 4). The DFO has indicated an inconsistency in Appendix G, Section 3.2.2 of	Provide a rationale for the model inputs used to predict dispersion of disposed drill cuttings, and discuss the potential limitations of the model, including: • Clarifying the apparent inconsistency in equations used to estimate particle fall velocities (Equations 4 and 5, Section 3.3.2 of Appendix G of the EIS), and provide the correct citation(s) for the relationships (Sleath 2014/1984/1939). • Clarifying the statement in Section 3.2.3 of Appendix G of the EIS regarding the corresponding day of current data. Discuss model design and limitations (e.g. the use of low resolution data, model geometry) including the following: • Incorporate stochastic analysis in drill cutting dispersion scenarios, or provide a rationale for use of four simulations. • Explain whether the dispersion model has considered processes at the benthic boundary layer (e.g. the presence of a mud plume/cloud near the bottom, and how this affects drill cutting dispersion predictions). If this is not addressed by the model, discuss the implications for model results. • Provide a justification for the assumption that currents are uniform over the deposition grids modelled. • Provide a rationale for the model selected and for the use of the turbulent diffusion term, and discuss the limitations of modelling without the use of advective-diffusive equations. Given the potential limitations of the model approach, indicate how a conservative approach to interpreting results would be taken when identifying areas for pre-drill coral surveys.

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					the EIS: equations 4 and 5 are dimensionally inconsistent (unless constants have units that are not specified). Section 3.2.3 of Appendix G of the EIS states, "In the model algorithm, as each calendar day of drilling and possible discharge is followed, the corresponding day of current data is input from the representative year time series file and is used to advect the particles." DFO has indicated that the meaning of this statement is unclear. There cannot be a "corresponding day" as seasonal averages are used as forcing. Model design and limitations: DFO noted that no stochastic analysis was performed for drill cuttings dispersion modelling (only four simulations argued to be representative of each season), which is a limitation of the modelling. Additionally, it noted that high resolution reanalysis (e.g. Mercator GLORYS or HYCOM that was used for oil spill scenarios) should have been used to force the model over several months/years. Using such products would avoid uncertainty related to the use of incomplete or non-homogeneous forcing from site to site. Currents for input to the drill cuttings model were derived from seasonal average currents at near-surface, mid-depth and near-bottom depths through the water column, which DFO stated is not sufficient. Bourgault et al. (2014) showed that seasonal average currents may not be appropriate to model dispersion as they remove all energetic high frequency motions (eddies, tides, storms, etc.). The EIS states that such energetic motions are important in this region (see Appendix G of the EIS), and this is confirmed with drifter observations. The EIS states, "The assumption flat bathymetry is borne out as a reasonable approximation given the distances and directions that the cuttings drift." DFO indicated that this approximation is based on other questionable approximations: the use of constant, uniform, and seasonal currents, as well as neglecting benthic boundary layer processes. The bathymetry approximation may not hold if more realistic currents are used. The EIS states, "A 'base case' of 0.001 m/s values for the two smallest particle types as reported in Table 3-4, were deemed the most reasonable and selected for the model runs. These values, somewhat smaller than a faster 0.005 m/s settling, provide a somewhat more conservative estimate in terms of how far horizontally the cuttings may	

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					disperse." DFO has indicated that this is not necessarily conservative since the slowing down of settling velocities due to benthic boundary layer stress have not been taken into account. The effect of benthic boundary layer stress is even mentioned in the report: "slowing to 0.0001 m/s (for floc breakup when the bottom stress exceeds a threshold)." By neglecting this parametrization, the model neglects re-settling/re-suspension mechanisms that would create a plume/cloud near the bottom that may be critical for benthic biology (e.g. Cranford and Gordon, 1992). The EIS states, "It is assumed that the currents are representative of the two locations and are uniform over the deposition grids (domain) modelled." DFO stated that if uniform currents are used, then the model is not a real 3D model as stated in the introduction. Moreover, Figures 3-1 to 3-8 show that velocities are not uniform over the domain. This simplification/ shortcut is not acceptable, especially as the selected location for the currents are from the lowest advection velocities. These figures suggest that as the particles move away from the release site, they should be entrained by stronger velocities. The DFO has indicated that in Section 3.2.5 of Appendix D of the EIS there are problems with the turbulent diffusion term (Rx,Ry,Rz in [-1,1]): a) x', y', z' are not defined; b) it is not clear why vertical (Rz) and horizontal (Rx,Ry) "diffusivity" coefficients are the same order of magnitude, and whether there is scientific justification for this; c) this scheme appears to be totally dependent on the model horizontal and vertical grid resolution (which has the advantage of reducing the problem raised in b); and d) the scientific rationale for imposing the range [-1,1] is not clear. If interpreted correctly, the equation means that the particle can move at most by one grid cell per time step. The DFO noted that advective-diffusive equations are a very standard and simple modelling procedure and would produce higher resolution results.	
IR-23	Elsipogtog-03-Nx, -13-Nx; MTI-06-	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Section 8 Follow-up and Monitoring Programs	Section 8.6 Environmental Monitoring and Follow-up	The proponent has not proposed to undertake any follow-up monitoring regarding marine fish, since no significant effects are predicted. However, Elispogtog First Nation is concerned that if no monitoring is conducted, the predictions of effects cannot be tested or	Provide additional rationale on the need for follow-up to verify effects related to fish and fish habitat. Comment on the need for and of feasibility of monitoring to

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	Nx				verified. Similar to this, MTI raised concern with the lack of commitment to continually assess fish presence during operations, despite the EIS acknowledging the fluctuating nature of fish presence in the Project Area.	provide insight into fish species and abundance in the Project Area.
IR-24	DFO-46-Nx MFN-05-Nx	5(1)(a)(i) Fish and Fish Habitat	Part 2, Section 6.3.1 Fish and Fish Habitat	Section 8.3.3.2 Residual Environmental Effects Assessment	The EIS Guidelines require an analysis of the effects of underwater noise and vibration emissions on fish health and behaviour. Section 8.3.3.2 of the EIS refers the reader to Appendix E for additional information on anticipated underwater noise emissions. However, in assessing potential noise effects on fish and fish habitat, Section 8.3.3.1 of the EIS refers to "typical sound levels" rather than referencing the source levels and predictions included in Appendix E. It is not clear why specific sound emissions predictions are not used to support the assessment of effects on fish. The EIS states that "(t)ypical sound levels from offshore drilling activities are generally below estimated received sound exposure guidelines for injury to fish, those that have been established for recoverable injuries (170 dB re 1µPa for 48 hr SEL) and temporary hearing threshold shift (158 dB re 1µPa for 12 hr SEL) (Popper et al. 2014)." However, typical source levels of drilling activities are reported to be greater than 187 dB re 1 µPa based on information presented in Appendix E; this is above the thresholds indicated for effects on fish. It is unclear to what distance the levels would be expected to be above thresholds.	Update the assessment of effects of noise on fish, using sound levels from Appendix E that are intended to be representative of project conditions. As part of this assessment, include: • a discussion of how the at-source sound levels predicted in Appendix E compare to the selected noise thresholds for injury and behavioural effects in fish; and • estimates of the distance from source at which sound levels would be expected to be above thresholds for fish injury and behavioural effects. Update the effects analysis, proposed mitigation and follow-up, as well as effects predictions accordingly.
IR-25	KMKNO-25-Nx; MMS-05-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.4 Mitigation Measures	Section 10.3.2 Summary of Key Mitigation and Section 10.6 Environmental Monitoring and Follow-up	The EIS does not propose passive acoustic monitoring for detecting marine mammals in the vicinity of the Project during vertical seismic profiling. 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. The KMKNO expressed concern with the lack of passive acoustic monitoring, in particular during periods of low visibility when marine	Consider passive acoustic monitoring for detecting deep-diving cetaceans in the vicinity of the Project during vertical seismic profiling and the length of the ramp-up observation period. Describe whether passive acoustic monitoring and a longer pre-ramp up watch would be included in the mitigation measures for the Project. If the proponent does not believe additional mitigation is required, provide associated rationale.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					mammal observers cannot effectively observe the entire exclusion zone (i.e. fog, nighttime).	
IR-26	MMS-09-Nx; Nutash-15-Nx; MTI-09-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 8 Follow-Up and Monitoring Programs	Section 10.6 Environmental Monitoring and Follow-up	Sections 8, 9, and 10 of the EIS state that noise from the Project may affect marine species; however, there is no discussion in the EIS on follow-up programs to determine the accuracy of effects predictions with respect to noise and effectiveness of proposed mitigation measures.	State whether the proponent intends to verify noise predictions and/or the effectiveness of mitigation measures 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, including marine mammals and sea turtles, and certainty/uncertainty related to effects predictions.
IR-27	MMS-04-Nx; KMKNO-03-Nx, -22-Nx, -23-Nx; -37-Nx; MTI-10-Nx, -11-Nx; NunatuKavut-15-Nx, -13-Nx; Nutash-50-Nx; MTI-09-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.4 Mitigation Measures	Section 10.3.2 Summary of Key Mitigation	The Agency received comments from Indigenous groups about mitigation of effects on marine mammals. The KMKNO indicated that Section 10.3.8.1 of the EIS states "[r]educing vessel speed has been shown to reduce the number of marine mammal deaths and severe injuries due to vessel strikes (Vanderlaan and Taggart 2007; Vanderlaan et al 2008, 2009; vander Hoop et al 2012). Lethal strikes are infrequent at vessel speeds less than 25.9 km/h (14 knots) and rare at speeds less than 18.5 km/h (10 knots) (Laist et al 2001)." The 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. MMS raised concern with the simultaneous presence of ships and marine mammals resulting in risks of collision which may cause injuries and occasionally be fatal for the animal. The potential Project vessel traffic route is illustrated on Figure 2.5 as a direct line between the drilling installation and the supply base. The 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. In addition, The KMKNO noted that in some sections of the EIS it is stated the existing and common vessel traffic routes will be used "wherever practical" (section 10.3.1), and other sections state that these will be used "wherever possible" (section 10.3.8.2). Further to this, MTI noted that the EIS indicates that routes may vary at times based on particular location of active	Define speed limits that supply vessels operating outside of shipping lanes would adhere to and consider the associated potential for effects on marine mammals. Describe existing shipping lanes, clarify in what circumstances they would be used, and discuss where project vessel traffic routes would link up with existing shipping lanes. Describe whether the use of existing shipping lanes could reduce the potential for effects on marine mammals. Taking into consideration MMS's and MTI's comments, 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 Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					MODU(s), onshore facilities being used, environmental and logistical conditions; but does not include information on these possible variations. To reduce the adverse effects of drilling activities on marine mammals, MTI has suggested that additional mitigation measures should be considered. It suggested that drilling be restricted, or at an minimum closely monitored and regulated with marine mammal discovery contingency plans and work stoppage triggers in place during the period in which North Atlantic right whales are more likely to be present in the Project Area (early May and mid-October), as well as that if observations of individual North Atlantic right whales are made within close proximity during drilling activities. In addition, consideration should be given to implementing all applicable precautionary measures outlined in the Government of Canada's 2018 plan for protecting North Atlantic Right Whales. The NunatuKavut Community Council suggested that if it is determined that the Project or any related activities have an effect on migration routes, activities should be suspended during migration.	
IR-28		5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 8 Follow-up and Monitoring Programs	Section 10.6 Environmental Monitoring and Follow-up	Section 10 of the EIS states that vessel traffic for supply and servicing of the MODU is estimated at two to three return transits per week for a single MODU (and for two MODUs this will increase proportionally) and that any vessel strikes involving marine mammals or sea turtles will be reported to DFO within 24 hours.	Explain what procedures are in place for notifications of DFO in case of a vessel collision with a marine mammal or sea turtle. Explain what types of responses could be expected if any, 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.
IR-29	KMKNO-23-Nx, -24-Nx, -26-Nx; MMS-05-Nx; MTI-09-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.4 Mitigation Measures	Section 10.3.2 Summary of Key Mitigation; Table 10.5 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles; Section 10.6 Environmental Monitoring and Follow-up	Section 10.3.2 of the EIS states that mitigation measures applied during the Project's vertical seismic profiling surveys will conform with those in the *Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment* (Statement), while Table 10.5 states that Nexen will operate in compliance with relevant aspects of the Statement. It is unclear whether all mitigation measures in the Statement will be applied to the Project. Section 10.6 of the EIS states that visual monitoring for the presence of marine mammals and sea turtles within a pre-determined exclusion zone will take place during vertical seismic profiling operations where a seismic sound source array is used. The size of the monitored exclusion zone is not clear. Section 10.3.2 and Table 10.5 of the EIS states that there will be marine	Clarify what aspects of the Statement are considered "relevant" and whether all mitigation measures in the Statement will be applied to the Project. Including: • whether shut-down of the array would occur if any species of marine mammals or sea turtles enter the safety zone. Should shut down only occur on sighting of listed species, provide an explanation of how these species would be identified, and • what the size of a safety zone within which a qualified marine mammal observer will monitor for the presence of marine mammals and sea turtles would be. Provide explanation/justification for any mitigation measures included in the Statement that would not be applied to the Project.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					mammal observers during vertical seismic profiling surveys that will enable sound source array shutdown or delay actions to be implemented if marine mammal or sea turtle species listed on Schedule 1 of the SARA are detected within the monitored exclusion 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. The KMKNO has asked about the feasibility of extending the safety zone during vertical seismic profiling (e.g. to a radius of 1 kilometre from the installation). In addition the KMKNO asked if vessel personnel should be provided with training to identify marine mammals and sea turtles to serve as look outs during travel time, to minimize potential impacts.	Discuss the need for and feasibility of extending the safety zone during vertical seismic profiling. Clearly identify any modified or additional mitigation measures which would be applied. Confirm if there would be observations for marine mammals and sea turtles when transiting to and from the Project Area. If so, provide information on the actions to be taken in the event a marine mammal or sea turtle is spotted.
IR-30		5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.3.3. Marine Mammals and 6.3.4 Marine Turtles	Appendix E Underwater Noise Propagation Assessment; Section 2.7 Project Schedule	Appendix E of the EIS states that for sound modelling, "May was selected… since this profile is the least downward refracting during the months that are traditionally most operationally active (May to October). Thus, using the sound speed profile for May will result in conservative but realistic distances to the assessed sound thresholds compared to the yearly averaged." The EIS also states that distances to behavioural thresholds may be slightly longer for activities during January-May, but that during this time activities are unlikely due to heavy weather in the region. Section 2.7 of the EIS states that within its temporal scope, each of the planned exploration activities that comprise this project may occur in any year of the proposed exploration project, and at any time of the year. Based on Nexen's sound modelling results, behavioural acoustic threshold levels in marine mammals could be reached as far as 56.8 km from the MODU. It is not clear in the EIS whether the distance to behavioural thresholds could extend further in the months that weren't modelled for (January-April) and whether there is the possibility of exploration activity occurring during that time.	Confirm whether project activities could occur year-round. If so, taking into account that sound is expected to propagate longer distances from January-May, explain whether the distance to marine mammal and sea turtle behavioral sound threshold limits for the months that weren't modelled for (January-April) could extend further than the 56.8 km modelled in the EIS for May.
IR-31		5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 8 Follow-up and Monitoring Programs	Section 9.6 Environmental Monitoring and Follow-up, Marine Migratory Birds	Section 9.6 of the EIS states that a trained Environmental Observer will be onboard the MODU to record marine bird and marine mammals sightings during Project operations.	Describe any protocols that will be utilized while undertaking the marine mammal observation during Project operations, including reporting the results of the monitoring program.
IR-32	C-NLOPB-3 (Nexen)	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii)	Part 2, Section 6.3.1 Fish and Fish Habitat, and 6.6.3	Appendix E Underwater Sound Propagation Assessment (JASCO 2017)	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	Assess the effects of noise from operating multiple drilling units simultaneously, as proposed for the Project.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
		Aquatic Species	Marine Mammals		6.6.3). It is noted that the Nexen model (Appendix E of the EIS, Underwater Sound Propagation Assessment) 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 E, nor carried through the effects assessment.	Update the effects assessment, as applicable.
IR-33	MMS-05-Nx; MTI-09-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.1.6 Marine Mammals	Section 10.5.1 Residual Environmental Effects Summary	Vertical seismic profiling activities may adversely affect marine mammals. The EIS states in Table 10.5 that measures to mitigate the effects of vertical seismic profiling include keeping seismic sound levels at the minimum level possible based on the associated technical requirements for the survey. Typical energy levels are provided in Appendix E (Underwater Sound Propagation Assessment).	Describe how seismic sound levels will be kept at the minimum level possible. Within the description, include the following information: • what would be considered a minimum level; • above what frequency is energy considered unnecessary for the purpose of the survey; • how much reduction can be achieved; and • to what extent would these changes reduce potential effects on marine mammals?
Migratory Birds						
IR-34	ECCC-08-NX; MTI-13-Nx	5(1)(a)(iii) Migratory Birds	Part 2, Section 6.3.5 Migratory Birds and 6.6.3 Cumulative Effects Assessment	Section 9.3.3.2 Residual Environmental Effects Assessment	Table 15.6 (Cumulative Effects) states that the interactions between the oil platform and migratory birds are anticipated to be confined to within five kilometers 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. 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". Section 9.3.3.2 of the EIS states that "(o)verall, the presence and operation of the MODU(s) in the Project Area 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 the Leach's storm-petrels, regardless of the other light sources in the area. Each additional platform would emit lights that	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. Confirm whether the measures described in section 2.10.5 of the EIS will be used to mitigate effects of lighting from the Project on migratory birds and/or under which conditions they would be implemented. Consider potential need for additional follow-up related to effects on migratory birds. Update proposed mitigation, follow-up and significance predictions accordingly.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					would attract birds and should therefore not be considered “a negligible addition”. The EIS recognizes the potential effect of lighting on migratory birds, and Section 2.10.5 indicates that the use of artificial lighting will be minimized to the greatest extent possible and that “[t]his may include minimizing the amount, duration and frequency of pilot warning and obstruction avoidance lighting; shielding lights downward so that the light is directed toward the deck; and using strobe lights instead of solid-burning or slow pulsing warning lights at night where possible.” However, specific mitigation measures related to lighting and bird attraction were not confirmed.	
IR-35	ECCC-13-NX	5(1)(a)(iii) Migratory Birds	Part 2, Section 6.3.5 Migratory Birds and 6.6.3 Cumulative Effects Assessment	Chapter 15, Cumulative Environmental Effects	Section 15.3.4 of the EIS states “the current petroleum production projects (Hibernia, Terra Nova, White Rose and Hebron) are located at considerable distance from the Project Area / LSA, and with the possible exception of associated vessel transits, any environmental disturbances that are relevant to this VC resulting from Project activities (including light emissions that may attract and/or disorient night-flying birds) in this area will not likely overlap with those of the current production projects.” ECCC has advised that a new light source in darker parts of the Project Area where there is currently no offshore production may have a comparatively larger direct effect compared to the incremental effect of a new light source in the more active north western portion of the Project Area.	Update the assessment of effects of light on migratory birds taking into consideration differences in existing/proposed background lighting within ELs (i.e. differences between a new light source in the more active northwestern portion of the Project Area and a new light source in the portion of the Project Area which is currently a darker environment).
IR-36	ECCC-06-NX ECCC-10-NX KMKNO-18-Nx	5(1)(a)(iii) Migratory Birds	Section 6.3.5 Predicted Effects on Valued Components - Migratory Birds	Section 9.3.2 Summary of Key Mitigation and Section 9.3.6.1 Overview of Potential Effects and Existing Knowledge	Section 9.3.6.1 of the EIS provides information on the few studies to-date that have seen little or no bird mortality at flares but ECCC states 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. Section 9.3.2 of the EIS states that flaring will be kept to the minimum necessary to characterize the hydrocarbon accumulation and as necessary for the safety of the operation. Flare shields will be considered if technically and safely feasible. Information on the specific	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. Describe potential measures that could mitigate the effects of flaring on migratory birds, and applicability to the Project, including: • use of water curtains and flare shields, and the factors that would be considered in determining technical and economic feasibility; • timing of flaring to avoid periods of migratory bird vulnerability; and • minimizing night-time flaring.

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					circumstances under which flare shields would be feasible are not provided. In addition, ECCC identified the following mitigation measures that require consideration: • notification to the C-NLOPB at least 30 days in advance of flaring to determine whether the flaring would occur during a period of migratory bird vulnerability along with a description of how the proponent plans to prevent harm to migratory birds; and • the minimization of flaring during night time and during periods of bird vulnerability. The KMKNO stated that in order to minimize the chance of episodic mass mortality, flaring during periods when birds are more vulnerable (fog, at night, etc.) should be avoided and that additional mitigation measures such as water curtains should be used.	Update proposed mitigation accordingly.
IR-37		5(1)(a)(iii) Migratory Birds	Part 2, Section 6.3.5 Migratory Birds	Section 9.3.3. Presence and Operation of MODUs	Section 9.3.3 provides results of bird searches on board offshore platforms and vessels in the offshore area, over non-continuous timelines between 1998 and 2006. However, more contextual information and information on the data is required to determine its applicability to the current project's effects assessment.	With regard to the information referenced in Section 9.3.3 of the EIS and 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 were 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

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
						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-38	ECCC-07-NX ECCC-12-NX KMKNO-19-Nx; MTI-15-Nx, -16-Nx	5(1)(a)(iii) Migratory Birds	Section 6.3.5 Predicted Effects on Valued Components - Migratory Birds; Section 8 Follow-up and Monitoring Programs	Section 9.6 Environmental Monitoring and Follow-up	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. ECCC has also advised that 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 should 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. The EIS states 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 MTI has recommended additional monitoring and mitigation measures be considered for birds. For example, data on the number of bird strandings and deaths could be used as an adaptive management tool to determine the effectiveness of or need for additional mitigation.	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. Taking into consideration the certainty/uncertainty of predictions identified by ECCC, discuss requirements for a follow-up program in relation to the potential effects of the Project. 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. Discuss the need for and feasibility of using bird stranding and mortality data as an adaptive management tool.
IR-39	MTI-12-Nx, -15-Nx	5(1)(a)(iii) Migratory Birds	Part 2, Section 6.3.5 Migratory Birds	Section 9.6 Environmental Monitoring and Follow-Up	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	Taking 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

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					for monitoring (Fraser and Racine, 2016; https://nlenvironmentnetwork.files.wordpress.com/2016/05/fraser_racine_spills_seabirds-2016.pdf).”	economic/technical feasibility of these measures.
IR-40	ECCC-09-NX	5(1)(a)(iii) Migratory Birds	Section 6.3.5 Predicted Effects on Valued Components - Migratory Birds	Section 9.3.3.2 Residual Environmental Effects of the Project	The EIS states that “… (t)he MODU will be situated over 400 kilometers offshore, which is far from coastal breeding sites and IBAs, and well beyond the foraging range of almost all species that nest in Newfoundland.”(p. 698). The EIS also states that “(a)lthough the MODU will be situated outside the foraging range of most species, the Leach’s Storm-petrel is known to make foraging trips of thousands of kilometres during the breeding season (Pollet et al 2014). The MODU will take up to 160 days to drill… and so disturbance will be short- to medium-term and transient in nature”(p.699). ECCC has advised that Leach’s storm-petrels breeding on both Gull Island and Baccalieu Island forage in the proposed Project Area during the breeding season. Therefore, there is potential for effects on breeding birds. 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-petrels. For example, if activities take place during the autumn when young birds have left the colonies, numbers could be especially high. The EIS concludes 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 four million breeding individuals. A submission from the public on another offshore exploratory drilling project in the area stated 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).	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-41		5(1)(a)(iii) Migratory Birds	Section 6.1.5 Species at Risk	Section 6.2.6 Species at Risk and Otherwise of Special Conservation	The current EIS does not consider avian species listed on the IUCN Red List of Threatened Species. Species such as the Bermuda Petrel (*Pterodroma cahow*), and White-tailed Tropicbird (*Phaethon lepturus*)	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

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Concern	have been noted in the area of similar projects offshore Newfoundland. The Bermudan White-tailed Tropicbird has been noted as one of the most endangered species of seabirds with a population of 146 mature individuals (BirdLife International, 2016).	species, and update potential mitigation and follow-up, as well as effects predictions, as applicable.
IR-42	ECCC-01 Conformity	5(1)(a)(iii) Migratory Birds	Section 6.3.5 Predicted Effects on Valued Components - Migratory Birds,	Section 9.2 Potential Environmental Changes, Effects and Associated Parameters, Table 9.2	ECCC has advised that Table 9.2, 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. Section 6.3.5 of the EIS Guidelines require examination of the change in marine habitat quality from drill muds and cuttings and sedimentation, and indirect effects caused by increased disturbance (e.g. noise, light, presence of workers), relative abundance movements and changes in migratory bird habitat. ECCC has advised that a change in avifauna presence and abundance and change in habitat availability could result from drilling and associated marine discharges. Likewise, ECCC advised that vertical seismic profiling could result in change in habitat availability and quality.	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 and • Drilling and associated discharges: Habitat availability and quality. If no changes are proposed, provide a rationale for no change in habitat availability as a result of drilling and associated marine discharges or vertical seismic profiling, or no change in avifauna presence and abundance as a result of drilling and associated marine discharges. Update the analysis of effects, proposed mitigation and follow-up, and significance predictions, as applicable.
IR-43		5(1)(a)(iii) Migratory Birds	Section 6.3.5 Predicted Effects on Valued Components - Migratory Birds	Section 16.6.3.2 Environmental Effects Assessment	The EIS states that "[b]ased on vulnerability indices (French-McCay 2009), the mortality risk would range from 35-99 percent for birds that come in contact with 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.	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 oil spills.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Species at Risk						
IR-44	DFO 10-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.1.5 Species at Risk	Section 6.3.5 Species at Risk and Otherwise of Special Conservation Concern	The Agency is the responsible authority for the EA of the Project and therefore must identify the adverse effects of the Project on listed wildlife species and their critical habitat under the SAR) 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 the COSEWIC species, the Agency requires an assessment of effects on these species as well as an accounting 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). The EIS does not explain how the mitigation measures for general VCs are consistent with applicable recovery strategies and action plans. In some cases actions 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).	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; and • 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 Update the effects assessment, potential mitigation and follow-up, as appropriate, including a description of how mitigation measures for VCs are consistent with applicable recovery strategies and action plans. Resulting analysis should take into consideration clarifications and corrections described in Appendix B.
IR-45	DFO 20-NX, DFO 21-NX, DFO 23-NX, DFO 24-NX, DFO 26-NX, 29 NX, DFO 30-NX, DFO 31-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.1.5 Species at Risk	Section 6.3.5 Species at Risk and Otherwise of Special Conservation Concern	The EIS Guidelines require descriptions of federal species at risk and their habitat at the project site and within areas that could be affected by routine project operations or accidents and malfunctions. While the EIS provides a description of most species at risk and considers potential effects of the Project on these within other more general VCs, 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, Killer and Northern bottlenose whales and the Harbour porpoise, no further effects analysis specific to these species is completed. 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 B). DFO has advised that the EIS provides very short descriptions of marine mammal and sea turtle species at risk and generally does not provide references when detailing the potential presence of these species.	Provide additional information about marine species at risk, including: • an analysis of potential effects of the Project on the Fin, Killer and Northern bottlenose whales and Harbour porpoise with consideration of the high or moderate likelihood of interaction between these species and the Project; • Lumpfish, Smooth Skate (Laurentian-Scotian population), Bowhead Whale (Eastern Canada – West Greenland population), 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; • descriptions of marine mammal and sea turtle species at risk, including information on seasonal movement patterns and migration corridors and references to support the potential presence of these species; • the number of fish species with the potential to overlap with the Project Area and/or RSA, descriptions of each of those species and references to support presence of those species that have a potential to have ranges that overlap with the

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					Additionally, DFO has advised that the statement in Section 6.1.8 of the EIS regarding fish species at risk that "of the 30 listed species in the North Atlantic, 13 species have a higher potential to have ranges that overlap with the Project Area and/or the RSA" is not justified, nor consistent with the 16 species that are later described in the text. All species listed on Schedule 1 of SARA and designated by COSEWIC with the potential to overlap with the project should be described. The EIS identifies three species at risk which have not been included in Table 8.6: Cusk, American plaice and Spiny dogfish. Table 8.6 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 do not appear to have been considered in assigning potential for interaction.	Project Area or RSA; • information on Cusk, American plaice and Spiny dogfish with applicable analysis of potential environmental interactions and effects to these marine fish species of concern; and • additional rationale for the summary of potential interactions for marine fish species at risk identified in Table 8.6, considering how abundance, timing of presence (e.g. 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. Update effects assessment, as appropriate. Resulting analysis should take into consideration clarifications and corrections described in Appendix B.
Special Areas						
IR-46	QFN-04-Nx CEAA; NunatuKavut-17-Nx; KMKNO-27-Nx	Section 5 - All	Part 2, Section 6.3 Predicted Effects on Valued Components	Section 11.3.3 Environmental Effects Assessment; Section 11.4 Environmental Effects Evaluation; Section 11.5 Environmental Monitoring and Follow-up	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 RSA. The EIS indicates that the analysis of effects on special areas is covered in other VC sections; however, it is not clear where and how routine effects of noise, light, or water and sediment quality on special areas have been fully considered. Qalipu First Nation and the KMKNO expressed concern about the effects of project related activities on special areas, which are adjacent to or overlap with the Project Area, in particular with respect to sponges and corals as they are easily disturbed and slow to recover. The NunatuKavut Community Council suggests that as a means by which to reduce the effects of operations on special areas, buffer zones around protected areas should be considered.	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). Update the effects assessment, potential mitigation, and follow-up, as appropriate.
IR-47	DFO 32 Nx	Section 5 - All	Part 2, Section 6.3 Predicted Effects on Valued	Section 11.3.3 Environmental Effects Assessment (All Planned	There are Ecologically and Biologically Significant Areas (EBSA) identified by the Conference of the Parties to the Convention on Biological Diversity located outside Canada's exclusive economic zone in	Further to IR-46, provide updated tables and a related figure with listings of all special areas that could be affected by the Project. Indicate closest distance to ELs 1144 and 1150 and potential for

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	DFO-26 Ax NX KMKNO-28-Nx		Components	Components and Activities) Table 11.3	the Northwest Atlantic, which overlap with the RSA and Project Area and which were not identified in the EIS. These areas include: the Seabird Foraging Zone in the Southern Labrador Sea and Labrador Sea Deep Convection Area; and two marine refuges in the Newfoundland-Labrador Shelves Bioregion, specifically the Hopedale Saddle Closure and the Hatton Basin Conservation Area. Relevant documents can be found at: • http://www.dfo-mpo.gc.ca/oceans/oeabcm-amcepz/refuges/index-eng.html • https://chm.cbd.int/database/reco rd?documentID=204102 • https://chm.cbd.int/database/record?documentID=204101 In addition, the Laurentian Channel should be listed as an Area of Interest or a proposed Marine Protected Area, as it has not been designated as a Marine Protected Area under the *Oceans Act*.	vessels to transect special areas. Where analysis in relation to specific special areas has not been included in the EIS (e.g. Seabird Forage Zone in Southern Labrador Sea, the Labrador Sea Deep Convection Area EBSA, Hopedale Saddle Closure, and Hatton Basin Conservation Area), conduct an assessment of potential effects, proposed mitigation and follow-up, as well as effects predictions, for routine activities and accidental events.
IR-48		5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.6.1 Effects of potential accidents or malfunctions	Section 16.4.1 Locations and Scenarios, page 946	The EIS Guidelines require that the points of origin selected for the spill trajectory models be conservative (e.g. selecting a potential location within the proposed drilling area that is closest to a sensitive feature or that could result in greatest effects). While the EIS states that "the criteria used included: reservoir type and properties; administrative boundaries (e.g., licence area boundaries); and the physical environment (e.g., potential range of water depths, proximity to more sensitive areas, potential range of ocean currents)", it does not describe how the proximity to sensitive areas was considered in selection of the example drill site locations.	Provide clarification on how the proximity to sensitive areas was considered in the selection of the points of origin for the spill trajectory modelling.
Indigenous Peoples						
IR-49	QFN-01-Nx; MTI-03-Nx, 05-Nx, 08-Nx, -24-Nx, -29-Nx; WNNB-CR-04-Nx, -CRI-07-Nx, -CRI-	5(1)(c)Aboriginal Peoples	Section 6.3.7 Indigenous Peoples	Section 12 Indigenous Peoples	Section 6.3.7 of the EIS Guidelines requires a description and analysis of how changes to the environment caused by the Project would affect current use of resources by Indigenous peoples for traditional purposes. Section 12.4.1 of the EIS concludes that, with respect to potential for indirect effects of the Project on Indigenous communities and activities, "(t)he environmental effects analysis also indicates there is limited potential for marine associated species that are known to be used by Indigenous groups to occur within the LSA prior to moving to any area of traditional use. The implementation of the mitigation measures outlined throughout this EIS will avoid or reduce direct or indirect	Utilizing the updated effects analysis required in IR-12, IR-13, IR-15, and IR-79, update the effects assessment, including cumulative effects assessment, for routine project operations and accidental events on the current/future use of Atlantic salmon, swordfish and Bluefin tuna by Indigenous peoples. Include consideration of additional information obtained during consultation meetings in Moncton (April 12, 2018), Quebec City (April 18, 2018), and St. John's (April 20, 2018), as applicable. For harvest (or potential harvest, in the case of Atlantic salmon that are currently not being harvested due to population status)

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	09-Nx; MMS-03-Nx; MFN-27-Nx				potential effects on these resources. The Project will not have an adverse effect on the availability or quality of resources that are currently used for traditional purposes by Indigenous groups, especially in a manner or to a degree that would alter the overall nature, location, or timing of current land and resource use activities for traditional purposes by one or more Indigenous groups, resulting in a detectable and sustained reduction in overall activity levels." Several Indigenous groups have expressed concern with the approach taken in evaluating effects on current use for traditional purposes, indicating that a precautionary approach is warranted when determining the degree to which there is a connection between Project Area effects and resource availability in Indigenous communities. MTI raised concern related to the data gaps and stated that additional clarification is required to understand project effect on Atlantic salmon and swordfish. It was noted that without additional analysis there remains uncertainty surrounding potential impacts on salmon populations that may be harvested by MTI members. Agency IRs (IR-12, IR-13, IR-15, and IR-79) have identified the need for additional analysis of routine operations and accidental events on Atlantic salmon, swordfish and Bluefin tuna. Subsequently, indirect effects on resources currently used or valued by Indigenous groups also require additional analysis.	that occurs outside the Project Area, ensure a fulsome discussion of potential indirect effects on Indigenous communities via changes to resource availability or quality as a result of the Project. The Agency understands that the proponent is considering, collecting further traditional knowledge from Indigenous communities. Please advise when this information will be available, and how it will be utilized, including how it could be used in the design and implementation of follow-up and monitoring programs and further mitigations.
IR-50	KMKNO-35-Nx, -39-Nx	5(1)(c)Aboriginal Peoples	Section 6.3.7 Indigenous Peoples	Section 12 Indigenous Peoples	As a primary measure to mitigate potential effects on Indigenous Communities and Activities, the EIS proposes to develop an Indigenous Communities Fisheries Communication Plan through which the proponent would communicate an annual update of planned activities, including timing of exploration activities and locations of planned wells. The EIS states that each Indigenous community would be involved in the development of the Indigenous Communities Fisheries Communication Plan; however, it is unclear whether this plan would allow adaptive management strategies specifically for Indigenous fisheries should issues arise in the future that were not predicted within this EIS.	Provide additional information on the Indigenous Communities Fisheries Communication Plan, including a discussion of the following: • whether the Indigenous Communities Fisheries Communication Plan would include measures to ensure that issues and concerns can be raised by Indigenous groups during the life of the Project and how this could occur; • whether an adaptive approach would be used to allow for a harvester feedback mechanism to report changes in harvesting (e.g. access, quality, quantity) over the life of the Project and how this could occur; and • the sufficiency of providing annual updates to Indigenous communities about planned activities given potential for changes in operations, and the potential need for more frequent communication over the life of the Project, for example monthly updates throughout Project execution to

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
						fishers.
IR-51	SIPE-01-Nx, KMKNO-36-Nx; Nunastiavut-01-Nx	5(1)(c) Aboriginal Peoples	Section 6.3.7 Indigenous Peoples	Section 16.6.7.2 Environmental Effects Assessment (Accidental Events)	While a blowout event is unlikely to occur, in the event that an accidental event such as a blowout did occur there is potential for adverse effects to Indigenous Peoples on food, social, ceremonial fisheries, moderate livelihood fisheries and communal commercial fisheries. Recognizing that Nexen will develop a Fishing Gear Damage or Loss Compensation Program, Sipekne'katik First Nation expressed interest in how the Plan would take into account differences between the communal commercial rights holders fishery and the commercial fishery stakeholders fishery. Sipeken'katik First Nation indicated that these fisheries differ in that: • stakeholders have the ability to leverage their fishing licence as an asset, whereas rights holder's licences do not allow for this; • stakeholders have the ability to apply for employment insurance, whereas rightsholders' licences do not allow for this; and • the income from the communal commercial rights holders is an important source of revenue to the community. Sipekne'Katik First Nation noted that these differences should be recognized in the development and the implementation of the Fishing Gear Damage or Loss Compensation Program. The KMKNO noted that there is a lack of information in the EIS on how Indigenous groups would be involved in the development of the Fisheries Gear Damage or Loss Compensation Program.	With respect to the development and implementation of the Fishing Gear Damage or Loss Compensation Program, discuss how differences between the communal commercial rights holders fishery and the commercial fishery stakeholders fishery would be considered. Provide information on if and how Indigenous groups would be involved in the development of the Fisheries Gear Damage or Loss Compensation Program.
IR-52	KMKNO-09-Nx, -33-Nx, -34-Nx; MTI-21-Nx, -22-Nx; NunatuKavut-03-Nx, -06-Nx, -01-	5(1)(c) Aboriginal Peoples	Section 6.3.7 Indigenous Peoples	Section 16.6.7.2 Environmental Effects Assessment (Accidental Events)	Section 6.3.7 of the EIS Guidelines requires a description and analysis of how changes to the environment caused by the Project will affect current use of resources by Indigenous peoples for traditional purposes, as well as human health and socio-economic conditions (including commercial fishing) of Indigenous communities. Underlying environmental changes to be considered in this analysis include any changes to environmental quality, including perceived disturbance of the environment (e.g. fear of contamination of water or country foods), and assessment of the potential to return affected areas to pre-Project conditions. The EIS Guidelines also require that the proponent provide justification if it is determined that an assessment of potential for	With consideration of the concerns expressed by Indigenous groups, provide additional analysis about the effects of an uncontrolled well event on Indigenous communities and activities, including: • an expanded discussion of the potential for contamination of fish, bird and marine mammal species harvested by Indigenous communities, either directly through contact with spilled oil, or indirectly through the food chain; • potential adverse effects on health of Indigenous peoples from the consumption of contaminated species, or

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	Nx; Ekuan-11-Nx, 12-Nx, -14-Nx,-16-Nx, -17-Nx, Nutash-18-Nx. -23-Nx, -40-Nx; MMS-03-Nx				contamination of country foods is not required. Section 16.6.6 of the EIS provides an analysis of potential effects of accidental events on Indigenous communities and activities. The EIS states that in the event of an uncontrolled well event, due to a limited potential for any degree of connection between individual fish, mammals, or birds affected by a spill and individuals harvested by Indigenous communities, there is "little potential for any effects on marine-associated species in general (and individuals in particular) to translate into a detectable effect on the use of such species for traditional purposes by an Indigenous group elsewhere in Eastern Canada. Adverse effects on the health of Indigenous peoples are also not predicted to occur as a result of the Project as a result of these factors, and given the imposition of a temporary harvesting closure around the affected area." For similar projects in the area, it has been noted that despite the limited potential for connection cited by the proponent, it is perceived that if an accidental event or malfunction occurred, there would be potential effects on species that are present, spawn, or migrate through the surrounding area, potentially impacting upon rights. Several Indigenous communities have raised concerns about the effects of a major blowout on traditionally harvested species, including the Innu First Nation of Ekuanitshit, which asked for additional effects analysis of potential contamination of species harvested by the Innu First Nation of Ekuanitshit (Atlantic salmon, the common eider, the Canada goose and pinnipeds), either directly via contact with spilled oil, or indirectly via food chain effects. The MTI, the KMKNO, and the NunatuKavut Community Council expressed concerns regarding the effects analysis of accidents and malfunctions on the health (both physical and psycho-social well-being) and socio-economics of potentially affected Indigenous communities. The Agency notes that there is no discussion in Section 16.6.6 of the EIS of the potential for contamination of traditionally harvested species, either through direct contact with oil (including potential oiling on inshore or near shore environments) or through bioaccumulation in the food chain. Although taint is briefly discussed in the analysis of effects of accidents and malfunctions on commercial fisheries (Section 16.6.7), it is not clearly linked in the discussion of effects on Indigenous communities. Moreover, there is no discussion of the effects of	justification for the determination that this assessment is not required; and • potential adverse effects of perceived contamination of country foods by Indigenous peoples, including effects of lack of access to traditional harvest species, and dietary changes if country foods are avoided and replaced with foods of lower nutritional content. Provide information on whether Indigenous groups would be engaged in development of the emergency response plan.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					perceived contamination after a spill event, either on communities themselves or on the marketability of commercial catches. Section 16.6.3.3 of the EIS indicates that a precautionary conclusion was drawn when predicting significant residual adverse effects of accidents and malfunctions on marine and migratory birds. It is unclear what the assumptions of this precautionary approach were and why this approach was taken for birds only. It is also unclear whether this predicted significant adverse effect on birds was carried through the assessment of effects of accidental events on Indigenous communities and activities.	
IR-53	KMKNO-29-Nx, -30-Nx; MTI-21-Nx	5(1)(c) Aboriginal Peoples	Section 6.1.8 Indigenous Peoples	Section 7.4 Existing Human Environment	Section 7.4 of the EIS states that for each of the Indigenous groups, limited information is available on the current use of lands and the resources for traditional purposes and the discussion is based on available information on food, social and ceremonial harvesting and commercial communal fishing. The MTI states that other means of data collection that support a more comprehensive understanding of each community's activities should be employed. The KMKNO describes primary sources of information as possibly including traditional land use studies, socio-economic studies, heritage surveys or other relevant studies conducted specifically for the project and its EIS. Often these studies and other types of relevant information are obtained directly from Indigenous groups. Secondary sources of information could include previously documented information on the area, not collected specifically for the purposes of the project, or desk-top literature based information. Furthermore, the Agency understands that the proponent may be considering collecting further traditional knowledge from Indigenous communities that may inform the effects assessment.	Provide a rationale for only using secondary sources of information, particularly related to land and resources use, fishing activity, health and socio-economic issues. The Agency understands that the proponent may be in discussions with some Indigenous groups regarding the collection of additional traditional knowledge. Please advise when and if the traditional knowledge being considered for collection would be available, and how it would be integrated into the current assessment as well as potential monitoring and follow-up.
IR-54	MTI 25-Nx; MTI-27-Nx KMKNO-06-Nx	5(1)(c) Aboriginal Peoples	Part 2, Section 5.1 Indigenous Groups and Engagement Activities	Section 3.3.8 Planned Future Engagement with Indigenous Groups, and Section 12.5 Environmental Monitoring and Follow-Up	Section 3.3.8 of the EIS states that Nexen will continue to communicate with Indigenous groups about the Project, through established and/or informal engagement processes, as required and requested. These will be to facilitate discussion of any Project-related monitoring and/or follow-up, as required. The specific nature, frequency and format of any such future engagement will be determined in discussion with the Indigenous groups themselves.	Consider the information from MTI and describe the on-going role of Indigenous groups in monitoring and follow-up plans, including for accidents and malfunctions, developed by Nexen.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					Section 12.5 of the EIS (Environmental Monitoring and Follow-up) states that "The various environmental monitoring initiatives outlined earlier in relation to the biophysical environment should also be indirectly applicable to this VC (Effects on Indigenous Peoples)". MTI states that the reader should be able to see a summary of what these mitigations are within this EIS Chapter; and that, apart from the mitigations that are situated in other sections of the EIS, the only measure provided is an "Indigenous Communities Fisheries Communication Plan". MTI recommends an Indigenous environmental monitoring program that formally and explicitly incorporates Indigenous knowledge and monitoring into the indigenous Communities Fisheries Communication Plan's feedback mechanisms through an adaptive management plan; community monitoring and reporting regarding changes in (e.g., swordfish; Atlantic salmon) harvesting (e.g., access, quality, quantity) over the life of the Project is needed over the life of the project. An Indigenous advisory committee is needed to oversee the proposed monitoring program that includes MTI representatives.	
Commercial Fisheries						
IR-55		5(2)(b)(i) Health and Socio-economic conditions	Part 2, Section 6.3.8.2, Commercial Fisheries	Section 13.3.3 Presence and Operation of MODUs	Section 13.3.3 of the EIS states the presence and operation of one or more MODU(s) within the Project Area has the potential to interact with marine fisheries and other marine users by making limited areas temporarily unavailable for fishing or transit while equipment is present and operations are active. Safety zones are typically 500 metres in radius but can be as large as 1000 metres. As well, because more than one MODU might be operating at the same time; this would increase the total size of excluded area within the Project Area by a proportional amount.	Provide additional information on what factors are considered in determining the size of the safety zone and when the decision will be made.
IR-56	FFAW -03, FFAW -04	5(2)(b)(i) Health and Socio-Economic Conditions	Part 2, Section 6.3.8.2, Commercial Fisheries	Section 13.3.7 Wellhead Decommissioning; Section 2.5.2.5 Well Abandonment or Suspension	Section 13.3.7 of the EIS states that the drilling locations where wellheads are removed will be opened to normal fishing and shipping activity as soon as the safety zone is rescinded. Section 2.5.2.5 indicates that planned wellhead removal may take place immediately following drilling/testing or at a later date. It is unclear why the wellhead removal may occur later, and how much time could lapse before the wellhead is removed. Additional information is required with respect to any concerns associated with commercial fisheries access if the wellhead is not removed immediately.	Provide clarification and additional information related to wellhead removal if it may be carried out at a later date. Describe possible timeline for wellhead removal if it is not completed immediately after drilling and well testing, 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

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
						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.
Accidents and Malfunctions - Emergency Planning and Response						
IR-57	C-NLOPB-7-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.1, Mitigation Measures	Section 16.1.4.1 Nexen Emergency Response Hierarchy	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 the ECRC may be limited in its ability to respond outside the 200 nm EEZ.	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. As applicable, 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-58	KMKNO-48-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.6.2.2 Environmental Effects Assessment	Section 16.6.2.2 of the EIS states "[a]ny batch spill resulting from the Project would cause a temporary decrease in water (and thus habitat) quality around the spill site. This would be short-term in nature, lasting until the slick disperses when aided by surface wave action in the offshore environment." The KMKNO has indicated that the information in the EIS could be interpreted as meaning that a slick would only be dispersed through surface wave action, and that no response actions would be taken to attempt to contain and recover the spill. Further, Section 16.1.4.3 provides potential Oil Spill Response Plan tactics; however, it is not clear whether these measures may also be employed in response to a diesel spill.	Describe the spill response tactics to be utilized in the event of a diesel spill.
Accidents and Malfunctions - Vessels, SBMs, Riser & Equipment						
IR-59		Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.2.2 Dropped Objects	The EIS describes surveys that may be undertaken during the project including, but not limited to drop camera /video systems, core sampling equipment, and other sampling gear. These activities are described in Section 8.6 Environmental Monitoring and Follow-up. However, there is no discussion in Section 16, or otherwise, in the EIS of the potential effects of accidental events associated with the loss of equipment, as a result of the execution of these activities described in Section 8.6, including if it is not recovered.	Comment on the probability for a dropped object, and provide an analysis of associated environmental effects.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					Section 16.2.2 of the EIS discusses the potential accidental event of dropped objects. The EIS outlines the potential causes and safeguards/contingencies that may aid in prevention of dropped objects; however, there is no discussion of the probability of such an occurrence or the potential environmental effects.	
Accidents and Malfunctions - Model Inputs						
IF-60		Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.1.4.2 Emergency Response Contingency Plans	The EIS indicates the following metrics that are relevant to the scenario of a subsurface blowout: • Water depths at drilling locations: 330 m to 1,200 m • Time to drill individual exploratory wells: 45 to 160 days • Estimated time to mobilize a relief well MODU / equipment, drill the relief well, and permanently kill the well: 120 days	Provide a rationale as to why the estimated timeframe of 120 days to drill a relief well is less than the maximum time to drill a typical exploratory well, 160 days. Explain whether the MODU used for exploration drilling could remain operational after a blowout and could therefore be utilized to drill a relief well.
IR-61	NRCan-10-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 3.1, Project Components; and Section 3.2.1, Drilling and Testing Activities	Section 16.4.3 Model Data Input	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. NRCan advised that the 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.	Provide further explanation 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-62		Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.4.1 Locations and Scenarios; Section 16.3.1 Historical Spill Data – Canada NL Offshore Area	Information presented in the EIS indicates that very small (<1 barrel, equal to 159 liters) and small (1-49.9 barrels, equal to approximately 159-7,934 liters) spills are the most common type of spill; 98 percent of recorded spills for the Canada-Newfoundland offshore area between 1997 and 2017 fell into these categories. The proponent modelled marine diesel batch spills, based on release volumes of 100 liters and 1,000 liters. However, there is no rationale provided for selection of 100 L and 1,000 L as plausible “worst-case” scenarios for batch diesel spills.	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 VCs, as applicable.
IR-63	C-NLOPB-8-Nx, -09-Nx; DFO-07-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.4.1 Locations and Scenarios	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) EL 1144 at 1,137 m depth; release duration of 30 days; release	Conduct the fate and behaviour modelling to reflect the worst case discharge scenario that models the drilling of a relief well. The spill model should be continued until the slick volume is reduced to a negligible amount or until a shoreline is reached. Update the effects assessment as applicable.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					rate of 184,000 barrels per day 2) EL 1150 at 378 m; release duration of 30 days, and release rate of 44,291 barrels per day. The EIS states the rationale for the 30-day release duration is that it represents the time to cap the well in the event of a spill. However, the C-NLOPB and DFO have advised that a worst-case discharge scenario would be the time taken to drill a relief well and therefore modelling for both a capping stack (i.e. 30-day release) and for drilling a relief well (i.e. 120-day release) should be completed. The C-NLOPB also advised that the model should be run until defined thresholds based on concentration and/or probability of oiling is reached.	
IR-64	DFO-44 and -45 NX; C-NLOPB-09-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Appendix G – Section 4.1 Stochastic Analysis Results	DFO noted that for many figures provided in the EIS with stochastic results, the spatial extent of the statistics are truncated by the boundaries of the numerical domain. DFO further noted that the stochastic footprints reported are therefore incomplete. Table 16.3 of the EIS indicates that the modeling duration is 60 days. Section 16.4.4.1 states that "oil contamination above the identified threshold was predicted to extend beyond extent of the model domain." DFO noted, with regards to shoreline contact, that the results suggest that only Sable Island would be affected by a potential oil spill. However, the simulations are stopped when the patch is approaching the coasts of Newfoundland and Labrador and Nova Scotia (e.g. Figure 4-4, Appendix G). Continuing the simulations after the release stops may lead to oil being in contact with the shore (it appears that simulations are stopped very early while most of the oil is still close to the release site). The C-NLOPB has advised that the model should be run until the ecological thresholds defined in the EIS or the probability of shoreline oiling is reached.	Provide a rationale for the selection of boundaries for stochastic modelling. Discuss the limitations of the truncated spatial extent of spill dispersion results, including the implications for shoreline contact, including Sable Island.
Accidents and Malfunctions - Dispersants						
IR-65	ECCC-17-Nx	Multiple VCs-Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.6.2.1 Potential Issues and Interactions; Section 16.6.3.1 Potential Issues and Interactions	The EIS presents contradictory statements about the effectiveness of dispersants in oil degradation: Section 16.6.3.1 states "(a)pplication of chemical dispersants results in a far greater rate of biodegradation of oil, reducing the duration to a matter of weeks rather than of years (Baelum et al 2012)." While Section 16.6.2.1 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,	Update the discussion of biodegradation of oil with and without chemical dispersants taking into consideration the following documents: Fingas, M. (2017) A Review of Literature Related to Oil Spill Dispersants 2014-2017. Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), Anchorage, Alaska.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					there still remains some debate on the effects on oil degradation rates (Brakstad et al. 2014, 2015; Kleindienst et al. 2015; Seidal et al. 2016). ECCC has offered two papers for consideration: Whitmer et al. 2018 and and Fingas 2017, a synthesis paper 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".	Pp. 264 Whitmer, E.R., Elias, B.A., Harvey, D.J., and Ziccardi, M.H. (2018) An experimental study of the effects of chemically dispersed oil on feather structure and waterproofing in Common Murres (Uria aalge). Journal of Wildlife Diseases, 54: 315-328
IR-66	ECCC-17-Nx	Multiple VCs-Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.6.2.1 Potential Issues and Interactions; Section 16.6.3.1 Potential Issues and Interactions	ECCC has advised that it is not known what the effects of dispersants alone may be 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.	Provide an assessment of the effects of dispersants on migratory birds, including recent studies.
IR-67		Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.1.4.3 Potential OSRP Tactics	The use of dispersants to transform the surface oil to the water column for biodegradation is listed as a possible response measure. However, the effectiveness of dispersants in cold water may differ from those in warmer waters.	Discuss the efficacy of dispersants in cold water.
IR-68		Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.1.4.3 Potential OSRP Tactics	As described in Section 16.1.4.3 of the EIS, in addition to other tools surface/aerial/subsurface dispersants may be used as a response tool in the event of a spill. 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.	Discuss differences in potential effects between subsea, surface and aerial dispersant application.
Accidents and Malfunctions - Capping Stack						
IR-69	KMKNO-44-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents and Malfunctions	Section 16.1.4.2 Emergency Response Contingency Plans, Well Containment Procedure (Capping Stack)	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. The EIS indicates that the mobilization and deployment of a capping stack is expected to range between 15 and 30 days depending on weather conditions, vessel availability and the state of the equipment. The KMKNO stated that recent innovations have resulted in the design of a lighter capping stack that can be transported via aircraft, the RapidCap^{TM} Air Mobil Capping Stack. The KMKNO indicated that the	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, having a capping stack available on a vessel for rapid deployment, or shipping a capping stack by air. Also, discuss if there have been any recent or ongoing innovations in capping stack technology and availability, and application to the Project.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					lightweight capping stack can be flown from Houston within 24 hours decreasing the time required to cap a well.	
IR-70	ECCC-15 Nx; Nutash-50-Nx; MFN-14-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.1.4.2 Emergency Response Contingency Plans, Well Containment Procedure (Capping Stack)	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). Technical information regarding the mobilization, deployment and mechanics of capping stacks has been presented, but no information has been provided on their expected operational lifespan, the timing of decommissioning, nor on any follow-up monitoring activities that would be required if the capping stack is 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 for, at blowout-affected well sites.	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 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-71	ECCC-14-Nx; ECCC-16-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions.	Section 16.1.4.2 Emergency Response Contingency	Section 16.1.4.2 (Emergency Response Contingency Plan) of the EIS provides information related to the complement of tools and strategies for spill response. However, in several instances additional is required. The EIS lists components of the Well Control Emergency Response Plan including a site survey, dispersant system deployment, and debris removal procedures; however, the EIS does not describe what timelines are associated with each of these, how they relate to the mobilization and initiation of the capping stack and relief well~~,~~ and whether additional equipment would be required to be brought to the site for the activities (e.g. debris removal equipment). The EIS states that "In the unlikely event that each of the preventative barriers fail and an uncontrolled well event has occurred, where secondary BOP control intervention systems (ROV intervention, remote acoustic activation of the BOP) were unsuccessful, Nexen would immediately commence with mobilizing multiple contingency plans, including well capping / containment and relief well operations." The EIS does not indicate the possible timeframe taken by secondary BOP control intervention systems, and how this may impact the stated 15 to 30 day timeline for mobilization and deployment of the capping stack. The EIS indicates that if needed, a capping stack would be transferred	Provide information on steps and timeframes involved in the deployment of subsea incident response equipment, such as the capping stack, including the following: • the timeframe for employing secondary BOP control intervention systems and how this may impact the stated 15 to 30 day timeline for mobilization and deployment of the capping stack; • the timelines associated with survey work, dispersant application and debris removal at the wellsite after a blow-out and how these steps relate to the mobilization and initiation of response measures (i.e. the capping stack and relief well); • clarification on whether additional equipment would be required to be brought to the wellsite after a blow-out for use before the capping stack can be installed (e.g. for debris removal); • a description of the steps included in the mobilization and deployment of the capping stack, including the timeframes related to each step; • assumptions made in the calculation of the stated 15 to 30 day estimate for mobilization and deployment of the capping stack; and • a description of the decision making processes and timeline associated with the deployment of the contingency capping

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					by vessel with sufficient capability for direct or indirect installation directly from Montrose, United Kingdom to the wellsite. Alternatively, there is access to a contingency capping stack located in Singapore. The EIS does not indicate in what circumstances the contingency capping stack would be mobilized from Singapore, or the timeline associated with the decision to initiate mobilization and deployment. The EIS states that the mobilization and deployment of the capping stack is expected to range from 15 to 30 days depending on weather conditions, vessel availability, and the state of the equipment (deployment system, capping stack, and BOP/wellhead); however, the assumptions made in calculating this range are not described. Further, the EIS does not describe the steps included in mobilization and deployment (e.g. final equipment preparation and testing, shipment to a port facility; loading on a vessel), and what the timeframes may be for each step. The EIS notes that "(A) relief well may also be required to permanently eliminate the flow and would be initiated at the time of the blowout, in parallel with the deployment of the capping stack", indicating that there may be instances when a relief well is not required. However, there is no information on circumstances under which a relief well is needed or the factors considered in the decision to drill a relief well. 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.	stack.
IR-72	C-NLOPB-6-Nx	All – Project Description Relevant to All Section 5 Effects	Part 2, Section 3, Project Description	Section 16.1.4.2 Emergency Response Contingency Plans, Well Containment Procedure (Capping Stack)	The EIS Guidelines require a discussion on the use and feasibility of a capping stack to stop a blowout and resultant spills. Table 2.1 of the EIS indicates that water depths range from approximately 330 meters to 1,200 meters within the Project Area. The C-NLOPB has advised that the use of a regular capping stack in shallow water depths may not be possible because a vessel may not be able to operate over the well.	Provide additional information on the technology available to cap a shallow-water well, including information available to support the effectiveness of the technology, with respect to the potential shallow depths in the ELs. Discuss limitations associated with the use of a capping stack in particular in shallow water environments, including any differences in the steps taken to affix a capping stack in shallow water that may not be required when capping a deep water well (e.g. use of dispersants to reduce flow rate). Explain how the limitations of the technology could affect the length of time it may take to effectively

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
						cap a well. If applicable, update the effects analysis to reflect these additional considerations.
Accidents and Malfunctions –Effects						
IR-73	NRCan-09-Nx	Potential effects to 5(1)(b) Federal Lands / Transboundary	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.6 Environmental Effects Assessment, Section 16.1.4.3 OSRP Tactics	The EIS Guidelines require that the environmental effects of spill response measures outlined in the emergency response plan be considered (Section 6.6.1). Section 16.1.4.3 of the EIS states that Nexen will conduct a Net Environmental Benefits Analysis (NEBA) and that the assessment will allow spill responders and stakeholders to choose the best response options that would result in the maximum possible benefit and minimal potential effects to the environment. However, the EIS does not explain how the Net Environmental Benefits Analysis is conducted, what is included in the assessment, how it enables spill responders and stakeholders to choose the best response option, nor how it achieves the objectives of maximizing benefits and minimizing potential environmental effects. For example, NRCan has advised that in situ burning of crude oils could result in incompletely-combusted oil in the water.	Describe the Net Environmental Benefits Analysis, including the following information: • explain how a Net Environmental Benefits Analysis is conducted; • explain what is included in the assessment; • explain how it enables spill responders and stakeholders to choose the best response option; • identify who the stakeholders are; and • explain how it achieves the objectives of maximizing benefits and minimizing potential effects to the environment.
IR-74		Potential effects to 5(1)(b) Federal Lands / Transboundary	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.6 Environmental Effects Assessment; Section 16.1.4.3 OSRP Tactics	While Section 16.1.4.3 of the EIS outlines the possible spill response tactics, such as in situ burning, the EIS does not consistently include a discussion related to the environmental effects for each tactic.	Provide a discussion of the potential environmental effects of response measures on VCs. With respect to in situ burning specifically, describe the potential for incomplete burning and resulting oil in the water and assess associated effects. Describe proposed mitigation and follow-up, as applicable for response measures
IR-75	NRCan IR-11-Nx; Nutash-50-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 3.1, Project Components; and 3.2.1, Drilling and Testing Activities	Section 16.4.4.2 Summary of Deterministic Results	The EIS states that the majority of the oil entrainment in the water column from a spill would be due to wind induced surface-breaking waves. NRCan has advised that 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.	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.
IR-76	DFO-06-	Multiple VCs –	Part 2, Section 6.3	Section 16.6.2.1 Potential	The predicted effect of seabed disturbance from a spill of SBMs on	Discuss the potential effects of a SBM spill(s) on sensitive benthic

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
	Ax-Nx; DFO-07-Ax-Nx; MTI-19-Nx	Accidents and Malfunctions	Predicted Effects on Valued Components	Issues and Interactions, page 993; Section 16.6.2.2 Environmental Effects Assessment; Section 16.6.5.2 Environmental Effects Assessment	sensitive coral and sponge species is not discussed. Similarly, Section 16.5 of the EIS report concludes no predicted effect from a drill fluid spill on special areas based on modelling results, with a high level of confidence." The DFO has advised that a SBM spill could affect sensitive areas given the proximity to sensitive areas and the results of the modelling which show dispersion up to 500 metres with maximum and average thicknesses above the predicted no effects threshold. MTI has asked about the cumulative effects of multiple drilling fluid releases on species important to MTI, including swordfish, Atlantic salmon, and Bluefin tuna.	species and species of importance to Indigenous groups. With respect to sensitive areas, discuss the effects of an SBM spill taking into consideration modelling results. Update the conclusion or provide a rationale for the conclusion of no predicted detectable adverse effect.
IR-77		Multiple VCs – Accidents and Malfunctions	Section 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.6 Environmental Effects Assessement	In several tables (Table 16.17, 16.18, 16.19, 16.22 and 16.24) related to the analysis of the residual accidental event related environmental effects, the frequency of 100 litre diesel spills is categorized as N-O, indicating that they are "not likely to occur – occurs once". However, Section 16.3.2 states that "spills less than one barrel in size (less than 159 litres) may occur one to two times per well, based on recent petroleum development experience off Newfoundland and Labrador".	Provide a rationale for the categorization of the frequency of batch spills as "not likely to occur once" given recent production development experience, or update the predicted frequency of 100 litre diesel spills.
IR-78	DFO-09-Nx, 04-Ax-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6..6.1 Effects of Potential Accidents or Malfunctions	Section 16.6.4 Marine Mammals and Sea Turtles (including Species at Risk)	Section 16.6.4 of the EIS states that, "No designated critical habitat for marine mammals or sea turtles is present within or near the RSA". However, spill trajectory modelling indicates a small possibility that oil could reach the Gully, Sable Island, Haldimand Canyon, and Shortland Canyon areas. The EIS does not mention marine mammals and their critical habitat in these areas that could be affected by accidents or malfunctions. In addition, confirmation is required on the shoreline oiling of Sable Island. The EIS states that for EL 1144 "The 99th percentile shoreline oiling case was identified in the late summer, where weather patterns were sufficient to transport oil to the south and west, where a small fraction of oil (less than 0.01 percent) was transported to the shores of Sable Island." (p. 966)	For EL 1144, clarify whether shoreline oiling on Sable Island could occur during summer months. Provide a description of marine mammal species at risk and their critical habitat in the Gully Marine Protected Area ,Sable Island , Haldimand Canyon and Shortland Canyon that could be impacted by an accidental event, and assess associated effects, as applicable.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					However, based on Table 16.11 page 958, there is no shoreline probability entered for summer scenarios. Page 977 states, "There was no shoreline oiling predicted from summer scenarios for the EL 1144 example well site."	
IR-79	MTI-28-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6..6.1 Effects of Potential Accidents or Malfunctions	Section 8.3.6 Well Testing	The MTI has advised that oil spills are known to impact cardiac tissues of Atlantic Bluefin tuna. Exposure to polycyclic aromatic hydrocarbons (PAHs) from crude oil spills disrupts cardiac function in Bluefin tuna (affects the regulation of cellular excitability, which can cause life-threatening arrhythmias) (Brette et al, 2014). The assessment in the EIS of effects on tuna is relatively limited, particularly in the context of spills. The EIS suggests that occurrence likelihood of tuna is low, and therefore effects on this species are negligible.	Provide an assessment of how a spill could affect both individuals and populations of Atlantic Bluefin tuna in the event that a spill occurs when individuals are present. Discuss the potential biological effects of a spill on tuna.
IR-80	ECCC-02-Conf-Nx; Ekuna-11-Nx	5(1)(a)(ii) Migratory Birds	6.1.4 Migratory Birds and their Habitat, 6.3.5 Migratory Birds, 6.6.1 Effects of Potential Accidents and Malfunctions	Section 11 Special Areas: Environmental Effects Assessment, Section 16.6.3 Section 11 Special Areas: Environmental Effects Assessment, Section 16.6.3 Marine and Migratory Birds (Including Species at Risk)	The EIS Guidelines require that direct and direct adverse effects on migratory birds, including population level effects that could be caused by all project activities, including effects of oil spills in the nearshore or that reach land on landbird species, are examined. Environment and Climate Change Canada has indicated that Important Bird Areas and seabird colonies throughout the eastern Avalon peninsula could be affected by an accidental hydrocarbon spill. A vessel collision was modelled, and results presented in the EIS, using the midpoint between St. John's and the Project Area as the vessel collision location. Results of the modelling indicate no shoreline contact. While it was shown that the trajectory would be eastward and seaward, the Innu First Nation of Ekuanitshit expressed concern with the distance from the coast, indicating that an analysis should include the effects of the spill on coastal habitats.	Provide a discussion on the effect of a spill on coastal species and habitats, if a vessel collision was to occur close to shore.
IR-81	MMS-02-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16.4.4 Model Results	The MMS 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.	Discuss the probability that oil from a vessel spill or well blowout could reach the Gulf of St. Lawrence and the Gaspé Peninsula coast, if so, describe the potential environmental effects.
Effects of the Environment on the Project						
IR-82	ECCC-03	5(1)(a)(i) Fish and Fish Habitat	Section 6.1 – Project Setting and Baseline Conditions Sub-section 6.1.1 – Project –	Chapter 5 – Existing Physical Environment Section 5.3 – Climatology	Section 5.3 of the EIS provides climatology information. ECCC noted that the wind and wave climate analysis was based only on MSC50 data. In-situ data from offshore buoys or oil platforms within the Eastern Newfoundland Strategic Environmental Assessment area is required.	Provide additional data from offshore buoys and oil platforms within the Eastern Newfoundland Strategic Environmental Assessment area. Update the effects analysis including mitigation and monitoring, as

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
			Atmospheric Environment			appropriate, taking into account data from offshore buoys and oil platforms.
IR-83	ECCC-04-NX	5(1)(a)(i) Fish and Fish Habitat	Section 6.1 – Project Setting and Baseline Conditions Sub-section 6.1.1 – Project – Atmospheric Environment	Chapter 17 – Effects of the Environment on the Project Section 17 Section 17.3.2 Climatology, Weather and Oceanographic Conditions	Section 17.1.2 of the EIS states superstructure icing, which can result from freezing precipitation or a combination of low ambient air temperature, low sea surface temperatures, and wind-induced sea spray, can pose a risk to offshore operations. No further information is provided. ECCC has advised that a monthly summary of the potential for freezing spray occurrence and associated intensity for the Project Area is required to better understand superstructure icing events that may occur. A suitable methodology (used in similar Environment Impact Statements) is to generate a synthetic climatology using a recognized model/nomogram for vessel icing [i.e. Overland (used by the National Weather Service) or the Modified Stallabrass model (used by ECCC)] and forced with the same met-ocean parameters derived from the ICOADS database as presented in Section 6.1.1. The results can be presented as categorical icing events such as those used in ECCC's marine forecast (light < 7 mm/h, moderate 7 to 20 mm/h, and severe > 20 mm/h) or (https://www.canada.ca/en/environment-climate-change/services/general-marine-weather-information/publications/guide-forecasts/chapter-8.html). Section 17.3.2 of the EIS states that superstructure icing issues are considered and addressed through the selection of equipment and through appropriate operational procedures. The EIS does not provide any information on what measures may be included in operating procedures.	Provide a monthly summary of the potential for freezing spray occurrence and associated intensity for the Project Area. Update the analysis of the effects of the environment on the Project, including the identification of applicable mitigation measures, as appropriate.
Cumulative Effects						
IR-84	CEAA MTI-09-Nx; MTI-18-Nx; Nutash-29-Nx; C-NLOPB-5-Nx; FFAW-08	Section 5 (1)(a)(i) Fish and Fish Habitat, and (iii) Migratory Birds	Part 2, Section 6.6.3 Cumulative Effects	Section 15: Cumulative Environmental Effects	The cumulative effects assessments for all VCs conclude that the cumulative effects of the Project and other projects and activities are unlikely to be significant. The analysis and conclusions are based partly on the limited spatial interactions/geographical overlap of environmental disturbances from the Project and other activities. As recognized by the EIS, cumulative effects can occur as a result of the large ranges of species as well as the mobile nature of individuals. The EIS states that underwater noise from the drilling unit in excess of behavioural thresholds for marine mammals could extend tens of kilometers from the drilling unit. Noise emissions from existing	Update the assessment of potential cumulative environmental effects on migratory birds (specifically Leaches Storm Petrel) and marine mammals using appropriate methodology (e.g. mapping, quantification and/or otherwise) taking into account: • the spatial extent of effects from key activities (e.g. noise on whales, lights on birds) and associated cumulative effects of creating multiple zones of avoidance in the Project Area; • the spatial range of populations, recognizing that effects on

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					production facilities and reasonably foreseeable exploratory drilling programs, as well as seismic activity operating simultaneously may not overlap specifically, but could result in cumulative effects by creating multiple zones of avoidance for marine species or masking of marine mammal communication throughout the Project Area. Figure 15.1 illustrates petroleum projects as well as some fishing activity in the Project Area. While this is helpful in presenting some of the cumulative effects to which VCs may be exposed, it is does not consider all projects and activities (e.g. marine shipping, multi-year seismic programs with concurrent surveys that include support vessels), nor does it account for the extent of effects (e.g. the results from the modelling for the Project, referenced in the EIS and Appendix E, found that noise from the drilling unit could extend 56.8 km from the drilling unit). Further consideration should be given to how mapping could be expanded to illustrate the potential for overlapping cumulative effects on VCs as a result of several projects exerting discrete areas of influence simultaneously. The Agency's Technical Guidance document on *Assessing Cumulative Effects under CEAA 2012* (April 2017 draft) identifies methodological options for analysis of cumulative effects, including quantitative models and spatial analysis.	individuals from the same population in different areas would result in cumulative effects to the species; • that some VCs would be affected by multiple activities (e.g. noise from drilling units, production facilities and seismic operations, as well as vessel interactions); and • the Government of Newfoundland and Labrador's recent announcement of *Advance 2030: A Plan for Growth in the Newfoundland and Labrador Oil and Gas Industry*, including the vision of 100 new exploration wells drilled by 20301 (http://www.nr.gov.nl.ca/nr/advance30/). For migratory birds, focus the assessment on Leaches Storm Petrel, as a key indicator species, given the status of this species and potential sensitivity to lighting. With respect to the analysis of underwater noise on marine mammals, include consideration of various underwater noise sources occurring at the same time (e.g. multiple exploration units operating simultaneously, exploration drilling occurring at the same time as geophysical activities, marine shipping etc.) and associated cumulative effects on the species, including how and where thresholds for behavioral modifications or injury may be exceeded. Consider the potential accessibility of unaffected corridors between areas of influence on marine mammals and provide figures to illustrate potential projects/activities and associated zones of influences (e.g. range of effects) to which they could be exposed. Discuss the need for mitigation and monitoring or follow-up, and update predictions regarding the significance of effects accordingly.
Mitigation						
IR-85	NunatuKavut-13-Nx	Section 5 - All	Part 2, Section 6.4 Mitigation Measures	Section 4.3.3 Environmental Effects Assessment and Mitigation	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.	Review proposed mitigation measures in relation to all VCs 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.

IR Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
					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 states that "existing and common vessel travel routes will be used wherever practical, vessels will seek to maintain a steady course and safe vessel speed" (section 10.3.8.2). Safe vessel speeds are not defined and it is not explained under what circumstances vessels would have to deviate from existing travel routes. • In section 10.3.2 of the EIS, it states that "any low-level aircraft operations will… be avoided or minimized (except for approach and landing activities)." With respect to marine mammals and sea turtles, the EIS does not specify areas of environmental sensitivity that will be avoided in relation to helicopter flight paths or information on specific altitude and lateral distance limits that would be used to avoid sensitive sites. Additional clarity is needed to better understand the potential for adverse effects to marine mammals and sea turtles arising from project-related helicopter traffic and how it is proposed to mitigate those effects.	In addition, address the specific questions below to enable a robust understanding of proposed commitments: • Define "safe vessel speed" and explain which environmental effects these speeds propose 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. • 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. Describe if there is any potential mitigation proposed to avoid disturbance to marine mammals and sea turtles.

Required Clarifications

Clarification Number	External Reviewer ID	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Required Clarification
Project Description						
CL-01		Section 5 - All	Section 3.1 Designated Project	Section 2.7 Project Schedule	Section 2.7 of the EIS states that up to 10 wells may be drilled as part of the Project although this number, and the specific number per EL, may evolve as Project planning and implementation proceed. Under Section 2.1 of the EIS Guidelines, the designated project is the mobilization, operation and demobilization of MODU(s) designed for year-round operations for the drilling, testing and abandonment of up to ten wells (exploration or delineation).	Confirm whether 10 wells is the maximum number of wells that would be drilled.

CL-02		Section 5 - All	Section 2.2 Alternative Means of Carrying Out the Project	Section 2.9 Potential Environmental Emissions and Waste Management; Section 2.10.7 Chemical Selection	Section 2.9 of the EIS states that chemicals used for drilling operations will be screened in accordance with Nexen's chemical management and selection process, and will adhere to the C-NLOPB requirements under the Offshore Chemical Selection Guidelines. Further, Section 2.10.7 of the EIS states that Nexen will develop a chemical screening and management plan that will meet or exceed all regulatory requirements.	Provide information on Nexen's chemical management and selection process and the chemical screening and management plan, including a description of if and how they would enable the selection of lower toxicity chemicals, and the relationship to the Offshore Chemical Selection Guidelines.
Alternative Means						
CL-03		Section 5 - All	Section 2.2 Alternative Means to Carrying Out the Project	Section 2.10.3, Drilling Waste Management	Clarification is required with respect to the information presented in Table 2.10, Identification and Evaluation of Drilling Waste Disposal Options. It is not clear if the alternatives are related to SBMs, water based muds, or both. It appears that the information in the table is applicable to SBMs only, as the table states it would be not technically feasible to return water based muds to shore.	Provide clarification on the alternative means presented in Table 2.10 (i.e. whether they are applicable to SBMs, water based muds, or both).
Air Quality						
CL-04	NRCAN - 03-Nx		Part 2, 3.1. Project Components and Part 2, 3.2.1. Drilling and Testing Activities	Section 14.3.3.1 Semi-Submersible MODU Option; Section 14.3.3.2 Drill Ship MODU Option	Emission estimates for the semi-submersible MODU and drill ship MODU options were based on a NOx emission factor of 1.9 lb/MMBtu, which is based on engines employing engine retard to reduce NOx. NRCan has advised that based on the use of a selective catalytic reduction system on the semi-submersible engines, as stated in Section 14.3.3.1 of the EIS, a lower emission factor should be used for the semi-submersible option. No NOx reduction technique is described in Section 14.3.3.2 for the drill ship option and thus a higher emission factor may be appropriate.	Update the estimated emissions from semi-submersible and drill ship MODU operations, as appropriate. Describe NOx reduction techniques employed and the associated emission factors.
CL-05	NRCan-04-Nx		Part 2, 3.1. Project Components; Part 2, 3.2.1. Drilling and Testing Activities	Section 14.3.4 Well Testing	Section 14.3.4 of the EIS estimates that two wells will be tested and 10,000 Mcf of gas and 36,000 barrels of oil are flared per tested well.	Provide an explanation on how these volume estimates were obtained.
CL-06	NRCAN - 05-Nx		Part 2, 3.1. Project Components; Part 2, 3.2.1. Drilling and Testing Activities	Section 14.3.7 Greenhouse Gases	Global Warming Potentials for methane and nitrous oxide (25 and 298 respectively) are taken from the IPCC Fourth Assessment Report (AR4) (2007). A more recent publication, IPCC Fifth Assessment Report (AR5) Climate Change 2013: *The Physical Science Basis* (2013) indicates values for methane and nitrous oxide that are 28 and 265 respectively.	Provide a rationale for using the 2007 Fourth Assessment Report values (i.e. 25 and 298) instead of the 2013 Fifth Assessment Report values (i.e. 28 and 265) or provide updated tables from Section 14.3.7 based on 2013 values.
CL-07	NRCan-06-Nx		Part 2, 3.1. Project Components; Part 2, 3.2.1. Drilling and Testing Activities	Section 14.3.7 Greenhouse Gases	The EIS states that emission factors from the *Guidance Document for Reporting Greenhouse Gas Emissions for Large Industry in Newfoundland and Labrador* were used to calculate the greenhouse gas emissions for the MODU, supply vessel and helicopter. The source for greenhouse gas emission factors related to well testing is not provided.	Confirm where the greenhouse gas emission factors for well testing were obtained.
CL-08	NRCan-		Part 2, 3.1. Project	Section 14.3.7 Greenhouse	Section 14.3.7 of the EIS calculates greenhouse gas emissions from all	Clarify the flared volumes and diesel volumes used for

	07-Nx		Components and Part 2, 3.2.1. Drilling and Testing and Activities	Gases	sources using emission factors in terms of volume (e.g. g/L or g/m^3). NRCan advises some of the total emission rates are not consistent with assumed volumes and this could result underestimation or overestimation of $C0_2$ emission rates. For example: • using the assumed volume of gas and oil flared during well testing (specified in section 14.3.4 of the EIS) of 10,000 Mcf of gas and 36,000 barrels of oil per test in conjunction with the specified CO_2 emission factors of 2482 g/m^3 and 2663 g/L, results in a total CO_2 emission rate of 31,889 tonnes while the proponent calculates 35,405 tonnes. • using the assumed supply vessels consumption (specified in section 14.3.5.1) of two wells at 160 days and eight wells at 75 days each with an average fuel consumption of 64 m^3 per day, in conjunction with the supply vessel CO_2 emission factor of 2663 g/L, results in a total CO_2 emission rate of 156,797 tonnes of CO_s while the proponent reports 134,398 tonnes.	estimating total greenhouse gas emissions for the Project.
CL-09	ECCC-28-Nx	Air Quality CEAA 5; 5(1)(b) Federal Lands/Transboundary.	Part 2, Section 6.3.8.1, Air quality and Greenhouse Gas (GHG) Emissions.	14.3.5.1 Vessels	Section 14.3.5.1 of the EIS states that it is expected that three offshore supply vessels will be used to support the MODU for the Project. ECCC has advised that in the bullet points outlining operating conditions and assumptions used to calculate worst case air emissions from supply vessels on page 860-861, it is not clear which bullets refer to all three vessels combined and which refer to the one proxy vessel. Specifically, it is not clear whether the bullet that estimates average daily fuel consumption as 64 m^3/day refers to all three vessels or the one proxy vessel.	Provide clarifying information on the estimated 64 m^3/day fuel use and whether it refers to the three supply vessels.
CL-10	ECCC-29-Nx	Air Quality CEAA 5; 5(1)(b) Federal Lands/Transboundary.	Part 2, Section 6.3.8.1, Air Quality and Greenhouse Gas (GHG) Emissions.	14.3.3 Presence and Operation of MODUs	In several places, proxy equipment is used for the purpose of calculating the emissions (i.e. Wartsila, Stena Carron, Stena IceMax and Avalon Sea), which is reasonable. ECCC has requested that the proponent confirm that the equipment used for the Project would not have higher emissions of air pollutants than the proxy equipment used for the calculations.	Confirm whether the equipment used for the project would have higher emissions of air pollutants than the proxy equipment used for the calculations.
Fish and Fish Habitat/Marine Mammals and Sea Turtles						
CL-11	DFO-12-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, section 6.3 Predicted Effects on Valued Components – section 6.3.1 Fish	Section 8.2 Potential Environmental Changes, Effects and Associated Parameters	The EIS Guidelines require consideration of the effects of underwater noise and vibration emissions from project activities (i.e. drilling, vertical seismic profiling, offshore supply vessel operation, well abandonment) and how it may affect fish health and behaviour and consideration of how project-related effects may affect fish food	Based on the advice provided by the DFO, review and update Table 8.2., as applicable. If no changes are proposed, provide a rationale for excluding potential effects of vertical seismic profiling on food availability for marine species.

			and Fish Habitat		sources. The DFO has advised that a change in food availability and quantity could potentially result from sound emissions produced by vertical seismic profiling. This should be reflected in Table 8.2 "Potential Project-VC Interactions and Associated Effects: Marine Fish and Fish Habitat."	
CL-12	DFO-11-Ax-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Section 6.1 Project Setting and Baseline Conditions	Sections 6.1.6.1 Grand Banks Shelf, 6.1.6.2 Flemish Cap and 6.1.6.3 Flemish Pass	There are inconsistencies between the text and associated tables in Section 6.1.6.1. For example, different dominant infaunal invertebrate species are listed for Kenchington et al. (2001) in Table 6.1 and final sentence on page 201. Similarly, different dominant macrofaunal invertebrate species are listed for Prena et al. (1999) in Table 6.2 and in the final sentence on page 202.	Clarify the inconsistencies between the text and associated tables as applicable.
CL-13	DFO-14-Ax-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Section 6.1 Project Setting and Baseline Conditions	Section 6.1.6.4 Key Invertebrate Species	The statement "There are relatively low abundances of Northern shrimp on the eastern Flemish Cap in comparison to the western Flemish Cap" is inconsistent with Figure 6.4 (p. 208).	Clarify the abundance of Northern Shrimp on the eastern Flemish Cap in comparison to the western Flemish Cap.
CL-14	DFO-18 Ax NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.1.6 Marine Mammals	Section 6.3.1 Mysticetes (page 309, paragraph 2, final sentence)	From Figure 6.45 (page 312), it appears that Humpback Whales and not Blue Whales are found in the Project Area.	Clarify whether Humpback and/or Blue Whales may be found in the Project Area.
CL-15	DFO-19 Ax NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.1.6 Marine Mammals	Section 6.3.6 Important Areas and Times for Marine Mammals and Sea Turtles (page 320, paragraph 2, sentence 1)	The EIS states that "[f]rom Figures 6.45 to 6.48, it is evident that the greatest concentration of marine mammal sightings reported in DFO and Ocean Biographic Information System (OBIS) datasets was in the Southern Grand Banks area and within the 200 nautical mile limit, while most sea turtle sightings were south of the Grand Banks and off the continental shelf edge (p. 320)." From Figures 6.45 to 6.48, it is not obvious that the greatest concentration of marine mammal sightings is on the Southern Grand Banks.	Clarify where the greatest concentration of marine mammals can be found in the RSA.
Commercial Fisheries						
CL-16		5(2)(b)(i) Health and Socio-Economic Conditions	Part 2, Section 6.3.8.2, Commercial Fisheries	Section 13.3.3 Presence and Operation of MODUs	The EIS states that incompatible structures (i.e. underwater cables, shipwrecks and UXO) will be avoided.	Provide clarification as to how incompatible structures such as underwater cables, shipwrecks and UXO would be located and avoided.
Accidents and Malfunctions						
CL-17		Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Section 16 Accidental Events	Section 6.6.1 of the EIS Guidelines requires that the EIS describes the existing mechanisms and arrangements with response organizations for emergency response within the spatial extent of the project. Section 16.1.4.1 of the EIS states that Tier 2 & 3 response resources are expected to include mutual aid agreements with other oil and gas companies operating in the region. However, the capacity in which	Provide information on mutual aid agreements that may be implemented with other operators in the region, in particular with respect to drill rig assistance that may be required the event of emergency drilling of a relief well. Explain any potential limitations that may restrict aid

					other operators may be involved is not described.	assistance from other operators in the region in the event of a spill.
CL-18	ECCC-18-Nx	Multiple VCs - Accidents and Malfunctions	Part 2, Section 6.6.1, Effects of Potential Accidents or Malfunctions	Appendix G – Oil Spill Modelling - Section 3.4 – Wind Data; and Appendix G – Oil Spill Modelling, Section 3.5 - Currents	In Section 3.4 of Appendix G, it is noted that 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 is also noted that the CFSR winds were used in the hydrodynamic modelling (HYCOM) 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°". ECCC advised there was no rationale provided why there were differences in the temporal and spatial resolution of the wind forcing used between the two different models and questioned whether it was a limitation of the oil spill model, or whether 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.	Provide a 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.
CL-19	DFO-01-Nx	Multiple VCs - Regional Study Area (Accidents and Malfunctions)	Part 1, Section 3.2.3 Spatial and Temporal Boundaries	Section 4.3.1.1 Study Areas	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. In defining the RSA, the EIS states "The RSA also encompasses the predicted zone of influence of a potential oil spill event, as summarized and assessed in Section 16.4 and modelled in detail in Appendix G, and specifically the ecological and socioeconomic thresholds for the 95th percentile case for both surface (oil thickness) and water column exposure." (Table 4.3). However, figures presented in Section 16 and Appendix G, indicate that the predicted zone of influence for an oil spill event lies beyond the boundaries of the RSA.	Update the map and text describing the RSA, taking into consideration spill modelling results.
CL-20	DFO-05-Ax-Nx; Ekuanitshit-07-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.6.2.1 Potential Issues and Interactions – Existing Knowledge of the Effects of Dill Fluids (SBMs) on Marine Fish and Fish Habitat; Section 16.6.4.2 Environmental Effects Assessment	Section 16.6.2.1 of the EIS states, "The effects considered here relate exclusively to an accidental discharge of SBM (i.e., drill fluid only)." It would seem that the base fluid only, is being considered. However, on pages 993 and 1009 the EIS refers to SBMs as being a dense fluid, for example "SBMs, however, are a heavy, dense fluid which sinks rapidly so the effects on the water's surface would be limited as it sinks through the water column." DFO has advised that base drill fluids are typically less dense (~0.8 g/ml) than water, and that it is not clear throughout the section whether only	Clarify that that the SBM modelling and the associated effects analysis includes consideration of additives, as per description in Appendix H. If the effects analysis is based on the drill fluid only, advise whether additional environmental effects or changes in expected discharge are anticipated with the additional of other additives."

					the base drill fluid is being considered or the fluid plus the additives that are typical in drill muds are being considered.	
CL-21	C-NLOPB-10-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species 5(1)(a)(iii) Migratory Birds	Part 2 - Content of the Environmental Impact Statement - 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.4.3 Model Input Data	Section 16.4.3 of the EIS (page 954) indicates that Bay du Nord crude oil was used for the well event modelling, and provides the physical properties of the oil. However, no rationale was provided for the selection of Bay du Nord crude oil in the modelling of the blowout event.	Provide a rationale to support the selection and use of Bay du Nord crude oil for the well blow out modelling.
CL-22	DFO-40-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Appendix G – Section 3.3 Ice Cover	The EIS states that "(o)il trapped in or under sea ice will weather more slowly than oil released in open water." The EIS also states that "(f)rom 0 to ~30% coverage, the ice has no effect on the advection or weathering of surface floating oil. From approximately 30 to 80% ice coverage, oil advection is forced to the right of ice motion in the northern hemisphere, surface oil thickness generally increases due to ice-restricted spreading, and evaporation and entrainment are both reduced by damping/shielding the water surface from wind and waves. Above 80% ice coverage, surface oil moves with the ice and evaporation and entrainment cease." DFO has indicated that this may only be true for landfast ice. In the open ocean, the oil may disperse faster because of an increased effect of wind on the ice compared to an oil slick alone. A reference should be provided to support these statements.	Provide references to support the statements in EIS as noted in the context of this information requirement.
CL-23	DFO-41-Nx, and -43-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Appendix D – Section 3.5 Currents	The EIS states that "(t)he boundary where these two currents converge produces extremely energetic and variable frontal systems and eddies on smaller scales, on the order of kilometers (Volkov, 2005). Due to these eddies, local transport may advect parcels of water in nearly any direction." DFO indicated that it is unclear whether the numerical simulations have enough spatial resolution to resolve these 'extremely energetic eddies', or whether the currents used (daily average) have enough temporal resolution to resolve these eddies. The EIS states, "…oil transport was defined by the daily currents throughout each modelled simulation". This is a major limitation that should be quantified and discussed. Daily currents do not resolve high-resolution motions such as inertial or tidal currents (e.g. trapped diurnal tide known to travel around Flemish Cap; Wright and Xu, 2004). It is unclear whether the daily currents take into account these extremely energetic frontal systems.	Provide a discussion of whether the numerical simulations have enough spatial and temporal resolution to resolve the 'extremely energetic eddies' referred to in the EIS. The limitations of using lower-resolution data should be discussed, including implications for effects predictions.
CL-24	CL-KMKNO-	Multiple VCs – Accidents and	Part 2, Section 6.6.1 Effects of	Section 16.1.4 Contingency Planning and Emergency	The KMKNO and the Miawpukek First Nation have indicated that it is not clear from the EIS how the proponent intends to involve Indigenous	Confirm the level of involvement of Indigenous groups in the development and implementation of the OSRP and other

	41-Nx, -42-Nx; MFN-23-Nx	Malfunctions	Potential Accidents or Malfunctions	Response	groups in the development and the implementation of contingency plans. It noted that: - the proponent should indicate how it will involve Indigenous groups in the development and implementation of the Oil Spill Response Plan (OSRP)and other emergency response and contingency plans, including emergency response and preparedness planning, exercises and training; and - the proponent should indicate if Indigenous groups will be provided with the approved versions of contingency and response plans.	emergency response and preparedness plans, exercises and training. Confirm if Indigenous groups will be provided with versions of these plans when they are finalized.
CL-25	CL-KMKNO-43-Nx	Multiple VCs – Accidents and Malfunctions	Part 2, Section 6.6.1 Effects of Potential Accidents or Malfunctions	Section 16.1.4.1 Nexen Emergency Response Hierarchy	Section 16.1.4.1 of the EIS defines the three-tiered system employed by Nexen to categorize and respond to any type of incident. The KMKNO stated that the definitions provided do not appear to account for an incident that requires national but not international resources.	Clarify whether an incident that requires national but not international resources is considered a Tier 2 or Tier 3 incident.
CL-26	DFO-02-Nx; DFO-34-Ax-Nx	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 1, section 4.3 Study Strategy and Methodology.	Page 954, section 16.4.3 Model Input Data; Appendix G – Section 3.5 Currents	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 used for the spill trajectory model. The EIS states that, "[w]hile this subset of data is not the most recent five years of data, currents and winds in the study area are very similar to those from 5-10 years ago and the data used in this study would be representative of environmental conditions present today."	Provide rationale that the data inputs used are applicable and best suited to modelling in the Project Area, with consideration of predicted future conditions sufficient to provide a degree of certainty or validation in the predictions made, and provide a margin of error associated with the predictions. Provide additional justification for use of datasets from 2006-2010, including appropriate references.
Effects of the Environment on the Project						
CL-27	CL-ECCC-05-NX	5(1)(a)(i) Fish and Fish Habitat 5(1)(a)(ii) Aquatic Species	Part 2, Section 6.6.2 Effects of the environment on the project	Section 5.6.2 Icebergs	The EIS notes that there is a moderate risk for marine traffic due to icebergs anytime between January and June. ECCC has advised that according to Figure 5.37, there appears to be an inconsistency between the number of sightings per month and the declaration of moderate risk. There is no rationale why January is considered moderate risk with 22 iceberg sightings but July and August are not considered moderate risk with 53 and 23 sightings respectively.	Provide clarification why January is considered moderate risk with 22 iceberg sightings but July and August are not considered moderate risk with 53 and 23 sightings respectively.
Mitigation						
CL-28	C-NLOPB-2-Nx	5(1)(a)(i) Fish and Fish Habitat	Part 2 - Content of the Environmental Impact Statement - 6.1.2 Marine environment	Section 5.5.4 Seawater Properties (Temperature, Salinity, pH, Turbidity)	Section 5.5.4 of the EIS describes statistical summaries of sea temperature and salinity derived from the Ocean Data Inventory of the Bedford Institute of Oceanography (DFO 2016) for depths down to 1,000 m. However, Section 6.1.3 of the EIS states, "[t]he Flemish Pass is a perched slope basin that reaches approximately 1,300 m depths…".	Clarify whether there are data available for the entirety of the water column, (i.e. down to 1,300 m). If data is available, then it should be provided.

Appendix A - Hovmöller plots

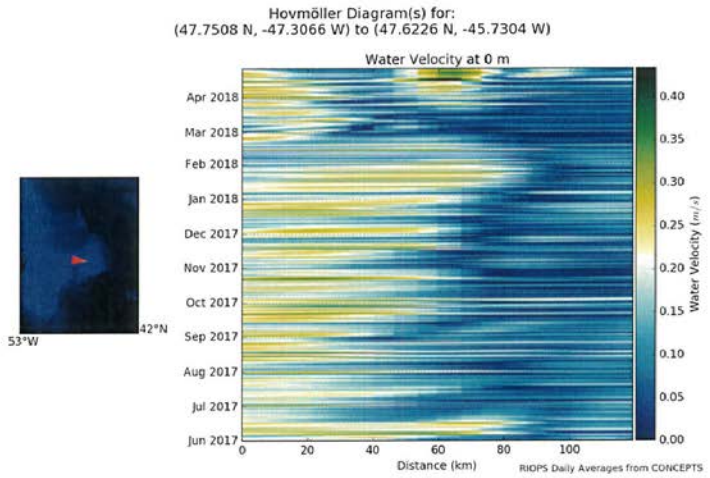

Figure 2. Hovmöller plot for Flemish Pass water velocity at surface.

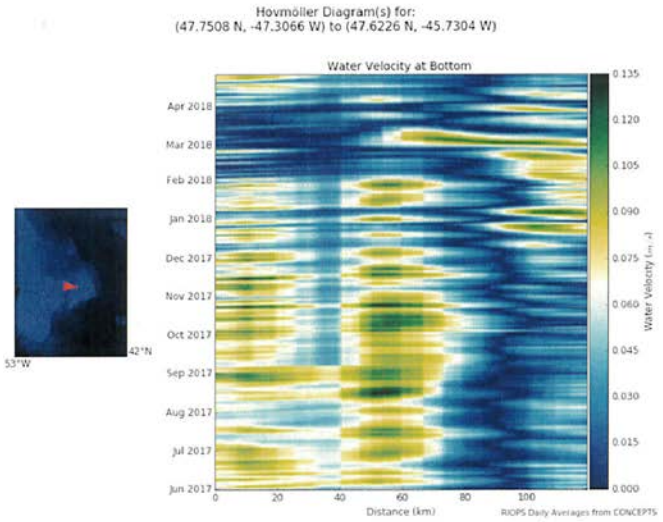

Figure 3. Hovmöller plot for Flemish Pass water velocity at bottom.

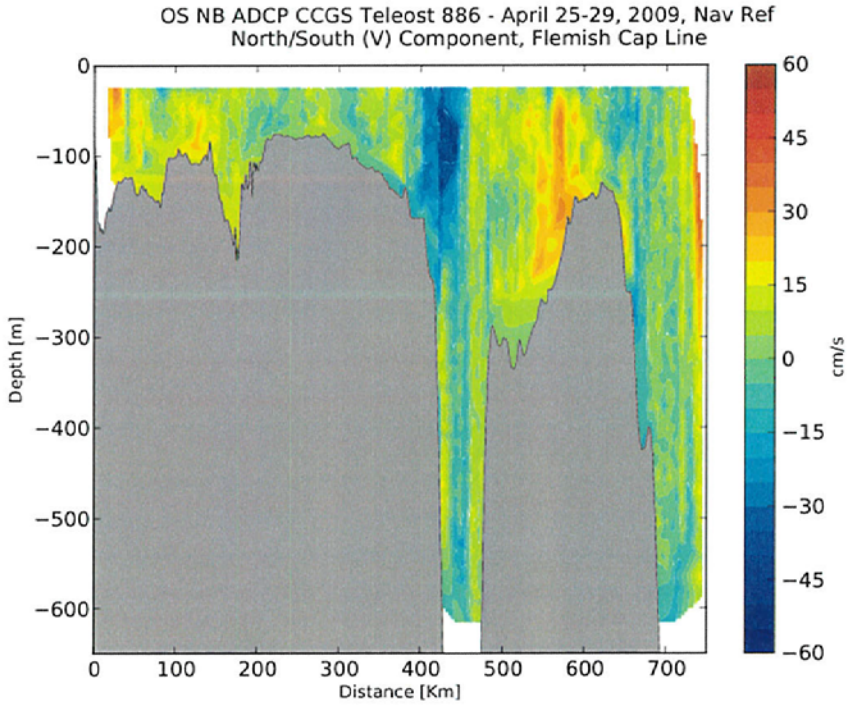

Figure 4. Example of ACDP of observed North-South Velocity along Flemish Cap Transect conducted by the DFO AZMP program between April 25 and April 29 2009.

Appendix B: Clarifications and Corrections Regarding Species at Risk

Reference to EIS	Clarification/Correction regarding Species at Risk
Section 6.3.7.1.8 Northern Bottlenose Whale	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.
Section 6.3.7.1.4 Fin Whale and 6.3.7.1.9 Sowerby's Beaked Whale	Outdated management plans have been referenced in the EIS for Fin whale, North Atlantic Right Whale and Sowerby's beaked whale. • Fin whale: http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Mp-FinWhaleAtlantic-v00-2017Jan24-Eng.pdf • Proposed Action Plan and updated Recovery Strategy for the North Atlantic Right Whale (http://www.sararegistry.gc.ca/virtual_sara/files/plans/Ap-NARW-v00-2016Aug05-Eng.PDF • Sowerby's beaked whale: http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Mp-Sowerbys-v00-2017Apr-Eng.pdf
Section 6.1.8 Species at Risk, Table 6.20 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	Errors in risk categories for species at risk have been noted throughout the EIS Report: • For Shortfin mako (Atlantic population), COSEWIC designation is Special Concern • For Barndoor Skate, COSEWIC designation is Not at Risk • For Harp seal, COSEWIC designation is Not Listed • For Beluga whale (St. Lawrence Estuary population), SARA Schedule 1 status is Endangered • For White Shark (Atlantic population), SARA Schedule 1 listing is Endangered
Table 8.6 (pages 655-658) Table 10.4 (pages 744-746)	Inconsistencies have been noted between baseline information (Chapter 6) and the environmental effects assessment (Chapters 8 & 10) for species at risk: • Habitat preference for Spotted Wolffish (Table 8.6 vs 6.1.8.1 Wolffish [page 260, paragraph 4, sentence 4]) • Timing of eggs in the water column for Atlantic Cod (Table 8.6 vs 6.1.7.3 Key Fish Species Distributions [page 237, paragraph 2, sentence 1]) • Migration patterns for Acadian Redfish and Deepwater Redfish (Table 8.6 vs 6.1.7.3 Key Fish Species Distributions [page 233, paragraph 3, sentence 2]) • Likelihood in the LSA for Shortfin Mako (Table 8.6 vs 6.1.8.4 Other Sharks [page 262, paragraph 2, sentence 7]) • Regularity and timing of presence for Leatherback Sea Turtle (Table 10.4 vs Table 6.29, pages 319-320) • Timing of presence for Loggerhead Sea Turtle (Table 10.4 vs Table 6.29, page 320)
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	The provision of population names is not consistent throughout the EIS Reports (e.g. Acadian Redfish (Atlantic population), Deepwater Redfish (Northern population), White Hake (Atlantic and Northern Gulf of St. Lawrence population), Atlantic Cod (Newfoundland and Labrador population), Basking Shark (Atlantic population), Shortfin Mako (Atlantic population), Spiny Dogfish (Atlantic population), White Shark (Atlantic population), Fin Whale (Atlantic population), Blue Whale (Atlantic population), Killer Whale (Northwest Atlantic/Eastern Arctic population), Harbour Porpoise (Northwest Atlantic population), Beluga Whale (St. Lawrence Estuary population), Northern Bottlenose Whale (Scotian Shelf population, Davis Strait-Baffin Bay-Labrador Sea population), Leatherback Sea Turtle (Atlantic population), Atlantic Walrus (Central/Low Arctic population), Atlantic Salmon (Inner Bay of Fundy, South Newfoundland, Quebec Eastern North Shore, Quebec Western North Shore, Anticosti Island, Inner St. Lawrence, Gaspe-Southern Gulf of St. Lawrence, Eastern Cape Breton, Nova Scotia Southern Upland, Outer Bay of Fundy). 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 Harbour seal, refer to the Atlantic and Eastern Arctic subspecies Ensure that subspecies accompany the species name (e.g. Common Minke Whale North Atlantic subspecies, Harbour Seal Atlantic subspecies and Harbour Seal Eastern Arctic subspecies).