August 15, 2011

Darren Hicks
Canada- Newfoundland & Labrador Offshore Petroleum Board
Fifth Floor, TD Place
140 Water Street
St. John's, NL
A1C 6H6

Dear Mr. Hicks,

Re: MKI's Response to Consolidated Comments on the EA Report Addendum on Multi Klient Invest Offshore Labrador 2D Seismic Program 2011-2013

We have reviewed the comments by Environment Canada, Nunatsiavut Government, Fisheries and Oceans Canada, C-NLOPB and FFAW compiled in a letter by CNLOPB on August 9, 2011. This letter provides MKI's response to the review comments on the Multi Klient Invest – Environmental Assessment Report for the 2-D marine seismic survey offshore Labrador program.

C-NLOPB

General Comment - The author has failed to include descriptions for: the Sperm Whale; the Northern bottlenose whale; and the White-beaked dolphin. Please address.

MKI Response

Information on these species is provided in Table 5.6. More detailed biological information is as follows

White-beaked dolphins have a more northerly distribution than most dolphin species, occurring in cold temperate and sub-Arctic waters of the N Atlantic (Jefferson et al. 2008). Waring et al. (2009) estimated a total of 2003 individuals in the N Atlantic, but it is unknown how many occur off Labrador and northeastern Newfoundland. White-beaked dolphins have no status under *SARA* and are considered *not at risk* by COSEWIC. Sightings of white-beaked dolphins are generally common in the Study Area in July and August, although none were seen during a summer 2007 aerial survey offshore of Labrador (Lawson and Gosselin 2009). White-beaked dolphins are thought to remain at high latitudes year-round and are generally observed in continental shelf and slope areas, although they also occur in shallow coastal areas. They typically occur in groups of less than 30 animals, but group sizes up to the low hundreds have also been reported (Lien et al. 1997). White-beaked dolphins have a range of prey items, including squid, crustaceans, and a number of small mesopelagic and schooling fishes like herring, haddock, hake, and cod (Jefferson et al. 2008).

The distribution of northern bottlenose whales is restricted to the N Atlantic, primarily in deep, offshore areas with two regions of concentration: The Gully and adjacent submarine canyons on the eastern Scotian Shelf, and Davis Strait off northern Labrador (Reeves et al. 1993). Throughout their range, northern bottlenose whales were harvested extensively during industrial whaling, which likely greatly reduced total numbers. The total abundance of northern bottlenose whales in the N Atlantic is unknown, but ~163 individuals comprise the Scotian Shelf population (Whitehead and Wimmer 2005). Although the Scotian Shelf population is designated *endangered* under Schedule 1 of *SARA* and by COSEWIC, the Davis Strait population has no status under *SARA* and is considered *not at risk* by COSEWIC. It is unclear to which population animals occurring in the Study Area belong. The Labrador population is considered to occur in the area year-round, with mating and births occurring in April. Occurring primarily in deep waters over canyons and the shelf edge, whales tagged on the Scotian Shelf routinely dove to depths over 800 m and remained submerged for over an hour (Hooker and Baird 1999). Foraging apparently occurs at depth, primarily on deep-water squid and fish. Northern bottlenose whales are likely to occur at low densities, but year-round, throughout the deep, offshore waters of the Labrador Sea.

Based on the DFO cetacean sightings database, northern bottlenose whales have been sighted in the deeper waters and near the shelf break of the Study Area from July to December. There was also one northern bottlenose whale. sighting (of a single animal) during a summer 2007 aerial survey offshore of Labrador (Lawson and Gosselin 2009).

The sperm whale is most common in tropical and temperate waters, but is widely distributed and occurs from the edge of the polar pack ice to the equator (Jefferson et al. 2008). Whitehead (2002) estimated a total of 13,190 sperm whales for the Iceland-Faroes area, the area north of it, and the east coast of North America combined, but Waring et al. (2009) reported an estimate of 4,804 animals for the N Atlantic. Sperm whales have no status under *SARA* and are designated *not at risk* by COSEWIC. However, they are a *low priority candidate species* under COSEWIC. Large aggregations or small groups of females and juveniles occur in tropical and sub-tropical regions, but males are most common singly or in small same-sex groups occurring at higher latitudes (Whitehead 2003). Since males tend to range further north, sperm whales encountered in the Labrador Sea are more likely to be single males. However, mixed groups with females and juveniles have occasionally been observed in higher latitudes and males can still form large same-sex aggregations (Whitehead and Weilgart 2000; Whitehead 2003). Sperm whales appear to prefer deep waters off the continental shelf, particularly areas with high secondary productivity, steep slopes, and canyons that may concentrate their primary prey of large-bodied squid (Jaquet and Whitehead 1996; Waring et al. 2001). Sperm whales are deep divers, routinely diving to hundreds of metres, sometimes to depths over 1,000 m and remaining submerged up to an hour (Whitehead and Weilgart 2000). Sperm whales are most likely to occur in deep water and high relief areas offshore of Labrador, presumably during summer months. In the Study Area, there were four sperm whale sightings in the DFO cetacean sightings database, all occurring from July to October.

Jefferson, T.A., M.A. Webber and R. Pitman. 2008. Marine Mammals of the World: A Comprehensive Guide to their Identification. Academic Press, London. 573 p.
Lawson, J.W. and J.F. Gosselin. 2009. Distribution and preliminary abundance estimates for cetaceans seen during Canada's Marine Megafauna Survey – A component of the 2007 TNASS. DFOCan. Sci. Advis. Sec. Res. Doc. 2009/031. 28 p.
Jaquet, N. and H. Whitehead. 1996. Scale-dependent correlation of sperm whale distribution with environmental features and productivity in the South Pacific. Mar. Ecol. Prog. Ser. 135(1-3): 1-9.
Lien, J., D. Nelson and J.D. Hai. 1997. Status of the White-beaked Dolphin, *Lagenorhynchus albirostris*, in Canada. Report for the Committee on the Status of Endangered Wildlife in Canada.
Reeves, R.R., E. Mitchell and H. Whitehead. 1993. Status of the northern bottlenose whale, *Hyperoodon ampullatus*. Can. Field-Nat. 107: 490-508.
Waring, G.T., T. Hamazaki, D. Sheehan, G. Wood and S. Baker. 2001. Characterization of beaked whale (Ziphiidae) and sperm whale (*Physeter macrocephalus*) summer habitat in shelf-edge and deeper waters off the northeast U.S. Mar. Mamm. Sci. 17: 703-717.
Waring, G.T., E. Josephson, C.P. Fairfield-Walsh and K. Maze-Foley. 2009. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2008. NOAA Tech. Memo. NMFS-NE 210. 440 p.
Whitehead, H. and T. Wimmer. 2005. Heterogeneity and the mark-recapture assesement of the Scotian Shelf population of northern bottlenose whales (*Hyperoodon ampullatus*). Can. J. Fish. Aquat. Sci. 62: 2573-2585.
Whitehead, H. and L.S. Weilgart. 2000. The sperm whale: Social females and roving males. P. 154-172. *In*: J. Mann, R. Connor, P.L. Tyack and H. Whitehead (ed.), Cetacean Societies: Field Studies of Dolphins and Whales. University of Chicago Press. Chicago.
Whitehead, H. 2003. Sperm whale societies: social evolution in the ocean. University of Chicago Press, Chicago. 431 p.

General Comment
There are several occurrences of the author referencing future 3-D seismic programs. The proponent should be reminded that this is not in context with the project description and scope of the project.

MKI Response
Future 3-D seismic surveys refers to the 2012 and 2013 period under this program. Future surveys refers

to consideration with respect to changes in socio-economic and ecological VECs. Future surveys also refers to other operators with respect to cumulative effects.

Page vi, **second paragraph** – Please explain why the CNSOPB needs to fulfill its responsibilities under CEAA.

MKI Response
Remove reference to CNSOPB

Section 1.0, pg 1, 3rd para. – Will MKI be applying for an authorization from the CNLOPB as well as the CNSOPB?

MKI Response
Replace with Canada-Newfoundland Atlantic Accord Implementation Act (S.C. 1987, C. 3).

Section 1.3 Regulatory Context, pg 4, 2nd paragraph – The NEB et. al. reference should be 2010, not 2002.

MKI Response
Agreed

Section 2.3.1 Seismic Vessel, pg 9 *- Please confirm that the seismic gear will not be deployed or active enroute to the Project Area.*

MKI Response
Confirmed. It is not standard practice to trail equipment behind any seismic vessel other than during operations while collecting data.

Section 2.3.2 2-D Seismic Survey Towed Array, pg 11, line 3 – Why is the spacing between tracks for this program 120 km instead of 2 km?

MKI Response
This is the requirement for this 2-D program. There are no restrictions on line spacing.

Section 2.3.2 Streamer, pg 12 – This section should be numbered as 2.3.3. Please correct this and any subsequent subsections.

MKI Response
Agreed. Change 2.3.2.1 to 2.3.4 Marine Mammal Safety Zone and Ramp-up Procedure and 2.3.2.2 to 2.3.5 Logistical Support

Section 2.3.2.2 Logistical Support, Support Vessels, 2nd para. – Again, as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (CNLOPB 2011), the use of a

„Fisheries Liaison Officer" (FLO) onboard the seismic vessel is considered best practice.

MKI Response
Agreed that the guideline states the preference however it is not mandatory. There are circumstances that prevent the FLO or MMO or other personnel not essential to the operation of the vessel where the only physical space for accommodation is on the support vessel.

Section 3.1 C-NLOPB Scoping Requirements, pg 22, 3rd bullet – Section 2.1 states “9,600 km” will be surveyed in 2011 and not “9,200 km” as stated here.

MKI Response

Note that “approximately 9,200 km “is the sentence in the bullet. Correct, the distance is 9,600 km.

Section 3.2.2 Consultation with Regulators, pg 27, Table 3.1 – Please correct “Maire” Leo Abbass to “Mayor”

MKI Response
Maire is not incorrect. Correct is perhaps a sensitive verb in this context. Change the French translation of Mayor to the English “Mayor”.

Section 4.2.3.1 Temporal Boundaries, page 34, line 2 – The activities have been assessed from “June to December”. Sections 2.1 and 6.1.2 identify July to November as the timing of seismic activities. Section 3.1 identifies June to December. Please identify the actual timing of the proposed program that is being assessed.

MKI Response
The schedule of the survey will occur between July and November within 2011 to 2013.

Section 4.2.3.1 Temporal Boundaries, page 34, line 3 – explain why “2015” is identified when the temporal scope of this project is only until 2013.

MKI Response
The correct temporal scope is 2011 to 2o13, inclusive

Section 4.2.3.2 Spatial Boundaries, pg 34 – Please confirm that the “Project Area” is as identified in Figure 2.1, is 541,423 km2 in size, and includes a 10 km turning radius.

MKI Response
Confirmed.

Section 4.2.3.2 Spatial Boundaries, pg 34, bullet number one, line 4 – “This area encompasses…turning radii.” Does the Project Area include the area where data can be acquired between 2011 to 2013 and not just 2011?

MKI Response
Correct, all survey data will be collected within the Project Area.

Section 4.2.3.2 Spatial Boundaries, pg 34, bullet number two – The full reference for the Labrador Shelf SEA Area is required, please address.

MKI Response
Section 3.3 makes reference to the Labrador Shelf SEA. The References in Section include the reference Sikumiut Environmental Management Ltd. 2008. Strategic Environmental Assessment, Labrador Shelf Offshore Area. Canada-Newfoundland and Labrador Offshore Petroleum Board (CNLOPB).
St. John’s, NL.

Section 4.2.4 Interactions Between Project Activities and VECs, page 36, Table 4.2 –
3-D Seismic Surveys, Well Site Survey, and Vertical Seismic Profile components are neither “detailed in Section 2.0” or “assessed in Section 6.0”.

MKI Response
Correct, only 2-D surveys, vessel presence, presence of cables and streamers, and accidental events are project activities included in the EA

Section 5.5.1.1 Nain Bight and Hamilton Inlet, page 107, paragraph two, line 3 – These areas are NOT found in Figure 5.18, but in Figure 5.20. Please address.
Section 5.5.2.1 The Torngat Mountains National Park, page 108, paragraph one, line 5 – This area is NOT found in Figure 5.18, but in Figure 5.20. Please address.
Section 5.7.1 Gilbert Bay Marine Protected Area, page 111, line 3 – This area is NOT found in Figure 5.18, but in Figure 5.20. Please address.
Section 5.9.1 Hawke Channel and Hamilton Bank, page 113, line 1 - This area is NOT found in Figure 5.18, but in Figure 5.20. Please address.

MKI Response
Correct, location illustration of parks and marine conservation areas is provided in Figure 5.20

Section 6.1.8 Summary, pg 155, Table 6.1 – Please explain why the geographic extent is 10s of metres when, "Each source array is about 20 m long and 24 m wide. Following 100 to 200 m behind the source array is a single streamer between 8 and 10 km long."

MKI Response
The definition of geographic extent is provided on Section 4.2.6 page 37. Geographic extent – the area over which the particular effect will occur. This definition does not address the physical size of structures. There are no observer records that note an entire array being inundated by seabirds. Observers have noted an occasional seabird diving around active arrays – one or a few birds could be affected with 10s of meters of the spot that they dove into near the array while it was active.

Section 8.3 Conclusions, page 213 – The program being assessed is from 2011 to 2013 yet it is stated in this section that it extends over five years.

MKI Response
Change reference from five years to three years

Reference Section – in the EA Addendum there are two references to a C-NLOPB 2011 document, the GGEGP Guidelines and the C-NLOPB Scoping Document, but in the Reference Section only the GGEGP Guidelines are present. Please address.

MKI Response ???
The Scoping Document prepared by the C-NLOPB in 2011 is provided in Appendix A. There are several references directing the reader to this appendix. This has been standard practices in the EAs submitted to the C-NLOPB.

Reference Section – please cite the reference for Beauchamp *et. al.* 2009 used in the Blue Whale description of the EA Addendum.

MKI Response
Beauchamp J, Bouchard H, de Margerie P, Otis N, Savaria J-Y. 2009. Recovery Strategy for the blue whale (*Balaenoptera musculus*), Northwest Atlantic population, in Canada [Final]. *Species at Risk Act* Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. 62 pp.

Reference Section – please cite the reference for Miller *et. al.* 2005 used in paragraph 3 of page 180.

MKI Response
Miller, G.W., V.D. Moulton, R.A. Davis, M. Holst, P. Millman, A. MacGillivray, and D. Hannay. 2005. Monitoring seismic effects on marine mammals—southeastern Beaufort Sea, 2001-2002. Pages 511-542 *in* S.L. Armsworthy, P.J. Cranford, and K. Lee, eds. Offshore Oil and Gas Environmental Effects Monitoring/Approaches and Technologies. Battelle Press, Columbus, OH.

Environment Canada – Canadian Wildlife Service

EC-CWS Comment 1 (Section 5.3.5) "*It was requested that three reference sources [Brown (1986), Fifield et al. (2009), Lock et al. (1994)] be consulted for marine bird distribution in the previous draft, but were not added to this section."*

MKI Response
Please note that additional text in Section 5.3.5.1 to include additional information from Brown (1986) and Fifield et al. (2009) is included in the response to CWS Comment 6 below. .

Section 6.1.5.3, (Pg. 157, Paragraph 4) should read "Diving species, such as guillemots, puffins, murres, scoters, eiders and loons are considered to be the most vulnerable to surface slicks, while nesting terns are highly susceptible at their nesting sites during clean-up activities (Lock et al. 1994)."

References that were used including Chaulk *et al*. (2004); Chapdelaine *et al*. (2001); Mallory *et al*. (2008); Roul (2010); Brown (1988); Mowbray (2002); Wiley and Lee (1998); Wiley and Lee (1999); and Wiley and Lee (2000) are all credible, current sources as well.

EC-CWS Comment 3 "*There was a reference (in the March EA) to areas important to seabirds in the study area....This data did not represent areas that area important to the species in general or during the entire year..."*

"It appears that instead of providing more information… the proponent removed the existing information altogether. This should be rewritten to represent areas important to the species in general or during the entire year."

MKI Response
Additional information on Important Bird Areas (IBAs) was provided in a separate section (Section 5.6.2, Table 5.8) of the EA Addendum report. Please note that Table 5.8 has been amended to include species and seasons of special significance for each IBA. The revised table is included as an attachment (Attachment 1).

EC-CWS Comment 5 "*The proponent has made the (spelling) corrections, though Red-throated Loon has been removed from the document. EC-CWS is satisfied with the response, though the removal of the Red-throated Loon is unexplained*."

MKI Response
The Red-throated Loon was included in Section 5.3.5.2, Table 5.5 of the EA Addendum report.

EC-CWS Comment 6 (Section 5.3.5.1) "…*proponent failed to use the above references. The information provided was brief, particularly concerning abundances. The proponent should identify what is known about the distribution and abundance of each group in the study area*…"

MKI Response
Please be advised that the amendments to Section 5.3.5 include additional information regarding species distribution and abundance in the Study Area.

The text in Section 5.3.5 (Pg. 74, Paragraph 4) should read:

*"*Seabird density peaks in the spring and summer months in eastern Canada due to large number of breeding species and migrants (Brown 1986). Spring migration is a time of high sensitivity because birds are concentrated in high numbers, and are particularly vulnerable. All areas of the (Labrador) shelf are

used, though the shelf edge and Hawke Channel show notably high densities, and areas around colonies such as Funk Island will also have unusually high densities during the breeding season. Many species such as Northern Fulmars and gulls use these same waters as their wintering grounds (Brown 1986)."

The text in Section 5.3.5.1 should read as follows:

(Pg. 78, Paragraph 6) "Virtually all of the world's population of Greater Shearwaters (*Puffinus gravis*) spends the non-breeding season in the northwest Atlantic (Brown 1986). The Sooty Shearwater (*Puffinus griseus*) is far less common in the Atlantic, but uses the waters off the coast of Labrador during migration."

(Pg. 78, Paragraph 8) "In summer and fall, shearwaters are most abundant in the southern portions of the area, with densities in Newfoundland and Labrador (0.80 birds/km^2 in fall) lower than more southern locations such as the Scotian Shelf (2.2 birds/km^2 in fall). In winter, shearwater sightings are relatively scarce throughout the region, with the highest density found on the southern Grand Banks (0.96 birds/km^2) (Fifield et al. 2009)."

(Pg. 79, Paragraph 2) "The storm petrels in the Study Area include the Leach's Storm Petrel (*Oceanodroma leucorhoa*) which breeds in the north Atlantic and overwinters in the tropical Atlantic, and the less common Wilson's Storm-Petrel (*Oceanites oceanicus*) which breeds in the Antarctic and summers (boreal) in the north Atlantic (Brown 1988; Fifield et al. 2009). Petrels are commonly seen offshore during the summer months where they forage up to 200 km from their colony, but are rarely seen in the Study Area during the winter (Fifield et al. 2009)."

(Pg. 79, Paragraph 3***)*** "Leach's Storm-Petrels are known to breed in a variety of habitats on marine islands, ranging from open grasslands to heavily-canopied coniferous forests (Huntington et al. 1996). Baccalieu Island off eastern Newfoundland hosts the world's largest colony of Leach's Storm-Petrels, more than one third of the world's population (Sklepkovych and Montevecchi 1989 as cited in Fifield et al. 2009)."

(Pg. 79, Paragraph 6) "In Newfoundland and Labrador, Northern Gannets are most commonly observed in the highest densities close to shore, near their nesting colonies during the spring and summer months. Sightings are rare aside from these locations. In fall, gannets distribution shifts to the south, and few to no gannets have been sighted off the coast of Labrador in the fall and winter."

(Pg. 80, Paragraph 2) "Herring and Black-backed Gull are known to breed throughout the study area and in the Arctic in numbers reaching the tens of thousands (Pierotti and Good 1994, as cited in Fifield et al. 2009) and can be found offshore year-round though Herring gulls tend to stick closer to shore (Brown 1986). Glaucous Gulls also breed in coastal Labrador, reaching as far north as Baffin Island and Greenland. Their wintering grounds range from Labrador south to New England with particularly high densities encountered off the coast of Newfoundland (Gilchrist 2001, as cited in Fifield et al. 2009)."

(Pg. 80, Paragraph 4)"The central Labrador Shelf has been identified by Fifield (2009) and Brown (1986) as hosting particularly high concentrations of Kittiwakes during the fall."

(Pg. 81, Paragraph 1) "The species (Dovekie) winters in the low-arctic waters of the Labrador Sea, and coastal Newfoundland with particularly high congregations on the Grand Banks (Brown 1986, Montevecchi and Stenhouse 2002)."

EC-CWS Comment 7 "*In the current draft of the EA, the proponent removed the Thick-billed Murre section altogether, save for two lines. Overall, this section is extremely brief and neglected to take into account the comments from EC-CWS*"

MKI Response

Please note that the amendments to Section 5.3.5.1 included additional information regarding murre distribution and abundance in the study area.

The text in Pg. 80, Paragraph 5 should read "Large numbers of murres, including the Common Murre and the Thick-billed Murre, winter on the Grand Banks and in the Labrador Sea. In eastern Canada, they breed in densely packed colonies, with the Atlantic population (including both species) estimated at 16-25 million breeding birds (Gaston and Jones 1998, as cited in Fifield et al. 2009). High numbers of Murres are common in the Labrador and Newfoundland Shelves region (1.79 birds/km^2), with the highest densities occurring on the Grand Banks and northeast Newfoundland shelf (>3 birds/ km^2). Funk Island, as mentioned above for its significance to the Northern Gannet, is the largest Common Murre breeding colony in the North Atlantic, with densities reaching 15.08 to 46.57 birds/km^2 (Fifield et al. 2009). Though data is limited for the central Labrador Shelf, the area appears to be significant to murres during their fall migration though densities were very low in other parts of the region during the fall. In winter, murres are found in high numbers along the Labrador and Newfoundland shelves (3.05 birds/km^2), and tend to be more highly concentrated on continental shelf and slope regions (Fifield et al. 2009)."

EC-CWS Comment 8 "*The proponent reworded their document to say that the Labrador Sea is a key wintering area for Northern Fulmar. EC-CWS is satisfied with the response. However, the proponent removed the distribution map, and it is unclear why the proponent decided to do this*."

MKI Response
The Northern Fulmar has been included on Figure 5.11 (Seabird observation Records) along with other species. Please note that additional information on seasonal distribution and abundance of the Northern Fulmar is included in Section 5.3.5.1. The text in the following sections in the Addendum should read:

(P. 78, Paragraph 3) "The Northern Fulmar (*Fulmarus glacialis*) is a member of the shearwater and petrel family, which spends most of the year at sea, and are known to breed on the Gannet Islands. The majority of the eastern Canadian breeding population (2.1 million) is found in the arctic, with some smaller colonies being found in Labrador and Northern Newfoundland (Fifield et al. 2009)."

(P. 78, Paragraph 4) "In the Labrador and Newfoundland Shelves Region, Fulmars are found at the highest densities during winter, where average density is found to be 1.91 birds/km^2. Distribution throughout the area shifts towards the south in the winter, with highest densities found in the Laurentian Channel (Fifield et al. 2009)…

…A study by Mallory et al. (2008) tracked five Northern Fulmars and found that the birds tended to remain in the Labrador Sea (between 50° and 55° N)……from December to March. This suggests that the Labrador Sea is a key wintering area for fulmars from the high Arctic, which is inclusive of the Study Area."

(Pg. 78, Paragraph 5) "During summer and fall, Fulmar distribution shifts towards the north, with greater densities found in the north compared to southern parts of the area. The highest numbers have been recorded in the Labrador Sea at 0.48 birds/km^2 (summer) and 0.65 birds/km^2 (fall), with relatively sparse sightings further south (Fifield et al. 2009)."

EC-CWS Comment 11 "*in 6.1.3 of the current EA, the proponent states that there is no data suggesting that seismic surveys have adverse impacts of birds...The proponent does concede that noise from surveys could adversely affect surface feeding and diving seabirds near the air source arrays.*"

MKI Response
The proponent concedes that there is a lack of scientific evidence which shows the relationship between physiological damage to birds from seismic activity and the proximity of the birds to the seismic source.

EC-CWS Comment 14 "*The proponent removed any mention of other seismic activities [Chevron (2010-2017), Investcan (2010-2017), and Husky (2009-2017)] in the area…*"

MKI Response
These three other surveys and their potential cumulative effects were, in fact, mentioned in Sections 4.2.8 (Cumulative Effects Assessment), 5.16 (Petroleum Industry)**,** and the Cumulative Effects Sections for each VEC (Sections 6.2.11, 6.3.4.3, 6.5.5) of the report.

EC-CWS Comment 15 "*The proponent indicates that Marine bird data reports will be provided following this survey and any other subsequent seismic surveys. EC-CWS additionally requests that the raw data be forwarded to us*

MKI Response
The Proponent agreed to provide EC-CWS with the requested data following the survey as noted in pages 153 and 155 of the Addendum report.

Nunatsiavut Government - Department of Lands and Natural Resources

NG-DLNR Summary Recommendation 1: *The seismic program along the Labrador coast should begin no earlier than October 1 each year (i.e. communication is not an effective mitigation measure for the significant temporal overlaps of seismic surveys and the Inuit fishery). If this is not possible, other mitigation measures (eg. financial and otherwise) need to be agreed upon prior to the commencement of the program;*

MKI Response
The survey will be scheduled such that the last lines shot are those closest to the Settlement Zone eastern boundary and the lines will be run north to south. The approximate start timeframe of running these lines would be the last week of September.

NG-DLNR Summary Recommendation 2*: Inuit employees should be hired by the proponent every year. This includes, but is not limited to, Inuit marine mammal observers and fishery liaison officers (or, Inuit marine mammal observer trainees and fishery liaison officer trainees at a minimum) and Inuit for other positions related to the seismic survey vessel operations. In response to our earlier comments about this, the proponent cites section 6.7.4.3 – we are not sure why, as this section does not mention aboriginal or Inuit a single time.*

MKI Response
RPS Energy contracted an Inuit company, with offices in Nain, to conduct stakeholders consultations. The Nunatsiavut Government was on the stakeholders list. All Inuit communities, as well as Happy Valley-Goose Bay, were visited, allowing Beneficiaries the opportunity to learn about the project and pass on comments. Aboriginal fishers and the Torngat Fish Producers Cooperative were specifically engaged in the consultation for the project. At all public presentations, RPS indicated that Inuit Marine Mammal Observers could be on board for the Labrador surveys and that these would be provided by Sikumiut Environmental Management Ltd., an Inuit company with several years experience in providing Inuit observers for seismic operations. Contact and business cards were provided in the community visits that interested parties could contact directly. To spite our offers we received no responses at all. Subsequent to our consultation process, Sikumiut was approached, but Inuit candidates qualified to serve as MMOs and FLOs were not directly available. Personnel with previous experience on seismic vessels had found employment on a local coastal freight and passenger vessel and were no longer available to Sikumiut. No local training program exists to provide qualified Inuit candidates for MMO and FLO positions. Attempts by Sikumiut to develop and offer such a training program (with funding from Inuit Pathways) have been in the works for years, but for various reasons has not gotten off the ground. The proponent plans to return next year, and if qualified trained MMO and FLO can be made available they will consider them for MMO, FLO and Maritime positions. If the Nunatsiavut Government can identify qualified Inuit MMOs and FLOs,a list of available candidates must be provided for consideration. Of note,

besides the industry and government certification, training and competency requirements, PGS has corporate training requirements to work on their vessels, these requirements will be communicated to Sikumiut.

NG-DLNR Summary Recommendation 3: a comprehensive study funded by the proponent and the C-NLOPB to determine the effects of seismic activity along the Labrador coast. This would include, but not be limited to, species of interest to the Inuit fishery, such as snow crab, shrimp and turbot. The design and implementation of this program with laboratory and field components would be through a stakeholder group, including the Nunatsiavut Government, and would include research based questions and follow-up monitoring. We request that this stakeholder group be formed by the end of 2011.

MKI Response
MKI cannot comment on funding initiatives of a government organisation.

Section 5.6.1 of the March EA - behavioural responses of marine fish may include avoidance behavior (i.e. displacement) and avoiding the zone of influence around the seismic vessel. Fish distributions have been shown to change for up to five days after shooting ended in one study (Engas et al. 1996). In areas that are being fished (or are about to be fished) this can cause decreases in catch per unit effort for the aboriginal fishery, which is a significant socio-economic impact. Therefore, these are extremely important mitigation measures to put in place. If these specific measures are not taken into account, other appropriate mitigation measures should be discussed and agreed upon by the proponent and the Nunatsiavut Government.

MKI Response
There are no mitigation measures proposed in this comment. To date there are effects expected but there have been no significant socio-economic impact (as defined in all environmental assessments conducted in Atlantic Canada) demonstrated by catches in commercial or traditional fisheries.

Section 6.2.9, citing a DFO report (2004c) - the proponent states “less definitive results were significant differences between test and control groups related to bruising of the hepatopancreas; bruising of ovaries; dilated oocytes with detached chorions; one test group had delayed embryo hatch and larvae were slightly smaller; and orientation as a function of being turned over” when referencing effects on the reproductive biology of female snow crab. From the Inuit perspective, these are significant effects and we do not agree with categorizing them as „less definitive", as they are statistically significant effects.

MKI Response
The Nunatsiavut Government should discuss their concern on the validity of DFO study findings.

Section 6.7.4.1 - of the addendum report states that “because of the length of equipment towed behind the survey vessel, their maneuverability is restricted and other vessels must give way”. The Nunatsiavut Government strongly disagrees with this statement (the Inuit fishery has priority in all cases), but it is indicative of the proponent"s perspective on appropriate mitigation measures for Inuit.

MKI Response
This statement is not based on perceived ethnic culture prejudice. There are approximately 37 rules dealing with ships interacting with each other in the IMO sanctioned, Flag states enforced Regulation for Preventing Collisions at Sea. Then there are additional rules and annexes dealing with lights, shapes and sounds with various modification from country to country. The rules specify the actions and responsibilities of vessels in sight of one another , in open water, in channels or waterways and when in restricted visibility with respect to right of way, taking action, standing on. The rules were devised over many years by lawyers based on collisions and the resulting insurance and loss costs. They were slowly ratified into standards and are now the legal rules for ship to ship interactions. However, they also clearly state (a) Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which

may be required by the ordinary practice of seamen, or by the special circumstances of the case. (b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger In the case of fishing vessel in the same waters as the seismic vessel, it would be what side the fishing vessel is approaching the seismic vessel, but also more from the point of view of who was restricted in their ability to manoeuvre. The seismic vessel towing its streamers and gear is restricted in manoeuvrability and would be showing specific lights and shapes that are internationally understood to mean so. It is nominally the stand on vessel, in that it can maintain course in speed while another approaching must give way and pass free and clear. Most seismic vessel engage a guard boat that is intended to show the location of the streamer end but also "intercept" approaching targets that are not complying and barring a collision ward them off or cause them to change course.

As stated in the Addendum clear communication is required during the entire program between vessels at sea and between PGS and Torngat Fisheries Co-op and FFAW. Communications have worked successfully for many seismic programs and is an expected protocol while conducting these programs.

Fish, Food and Allied Workers

Section 2.2.5 Alternatives to Program Timing Page 9 - There are still noted references to a five year time frame for the project (Repeated on pages 34 and 213).

MKI Response
Correct five year time frame to three year time frame

Section 5.9.1 Hawke Channel and Hamilton Bank, paragraph three, Page 113 - Fisheries regulations to reduce by-catch while trawling for shrimp are in effect in all Shrimp Fishing Areas (SFAs) in Newfoundland and Labrador region. Otter trawling (shrimp fishing) and the use of nets are activities prohibited in the closed area of the Hawke Channel. Pot (crab) fishing is however is allowed in this closed area.

MKI Response
Comment provides clarity

Section 5.11.5 Snow Crab Page 134 – The opening and closing dates of fisheries is variable from year to year. This year the crab fishery in 3K will close towards the end of July. The fisheries maps for crab harvesting in 3K in 2005 to 2009 also show substantial activity in the northern portion of 3K in the month of July. In terms of more accurately describing fishing activity, the reference to the crab fishing season should therefore read "… in 3K from April to the end of July"

MKI Response
Change "in 3K from April to end of June" to ".... end of July."

Section 5.12 Fishing Gear, paragraph 2, Page 146 – Each vessel prosecuting the turbot fishery may have between 150 and 400 gill nets set in the water depending on fishing area and season. Each net is 50 fathoms in length and nets are usually strung in sets of 50. Therefore a set of gill nets could extend three miles.

MKI Response
Comment provides clarity

Section 6.7.4.1 Vessel Presence, paragraph 2, Page 204 – The comment that vessels must give way to the seismic ship due to its limited maneuverability is noted. Fishing vessels engaged in fishing activities

however are also restricted in their ability to maneuver. Clear communication on the water is critical to ensure safety.

MKI Response
Agreed. Gear separation and avoidance planning is paramount. It will be a matter to address ongoing and at sea with the vessels and FLO.

Section 6.7.4.2 Noise Emission Page 206 – The CEF, 2002, reference discussing seismic work conducted on the wets coast is not found in section nine (References). Furthermore, the comment/reference is contrary to reports from, fishermen on the west coast regarding the impacts of seismic programs on catch rates from later programs conducted in the last ten years.

MKI Response
CEF Consultants Ltd. 2002. Environmental impact assessment of a 2-D seismic survey in Sydney Bight. Prepared for Hunt Oil Company of Canada Inc.
Specific information on which seismic programs in the last ten years is required to comment.

Appendix B – The notes from the FFAW/One Ocean meeting with the consultant hired to engage with stakeholders to outline the seismic project are not contained here. Only meeting notes from April 2011 appear in this section. These notes were included in the original EA submission.

MKI Response
The information on the FFAW/One Ocean meetings remain an important component and are on record. The EA Addendum does not replace the EA report.

Fisheries and Oceans Canada

Section 1.3.1 – Species at Risk, page 5, bullet 1 - It should be clarified that if a species is listed under Schedule 1 of SARA as extirpated, endangered, or threatened then a Recovery Strategy is required. For a species listed as Special Concern a Management Plan is required. Also it is important to note that critical habitat can also be identified in an Action Plan. The definition of critical habitat at the end of the bullet is missing the part "...and that is identified as the species critical habitat in the recovery strategy or action plan for the species", as per the SARA definition.

MKI Response
Change last bullet summary of recovery strategy to include the following full explanation that if a species is listed under Schedule 1 of SARA as extirpated, endangered, or threatened then a Recovery Strategy is required. For a species listed as Special Concern a Management Plan is required. Also it is important to note that critical habitat can also be identified in an Action Plan.
Modify last bullet " Critical habitat is the habitat that is necessary for the survival or recovery of a listed species and that is identified as the species critical habitat in the recovery strategy or action plan for the species."

Section 2.3.2 – 2D Seismic Survey Towed Array - Table 2.1 and text contradict par 3 on page 13. "The individual source unit volumes can range from 70 cu. in. to 290 cu. in. The larger source units are positioned at the front of the array with progressively smaller volumes to the back of the array." This statement is opposite to what the diagram shows with the largest volumes at the back, and 45 to 250 in^3.

MKI Response
The individual source unit volumes can range from 70 cu. in. to 290 cu. in. is a typical range in gun size. The 45 to 250 cu in.volumes fits within that range. The position of the guns can vary throughout the program and between programs. This detail in not pertinent to the outcome of the environmental assessment.

Section 5.2.1 Comparison of Noise Levels, page 53, Figure 5.9 - What is the source of the data presented?

MKI Response
Mitson, R.B. 1993.Underwater noise radiated by research vessels. ICES Mar.Sci. Symp. 196: 147-152.

Section 3.2 – Community Engagement and Information Gathering - While most of the appropriate Labrador Aboriginal organizations were consulted in this process, the Torngat Joint Fisheries Board was not consulted. As they have an advisory role for the NG and DFO, they should also be included. Contact is Jamie Snook, at www.torngatsecretariat.com "The Torngat Joint Fisheries Board is the primary body making recommendations to the Minister on the conservation of species or stocks of Fish, species of Aquatic Plants and Fish Habitat in the Labrador Inuit Settlement Area." Additionally, The Labrador Metis Nation should be referred to as their new name -the NunatuKavut Community Council Inc.

MKI Response

The Torngat Fisheries Secretariat was consulted. Our initial letter and information package was sent to Jamie Snook on February 10 2011. Sikumiut followed up with a phone call however Jamie was on vacation at that time and he later responded saying that they would like to follow up on the file. On April 4 2011 Sikumiut advised Jamie of consultations meetings in Happy Valley – Goose Bay. Aaron Dale of the Secretariat called saying he was delegated to attend the meeting but got the date mixed up and unfortunately missed the meeting. On April 26, 2011, Sikumiut spoke with Aaron about the proposed project by phone and then e-mailed to him the information package that was sent to Jamie on Feb 10. Sikumiut received no communication from them since that date. Also Sikumiut met with Keith Watts of the Torngat Fisheries Co-op who is on the Torngat Secretariat Board.

Section 5.3.1 – Plankton - There are a number of additional relevant papers (journal publications and research documents) not cited for example, NAFO website (http://www.nafo.int/publications/frames/science.html) and the annual status reports on the physical/chemical/biological oceanography of the Labrador Sea that can be found in the Bulletin of the Atlantic Zone Monitoring Program (http://www.meds-sdmm.dfo-mpo.gc.ca/isdmgdsi/ azmp-pmza/publications-eng.html#bul).

MKI Response
This section of the EA was not meant to provide a review of all recent research on plankton but to provide an overview that plankton occur as a feature of the biological community. Templeman 2010, also of Fisheries and Oceans Canada, Frajka-Williams and Rhines 2010 is referenced in the addendum as a recent review of the ecosystem status on the Labrador Shelf and updating the SEA report. There appears to be many such review documents by many authors, all very relevant.

Section 5.3.1.1 – Phytoplankton - A description of ice-algae on the Labrador Shelf should be included in this section.

MKI Response
The epontic community occurs in ice, this program will occur in ice-free season. Sea-ice algae are described in detail in the SEA Labrador Shelf (Sikumiut 2008). It is feasible that the epontic algal communities may act as inoculums for the spring phytoplankton bloom (Anderson 1977).

page 55, par 5 - This section states “Phytoplankton are an autotrophic subset of plankton which derive their energy from sunlight.”

MKI Response
Change sentence to Phytoplankton are autotrophs, which means they derive their energy from sunlight.”

page 55, par 5 - This section states “Phytoplankton production is limited by a number of physical, biological, and climatic factors, including water temperature, nutrient availability, irradiance (sunlight intensity), and the community of grazers...”

MKI Response
Change text Phytoplankton production is limited by a number of physical, biological, and climatic factors, including nutrient availability, irradiance (sunlight intensity), and grazing.”

page 56, par 2 - This section states “Spring phytoplankton blooms begin when nutrients are mixed among layers and irradiance increases (Frajka-Williams and Rhines 2010). The timing of this bloom is especially important in the Labrador Sea because food chains in this region are short, such that higher predators depend almost exclusively on primary production (Frajka- Williams and Rhines2010). Unlike in other areas where the timing of the spring phytoplankton bloom follows a latitudinal gradient, the north Labrador Sea (north of 60° N and east of the Labrador Shelf) has its bloom before the central Labrador Sea. These differences are due to the limiting factors in each region: in the north phytoplankton production is nutrient limited while in the central it is light limited. The Study Area is within the central Labrador Sea, where the phytoplankton bloom is likely to occur in June (Frajka-Williams and Rhines 2010). The schedule of the proposed work may therefore coincide with the phytoplankton bloom in the Study Area.”

MKI Response
Change text as follows, “Spring phytoplankton blooms rely on nutrients that have been mixed into the surface waters via winter storm activity and occur when the water column stabilises and irradiance levels increase (Frajka-Williams and Rhines 2010). The timing of this bloom is especially important in the Labrador Sea because food chains in this region are short, with higher predators depending almost exclusively on seasonal primary production (Frajka-Williams and Rhines 2010). In other areas of the open ocean the timing of the spring phytoplankton bloom follows a latitudinal gradient, but here the bloom in the northeast Labrador Sea (north of 60° N and east of the Labrador Shelf) occurs earlier than in more southerly regions. This difference is thought to be because the winter mixed layer depth is shallower in the northeast, because of the presence of water of relatively low density water in the 0-100 m depth range, which results from freshwater run-off from the Greenland Shelf. This allows for the earlier development of stratification (water column stability), which is needed to maintain the phytoplankton within the near-surface layer. Farther south, in the central basin, winter mixed layer depths are generally deeper and stratification is more dependent on the production of low density water in the surface layers by solar warming. The Study Area includes part of the central Labrador Sea, where spring phytoplankton blooms can start as early as April or as late as July and shelf regions, where phytoplankton blooms start as the ice-edge retreats, which occurs sometime between May and July (depending on latitude). The schedule of the proposed work may therefore coincide with the phytoplankton bloom in the Study Area.”

page 56, par 2 - This section states “Spring phytoplankton blooms begin when nutrients are mixed among layers and irradiance increases (Frajka-Williams and Rhines 2010). The timing of this bloom is especially important in the Labrador Sea because food chains in this region are short, such that higher predators depend almost exclusively on primary production (Frajka-Williams and Rhines2010). Unlike in other areas where the timing of the spring phytoplankton bloom follows a latitudinal gradient, the north Labrador Sea (north of 60° N and east of the Labrador Shelf) has its bloom before the central Labrador Sea. These differences are due to the limiting factors in each region: in the north phytoplankton production is nutrient limited while in the central it is light limited. The Study Area is within the central Labrador Sea, where the phytoplankton bloom is likely to occur in June (Frajka-Williams and Rhines 2010). The schedule of the proposed work may therefore coincide with the phytoplankton bloom in the Study Area.”

MKI Response

Change text as follows, “Spring phytoplankton blooms rely on nutrients that have been mixed into the surface waters via winter storm activity and occur when the water column stabilises and irradiance levels increase (Frajka-Williams and Rhines 2010). The timing of this bloom is especially important in the Labrador Sea because food chains in this region are short, with higher predators depending almost exclusively on seasonal primary production (Frajka-Williams and Rhines 2010). In other areas of the open ocean the timing of the spring phytoplankton bloom follows a latitudinal gradient, but here the bloom in the northeast Labrador Sea (north of 60° N and east of the Labrador Shelf) occurs earlier than in more southerly regions. This difference is thought to be because the winter mixed layer depth is shallower in the northeast, because of the presence of water of relatively low density water in the 0-100 m depth range, which results from freshwater run-off from the Greenland Shelf. This allows for the earlier development of stratification (water column stability), which is needed to maintain the phytoplankton within the near-surface layer. Farther south, in the central basin, winter mixed layer depths are generally deeper and stratification is more dependent on the production of low density water in the surface layers by solar warming. The Study Area includes part of the central Labrador Sea, where spring phytoplankton blooms can start as early as April or as late as July and shelf regions, where phytoplankton blooms start as the ice-edge retreats, which occurs sometime between May and July (depending on latitude). The schedule of the proposed work may therefore coincide with the phytoplankton bloom in the Study Area.”

Section 5.3.1.2 – Zooplankton - Suggested changes and addition to the first paragraph, (1st sentence) in this section: “Zooplankton are heterotrophic organisms that are mostly invertebrates and that range in size between 10 m and 1 m (or more) in diameter. Microzooplankton (size range 10-100 m) includes organisms such as unicellular protists and copepod nauplii. The slightly larger mesozooplankton (size range 200-2000 m) community is dominated by copepods in the Labrador Sea, and this group also dominates the zooplankton community biomass overall (Head et al. 2003). Larger organisms belong to the macrozooplankton (>2000 m), a group that
in the Labrador Sea includes large amphipods (up to 3 cm in length) and jellyfish (up to 30 cm in diameter).”
The following text is a suggested addition after the 2nd sentence in the 1st paragraph (Also included amongst zooplankton…). Additional text: Diversity of zooplankton within the region is quite low, with communities usually dominated by less than 30 species (Huntley *et al*. 1983). Zooplankton community composition varies geographically and from month to month, but for given regions and months community composition is quite consistent from year to year (Head *et al*. 2003).
The following is a suggested re-write of the 2nd paragraph in this section: “The eggs and larval stages of copepods are important food sources for larval fish, including cod, and partly for this reason there have been numerous studies of copepod reproduction. For many zooplankton species reproduction at high latitudes either coincides with or closely follows phytoplankton blooms (Huntley *et al*. 1983). This is the general pattern followed by the dominant species of the central Labrador Sea, the copepod *Calanus finmarchicus*. Individuals produced over one growth season (spring-summer) spend the winter at depth as pre-adults, returning to the surface layers in advance of the spring bloom to mature and mate. Reproduction (egg production) is fuelled by the females ingesting phytoplankton, but egg-laying can start before phytoplankton concentrations reach bloom proportions. In the Central Labrador Sea individual female egg production rates are generally high from May to July, but since the abundance of females declines over the same period, community egg production rates are higher earlier (Head, unpubl. data). Two arctic copepod species, *Calanus glacialis* and *Calanus hyperboreus*, which are important members of the mesozooplankton community in the arctic waters of the Labrador and Newfoundland shelves (Head et al. 2003), reproduce in advance of the pelagic phytoplankton bloom. Female *C. hyperboreus* spend the winter at depth, having accumulated large amounts of stored energy during the previous year‟s growth season, which enables them to reproduce in late winter (Jan- Feb) without feeding (Conover 1988). Female *C. glacialis* also accumulate energy stores and spend the winter at depth, but like *C. finmarchicus*, they need to feed to produce eggs. Unlike *C. finmarchicus*, however, they can feed on the algae that grow

on the underside of the ice during early spring (Feb-Mar, Torangeau and Runge 1991). The reproductive strategies of the arctic species appear to be adaptations to a short growth season, allowing them to maximize the period over with their offspring will experience phytoplankton bloom conditions."
The following references should be added to the review:
Conover, R.J. (1988): Comparative life histories in the genera *Calanus* and *Neocalanus* in high latitudes of the northern hemisphere. Hydrobiologia, 1671168, 127-142.
Hirche, H.J., Brey, T., Niehoff, B. (2001) A high-frequency time series at Ocean Weather Ship Station M (Norwegian Sea): population dynamics of *Calanus finmarchicus* Mar. Ecol. Prog. Ser. 219: 205–219
Torangeau, S., Runge, J.A. (1991) Reproduction of *Calanus glacialis* under ice in spring Mar. Biol. 108: 227-233

MKI Response
Make changes and addition to the first paragraph, (1st sentence) in this section: "Zooplankton are heterotrophic organisms that are mostly invertebrates and that range in size between 10 m and 1 m (or more) in diameter. Microzooplankton (size range 10-100 m) includes organisms such as unicellular protists and copepod nauplii. The slightly larger mesozooplankton (size range 200-2000 m) community is dominated by copepods in the Labrador Sea, and this group also dominates the zooplankton community biomass overall (Head et al. 2003). Larger organisms belong to the macrozooplankton (>2000 m), a group that in the Labrador Sea includes large amphipods (up to 3 cm in length) and jellyfish (up to 30 cm in diameter)."

Re-write the 2nd paragraph in this section: "The eggs and larval stages of copepods are important food sources for larval fish, including cod, and partly for this reason there have been numerous studies of copepod reproduction. For many zooplankton species reproduction at high latitudes either coincides with or closely follows phytoplankton blooms (Huntley *et al*. 1983). This is the general pattern followed by the dominant species of the central Labrador Sea, the copepod *Calanus finmarchicus*. Individuals produced over one growth season (spring-summer) spend the winter at depth as pre-adults, returning to the surface layers in advance of the spring bloom to mature and mate. Reproduction (egg production) is fuelled by the females ingesting phytoplankton, but egg-laying can start before phytoplankton concentrations reach bloom proportions. In the Central Labrador Sea individual female egg production rates are generally high from May to July, but since the abundance of females declines over the same period, community egg production rates are higher earlier (Head, unpubl. data). Two arctic copepod species, *Calanus glacialis* and *Calanus hyperboreus*, which are important members of the mesozooplankton community in the arctic waters of the Labrador and Newfoundland shelves (Head et al. 2003), reproduce in advance of the pelagic phytoplankton bloom. Female *C. hyperboreus* spend the winter at depth, having accumulated large amounts of stored energy during the previous year"s growth season, which enables them to reproduce in late winter (Jan-Feb) without feeding (Conover 1988). Female *C. glacialis* also accumulate energy stores and spend the winter at depth, but like *C. finmarchicus*, they need to feed to produce eggs. Unlike *C. finmarchicus*, however, they can feed on the algae that grow on the underside of the ice during early spring (Feb-Mar, Torangeau and Runge 1991). The reproductive strategies of the arctic species appear to be adaptations to a short growth season, allowing them to maximize the period over with their offspring will experience phytoplankton bloom conditions."

The following references should be added to the Reference Section 9:
Conover, R.J. (1988): Comparative life histories in the genera *Calanus* and *Neocalanus* in high latitudes of the northern hemisphere. Hydrobiologia, 1671168, 127-142.

Hirche, H.J., Brey, T., Niehoff, B. (2001) A high-frequency time series at Ocean Weather Ship Station M (Norwegian Sea): population dynamics of *Calanus finmarchicus* Mar. Ecol. Prog. Ser. 219: 205–219

Torangeau, S., Runge, J.A. (1991) Reproduction of *Calanus glacialis* under ice in spring Mar. Biol. 108: 227-233

Section 5.3.3 – Coral and Sponges and Section 5.8 Coral Protection Zones - The report should

incorporate more recent results from Kenchington et al. 2010 and Wareham et al. 2010 into section 5.8 Coral Protection Zones (see Appendix 1) for known distributions of deep-sea corals. The document needs to highlight Hatton Basin and Saglek Bank as two areas known for large concentrations of slow-growing long-lived gorgonian corals (e.g. *Primnoa resedaeformis* and *Paragorgia arborea*). Please see the references for MacIsaac et al., 2001; Gass and Wilison, 2005; Wareham and Edinger, 2007; Kenchington et al., 2010; Wareham et al., 2010.

MKI Response
Add to this section that Hatton Basin and Saglek Bank as two areas known for large concentrations of slow-growing long-lived gorgonian corals (e.g. *Primnoa resedaeformis* and *Paragorgia arborea*). (MacIsaac et al., 2001; Gass and Wilison, 2005; Wareham and Edinger, 2007; Kenchington et al., 2010; Wareham et al., 2010).

Section 5.3.4 – Marine Fish - This section should have describe the species present in the area (which could have been done through analyses of DFO research vessel survey data) rather than listing the main species found in the entire Newfoundland and Labrador area. A section on Atlantic Cod should have been included.

MKI Response
Comment noted, however this is an opinion on approach and the information provided does not change the assessment of seismic affects on fish from this program or any of the many seismic surveys before this one.

Add Atlantic Cod to Section 5.3.4 Text originates from DFO 2010 Stock Assessment Of Northern (2j3kl) Cod In 2010 Canadian Science Advisory Secretariat Science Advisory Report 2010/019

Cod off Labrador and eastern Newfoundland grow slowly compared with individuals in the eastern Atlantic and further south in the western Atlantic. Since the late 1980s females have been maturing at about age 5, which is younger than in previous years.

Historically much of the stock was highly migratory. They over-wintered near the edge of the continental shelf and migrated in spring/summer to shallow waters along the coast and onto the plateau of Grand Bank.

Small cod tend to feed on small crustaceans; medium-sized cod feed on larger crustaceans and small fish; and large cod feed on medium-sized fish and crabs. Capelin in particular has historically been an important part of the annual diet. Very small cod are eaten by squid, many species of groundfish, including larger cod, and some species of birds. Larger juveniles are eaten by larger groundfish, seals and other marine mammals. Large cod probably have few natural predators, but seals can prey upon them by belly-feeding.

Page 60, par 4 - Correction to the text “subdivision 2GH, subdivision 2J” as 2G, 2H and 2J are not subdivisions they are Northwest Atlantic Fisheries Organization (NAFO) divisions.

MKI Response
Change text to division 2GH and division 2J

Page 61, par 4 - The statement “…Redfish species *S. mentella* has been placed on the Prioritized Candidate List by COSEWIC in October 2006 (COSEWIC 2006f)…” requires updating. COSEWIC have assessed Atlantic Redfish as threatened in 2010.

MKI Response
Add to paragraph that COSEWIC assessed Atlantic Redfish as threatened in 2010.

Page 61, par 5 - American plaice have been found deeper than the 731 m stated in the report. They have been caught to depths of 1300 m (Morgan and Bowering 2006).

MKI Response
American plaice have been found in water depths down to 1383 m (Morgan and Bowering 2006) and possibly deeper with future surveys.

Morgan, M.J., and Bowering, W.R. 2006. Is there mixing of American plaice populations in the Flemish Pass? J. Northw. Atl. Fish. Sci. **37**: 73-80.

page 62, par 4 - "American plaice has been placed on the Prioritized Candidate List by COSEWIC in October 2006 (COSEWIC 2006g)". This is not the latest information. In 2009, Newfoundland and Labrador American Plaice was assessed as "threatened" by COSEWIC

MKI Response
American Plaice in Newfoundland and Labrador water were assessed as threatened by COSEWIC

page 62, par 6 - Morgan et al 2001 should be replaced by the primary publication Morgan et al 2003, especially since Morgan et al 2001 is not to be cited without prior reference to the authors and the author was not contacted.

MKI Response
Comment is not clear but there seems to be an issue of contacting this particular author about referencing. Remove the following paragraph "Large sized immature fish are common, fish in spawning condition over most months and fish skipping spawning seasons (Morgan *et al.* 2001). A study conducted by Morgan *et al.* (2001) found that variability in maturity estimates appears to be a feature common to all of the areas. Estimates of age and size at 50 % maturity were fairly similar across populations with the exception of Division 2J3K which were higher (Morgan *et al.* 2001)." Refer to Section 4.8.5 on page 243 of the Labrador Shelf Offshore Area SEA for further informant on Amercian plaice.

Page 69, par 5 - This section states that "Although this Arctic-boreal species has evolved to live at the edge of Arctic waters exploiting the feeding opportunities, capelin require higher temperatures for successful reproduction (Rose 2005)."
It would be useful to have the temperature for this area for comparative purposes.

MKI Response
Such further research by a geophysical company has no bearing on the effects assessment of a seismic survey. The seismic survey will not change temperature in the ocean.

page 69, par 6 - This section states that (capelin) "They are members of the smelt family (Osmeridae), olive in colour with an elongated body and exhibit pronounced sexual dimorphism during spawning".

„Olive" should be replaced with „silvery". Scott and Scott (1988) or Templeman (1948) are the best references for general biology and include considerable information on spawning as well. Author is advised to refer to these references and correct this section. Also general capelin information given in

„Background biology section" of Capelin Stock Assessment Report (DFO 2008, 2011). This section states that (capelin) "Capelin is found along the coasts of Newfoundland and Labrador and on the Grand Bank. Migration towards the coast precedes spawning on beaches or in deeper waters (DFO2006g). Capelin roll on sandy or fine gravel beaches in water temperatures ranging between 6°C to 10°C. Beach spawning is more prevalent at night. During spawning, the thermal range of capelin typically shifts upwards (Rose 2005)."

MKI Response
The description of capelin colour is from a vetted DFO report, Canadian Science Advisory Secretariat

Science Advisory Report 2006/022. Capelin appear to have several descriptions depend on the authors.

Add..."on the Grand Bank in water depths up to 400 m". and...". Capelin spawn predominately on fine gravel beaches, but also off beach in water depths up to 20 m." Further bioilogical information on capelin can be found in Section 4.4.2.14 on the Labrador Shelf Offshore Area SEA.

page 69, par 7 - The reference DFO 2006g has not been included in the reference list.

MKI Response
Add to Section 9 References DFO (Fisheries and Oceans Canada). 2006g. Assessment of the Estuary and Gulf of St. Lawrence (Divisions 4RST) capelin stock in 2005. *Canadian Science Advisory Secretariat Science Advisory Report*, 2006/022.

page 70, par 1 - This section states that "Beach spawning occurs at 2°C to 10°C, but deepwater spawning is restricted to about 2°C to 7°C, most likely occurs from 2°C to 5°C (Rose 2005)."
"Beach spawning occurs at 2°C" should be 4°C. Check temperatures in Nakashima and Wheeler, 2002.

MKI Response
The information is derived from a vetted source in the ICES Journal of Marine Science and the seismic survey occurs in water depth well removed from the beach and does not affect water temperature.

page 70, par 1 - This section state that "Capelins are able to spawn at the age of two and males usually die following spawning. Spawning is typically in late June and early July, although it was somewhat later in the 1990s (Carscadden *et al.* 1997, 2001)."

MKI Response
Change the text as follows "Spawning is typically in late June and early July, although it has been typically 2-6 weeks later since the early 1990s (Carscadden *et al.* 1997, 2001)."

page 70, par 2 - This section states that "Eggs are red in colour, 1-mm diameter, and are attached to the substrate."

MKI Response
Change text as follows "Eggs are translucent ...." however this is not as described in DFO 2006g.

page 70, par 2 - This section states that "Incubation varies with ambient temperature and lasts approximately 15 days at 10°C."What is the reference for this?
MKI Response
Assessment of the Estuary and Gulf of St. Lawrence (Divisions 4RST) capelin stock in 2005. *Canadian Science Advisory Secretariat Science Advisory Report*, 2006/022.

page 70, par 2 - This section states that "Larval capelin is plankton and remains near the surface until the onset of winter."

MKI Response
Change plankton to planktonic

page 70, par 3 - This section states that "Capelin feeding is seasonal with intense feeding late winter and early spring leading up to the spawning cycle when feed ceases."

MKI Response
Change text as follows "Capelin feeding is seasonal with intense feeding in early to late fall and in early

spring leading up to the spawning cycle when feed ceases."

page 70, par 4 - This section states "Capelin predators comprise most major fish species including Atlantic cod, haddock, herring, flatfish species, dogfish and others."

MKI Response
Add turbot to the list.

page 70, par 5 - This section states "The primary cause of capelin mortality is associated with predation and as such, variations in capelin abundances are directly linked to natural causes (DFO 2006g)." Cohort strength has also been shown to be set upon emergence (Carscadden et al 2000).

MKI Response
Comment noted

page 72, par 4 - This section states - "It takes 5-10 years for male snow crab to reach legal size (95-mm carapace width). The full natural life cycle for snow crabs is approximately 15 years (FRCC 2005)". This would be more accurately described as, "It takes about 8-10 years for males to reach legal size (Sainte-Marie et al., 1995….CJFAS 52:903-924) and they can live 7 to 8 years thereafter (Fonseca et al., 2008…..Tran Am. Fish Soc. 137:1029-1043)."

MKI Response
Comment noted. In general, there appears to be disagreement among research scientists on biology of marine organisms.

Section 5.3.6.1 – Cetaceans - As a general comment DFO does have minimum population estimates for many cetacean and pinniped species in Atlantic Canada. These are based on systematic surveys such as detailed in Lawson and Gosselin (2009), and Stenson and Hammill (2006 and 2011). These figures should be quoted in place of statements such as "There are no complete population estimates for the western Northwest Atlantic Region", or the NOAA SAR estimates or Sikumiut reports, unless the latter include species for which the DFO surveys did not have enough sighting events to generate an acceptable estimate.

MKI Response
Comment noted

page 82 - Humpback and sei whales have been sighted in waters all the way to Greenland; beluga satellite tag records show them entering and following canyon structures out to the slope edge on the northern Labrador Shelf (Hammill, pers. comm.); sperm whale males are sighted very commonly near fishing vessels now on the northern Labrador Shelf as they feed near, and move between, fishing boats.

page 84 - A number of very large aggregations of humpback whales have been seen to the southwest of Greenland during recent aerial surveys there, so it is possible these whales may migrate through the proposed project area, or aggregate there to feed.

MKI Response
Pers. comm. observations are noted. All species note above are included in the list of cetaceans to be present in the Study Area.

Section 5.3.6.1 – Cetaceans, page 87 Beluga Whales - Please note, the Ungava population of Beluga Whale was assessed as endangered by COSEWIC, but is not listed as such under SARA.

Section 5.3.6.1 – Cetaceans, page 89 Killer Whale - The Killer Whale population referred to is the Northwest Atlantic/Eastern Arctic population and it has been assessed by COSEWIC as special concern. Killer whale abundance and distribution is reported in Lawson *et al*. 2007

MKI Response
Comments noted and added as clarifying text. The Addendum Report does not report that the Ungava population is listed by SARA in Section 5.3.6.1 or in Section 5.4.1.

Section 5.3.6.2 – Pinnipeds - Overall, the data presented on seals is largely out of date Table 5.6 reflects previous reports that have focus on more southern areas rather than the area of this study. The information on harp seals and hooded seals inaccurate due to the significant new data available since 2005 that was not mentioned.

MKI Response
Include the following text in Section 5.3.6.2

Harbour seals are not numerous but they commonly occur all along the Labrador coast. They are not thought to go far offshore so would not be a concern in this study area.

Bearded seals are also common throughout the area. They are not in high numbers compared to species such as harps but are sufficiently abundant to be an important species, particularly as they are an important part of the subsistence harvest. They are primarily observed along the coast because that is where people see them but they are regularly observed in the pack ice within this study area. They are also known to use offshore pack ice in other areas and so should be considered to be an important component of this study area. However, the survey will no t be undertaken in pack ice areas due to potential for cable damage by ice.

Ringed seals are also very common along the coastal area. However, satellite tracking studies have shown that many ringed seals, including adults, feed on the shelf area that is included in this study. Therefore they also have to be considered a significant species of this ecosystem.

Grey seals are not rare along the Labrador shelf. They are known to inhabit the area up to at least Nain and likely further. Again, the extent of their movements in offshore areas are not well known, but is likely, given how they utilize the Scotian Shelf and other pelagic areas. Grey seals are present in most months of the year, particularly from April through November.

Hoods are very common in the area and will be present in the study area during the summer and fall periods when operations will be occurring. Large numbers of harp seals and hooded seals are present in the study area throughout the year. They are not restricted to the winter and spring periods as suggested. Satellite tracking studies have shown that both species utilized this entire study area throughout the year and in fact, the northern areas are critical feeding areas for both species. Harp seals tend to remain on the shelf while hooded seals utilize the shelf edge and deep water of the Labrador Sea. Harps utilize this area year round for feeding and pupping while hoods are found here in most months with the possible exception of July when they are in SE Greenland for the moult. As such, these species are likely to be present during the entire seismic period.

Section 5.4.1 – Species Listed Under the Species at Risk Act and COSEWIC - Revise section title. Species are "listed" under the *Species at Risk Act* and "assessed" by COSEWIC. Where S. 32 of the *Species at Risk Act* is referenced, text should be revised to be more accurate. Under the *Species at Risk Act* it is prohibited to "kill, harm, harass, capture or take an individual...etc". Also note that S. 32 of the *Species at Risk Act* is not the prohibition against destruction of critical habitat, rather it's S 58.

MKI Response
The title simply using the term listed as a verb and not a noun as in a SARA Listed Species. COSEWIC uses the word list.

32. (1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.
58. (1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species—or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada—if (*a*) the critical habitat is on federal land, in the exclusive economic zone of Canada oron the continental shelf of Canada; (*b*) the listed species is an aquatic species;
Or (*c*) the listed species is a species of migratory birds protected by the *Migratory Birds Convention Act, 1994*.

Section 5.4.1 Table 5.7 *SARA* Schedule 1-listed Species within the Study Area, page 94 - Under Marine Mammals, Sowerby's Beaked Whale should be included as it was recently added to Schedule 1 of SARA as special concern. This should also be updated where mentioned throughout the document.

MKI Response
As of July 12 2011, after the submission of the Addendum, Sowerby's Beaked Whale is not "listed" under SARA in the SARA website. It is designated of Special Concern under COSEWIC only.

Section 5.4.1.1 Marine Mammals and Reptiles. page 96 Leatherback Sea Turtle - The 3rd paragraph says that the species is "considered nationally endangered" and then gives a reference to the COSEWIC assessment which was done prior to the species being listed on Schedule 1 of the *Species at Risk Act*. It's more accurate to say that Leatherback Sea Turtle is listed as endangered under the *Species at Risk Act*.

MKI Response
Table 5.7 lists the leatherback turtle as endangered under both SARA and COSEWIC. Add to Section 5.4.1.1 text that leatherback turtle is also listed as endangered under the SARA.

Section 5.4.1.2 - Fish, page 96 Wolffish - Wording should be revised - change "...have been designated by SARA" to "have been listed under SARA". Also, there are 3 species listed on Schedule 1 of SARA, Northern, Spotted and Atlantic Wolffish. Atlantic Wolffish is listed as special concern.

MKI Response
Change text to add that Atlantic wolfish are listed in Schedule 1 of SARA as a Special Concern in 2002.

Section 5.5 Sensitive Areas, page 105 - The northern edge of the study area has been identified as an ecologically and biologically significant area by DFO in 2011. This is primarily due to the high productivity of this area and its importance for sponges, corals, polar bears, seals, whales and various fish species such as Greenland halibut. When the report is published it will be made available at http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

MKI Response
Comment noted and applicable to future surveys in the region when the data are published

Section 5.7 – Marine Protected Areas (MPAs), page 111 - This section should make it clear that the MPA **protects** a genetically and geographically distinct population of Atlantic cod.

MKI Response
The text reads "Notably, the Bay also supports a resident population of Atlantic Cod, which is genetically distinct from other Labrador cod (DFO 2011c)." The fact that this is a marine protected area implies that the cod as well as the other organism are protected

Section 5.8 – Coral Protection Zones, page 112 par. 3 - The section states that "Nevertheless, the deep-sea coral program is new and there are data constraints associated with the mapping of deep-sea

coral distributions and diversity".
The data constraints need to be more clearly defined. We know that information largely exists for locations where commercial fishing and DFO surveys occur, however, the question of accuracy of reporting of coral-sponge bycatch in test/trial fisheries, not directly managed by DFO, can be considered as a data constraint.
par. 3 - This section states that "The impacts of fishing industries on deep-sea coral communities in Canadian waters are also poorly understood."
To qualify this statement it should be added that studies conducted in other areas have shown that benthic fishing activities can have a negative impact on deep-sea coral communities (see Probert, 1997; Watling & Norse, 1998; Fosså et al., 2001; Hall-Spenser et al., 2002; Grehan et al., 2005; Mortensen et al., 2005; Reed et al., 2005; Wheeler et al., 2005; Stone, 2006). Alternatively, it could be stated that based on known life histories of deep-sea corals, fishing industries will most likely have a negative impact…. (Andrews et al., 2002; Risk et al., 2002; Roark et al. 2005; Sherwood et al., 2006). The reference for the publications that are cited should be provided.
par. 4 - This section states that *"Currently, there are no conservation measures in place to protect deep sea corals within the Newfoundland and Labrador region (Gilkinson et al. 2006). Operators should be aware however, that there is a possibility that conservation measures to protect deep sea corals could be adopted in the future for the Newfoundland and Labrador region."*
This statement is not correct.

MKI Response
Add text of the following to Section 5.8 "that studies conducted in other areas have shown that benthic fishing activities can have a negative impact on deep-sea coral communities (see Probert, 1997; Watling & Norse, 1998; Fosså et al., 2001; Hall-Spenser et al., 2002; Grehan et al., 2005; Mortensen et al., 2005; Reed et al., 2005; Wheeler et al., 2005; Stone, 2006)."

Replace paragraph 4 with the following text "There are two interim closures in the Newfoundland and Labrador region. The first, Voluntary Coral Protection Zone in NAFO division 2G-0B off Cape Chidley, Labrador (MPA News, 2007). The second, CAD-NAFO Coral Protection Zone, is a mandatory closure on the slope of the Grand Bank in NAFO division 3O between 800 - 2000 m (NAFO, 2007)." Only the southern portion of the Voluntary Coral Protection Zone occurs in the Study Area.

Section 5.8.1 – Coral Conservation Priority Areas - The EIA mentions a voluntary closure in NAFO 30 near Cape Chidley. This may actually be referring to the fishing industry coral protection zone voluntary closure in 0B and 2G (Page 70 (figure 10) and page 29 in Campbell and Simms 2009).

Species misspelled: „antipatharian" and „Paramuricea" species

MKI Response
Add the following text, the northern boundary of study area under review does extend into the southern portion of Hatton Basin as well as includes all of Saglek Bank – two important areas for large gorgonian coral concentrations (Kenchington et al., 2010; Wareham et al., 2010)

Correction to the genus *Paramuricia* and *Paramuricia antipathorian*

Kenchington, E., Lirette, C., Cogswell, A., Archambault, D., Benoit, H., Bernier, D., Brodie, B., Fuller, S., Gilkinson, K., Levesque, M., Power, D., Siferd, T., Treble, M., and Wareham, V. (2010). Delineating Coral and Sponge Concentrations in the Biogeographic Regions of the East Coast of Canada Using Spatial Analyses. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/41, vi + 211 pp.

Wareham, V.E., Ollerhead, N.E. and Gilkinson, K.D. (2010). Spatial Analysis of Coral and Sponge Densities with Associated Fishing Effort in Proximity to Hatton Basin (NAFO Divisions 2G-0B). DFO Can. Sci. Advis. Sec. Res. Doc. 2010/58, 46 pp.

Section 5.9.1 – Hawke Channel and Hamilton Bank, page 113, par 3 - The statement " The area is within a Fisheries Conservation Closed Area related to salmon fishing and conservation, ..." is inaccurate. This closure is for all species other than snow crab.

MKI Response
According to the reviewer the information is from CPAWS (Rao et al) is incorrect. There is no published information within DFO that specifically discusses a Fisheries Conservation Closed Area to verify the list of species other than what is reported in the Addendum Report. The statement is proceeded by the following text "Following requests by harvesters, an area measuring 20 by 20 nautical miles was closed to shrimp trawling in 2002 in the interest of reducing mortality of other species as by-catch, and disturbance to spawning and juvenile cod. Fishing gear restrictions such as regulated mesh sizes and Nordmore grates on shrimp trawls are also in place to reduce by-catch from this fishery."

Section 5.10 – Ocean Resource Users - The Northern Coalition should also be included in consultations.

MKI Reponse
The Northern Coalition can be consulted in future separately from the FFAW, as required, if they are not being represented accordingly.

Section 5.11 – Commercial Fisheries, page 116 – 146 - The statement *"Harvest values are nolonger provided by DFO Statistics Branch"* (page 116) is not accurate. Upon request DFO provides this information. This section of the report would be much more informative if the value of the catch in the study area were to be provided.
The weights in the tables and figures in this section appear to be in Kgs however are labelled as tones and tons. Please provide the weight in tonnes. The weights appear to be the total volume landed in the survey area. It would be more informative to report on the weight or volume of fish *caught* in the survey area since it is the harvesting activity that can potentially be disrupted.

MKI Response
Average Catch of Main Species in the Study Area (2005-2009)

Species	Catch in Study Area (tonnes)	% of Total IN NAFO Units (tonnes)	Value ($)
American Place	0.00	0.18%	$0.79
Atlantic Halibut	0.07	23.58%	$431.68
Capelin	0	0	$0.00
Cod	0.18	0	$240.24
Greysole-Witch Flounder	0.79	45.04%	$191.73
Icelandic Scallops	0.41	2.35%	$649.13
Illex Squid	0.0535	0	$0.00
P. Montagui Shrimp	1257.71	67.83%	$2,792,111.76
P. Borealis Shrimp	35147.10	62.25%	$50,260,358.01
Snow Crab	635.70	34.94%	$1,926,167.21
Redfish	34.73	49.94%	$18,406.11

Roughhead Grenadier	3.28	26.10%	$1,258.56
Skate	0.92	25.53%	$302.12
Turbot-Greenland Flounder	1005.92	22.04%	$2,303,551.65

Section 5.11.4.1 – Northern Shrimp, page 133 - There are errors in the information presented. The SFA 4 TAC is 11,320 t (not 4,700), the SFA 5 TAC is 23,300 t (not 11,320) and the quota referenced in the last line for SFA 6 is for 2011/12 (not 2010/11).

MKI Response
Correct text as follows As of June 16, 2011, the 2011 quota for SFA 4 is 11,320 t, for SFA5 is 23,300 t and 52,387 t for SFA6. The SFA 6 quota, which was 85,725 t in 2009/10 (DFO 2010/018) was reduced to 52,387 t for 2011/12.

Section 5.11.6 Greenland Halibut/Turbot, page 145, Figure 5.43 - The title should be Greenland Halibut, not Snow Crab

MKI Response
Correct the title to Harvest Locations, Greenland Halibut**,** 2005-2009, November

Section 5.13, page 147 - It is suggested the report mention snow crab surveys carried out in Div. 2H by the Torngat Joint Fisheries Secretariat during the past two years. As well, there is a trap survey for snow crab conducted collaboratively between DFO and FFAW that surveys Div. 2J in the Fall each year.

MKI Response
Industry surveys noted in this section of the Addendum were all that were revealed during consultations. Add text as follows snow crab surveys carried out in Div. 2H by the Torngat Joint Fisheries Secretariat during the past two years. As well, there is a trap survey for snow crab conducted collaboratively between DFO and FFAW that surveys Div. 2J in the Fall each year.

Section 6.2 - Marine Finfish and Shellfish
The proponent should be aware of other relevant literature on the effects of sound and potential risk on finfish and shellfish. Although keeping abreast of relevant literature has now become more difficult due to literature connected with other sources of sound, these sources are valuable for assessing risks related to seismic. Inclusion of this literature would likely have led to move precautionary conclusions about the potential effects of sound on fish and shellfish.

MKI Response
Comment noted

Section 6.2.9 - Physical and Anatomical Effects
It is concluded that harmful effects on fish would only occur within 10's of metres from the gun source. This may be true for obvious signs of mortality or gross pathology but not for sub-lethal effects which could be of potential importance. Studies on sub-lethal effects are few in number, especially in relation to chronic sound exposures. However reports on the effect of sound on fish eggs, lobster, shrimp and more recently on fish and squid, raise the possibility of sub-lethal effects occurring over widespread areas, potentially in the kilometre range.

MKI Response
Comment noted.

Section 6.2.11 - Cumulative Effects
Given that shrimp is a major fisheries in the area and seismic surveys might be carried out in adjacent areas for a number of years, some attention to addressing the question of whether chronic exposures of shrimp to low levels of sound, such as those experienced over a number of weeks in a seismic area, poses a risk to the species.

MKI Response
Comment noted.

Section 6.2.13 Summary, Table 6.5 – Mitigation, page 173 - This section indicates that *"Adherence to the Statement of Canadian Practice on the Mitigations of Seismic Noise in the Marine Environment to the extent reasonably practical"* and *Avoidance of known spawning areas at time when fish are known to be spawning, where appropriate"*. Please be advised that the "*Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment"*(SOCP) specifies the mitigation requirements that must be met during the planning and conduct of marine seismic surveys, in order to minimize impacts on life in the oceans. These requirements are set out as minimum standards, which will apply in all non-ice covered marine waters in Canada. As such it is advised that the proponent adhere to all relevant minimum mitigations outlined in the SOCP including the Planning Seismic Surveys, Safety Zone and Start-up, Shut-down of Air Source Array(s), Line Changes and Maintenance Shut-downs, Operations in Low Visibility and Additional Mitigative Measures and Modifications sections of the SOCP.
DFO suggests removing the text *"where appropriate"* from the statement.

Section 6.3.4.1 – Noise Emissions, page 178 - While the proponent has generally provided a good description of mitigative measures included in the *"Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment"* (SOCP), there are outstanding concerns specifically with respect to the phrase *"to the extent reasonable practical"* and the noticeably absent mitigative measures related to Operations in Low Visibilities., which include the use of cetacean detection technology such as a Passive Acoustic Monitoring System. Please be advised that the SOCP specifies the mitigation requirements that must be met during the planning and conduct of marine seismic surveys, in order to minimize impacts on life in the oceans. These requirements are set out as minimum standards, which will apply in all non-ice covered marine waters in Canada. As such it is advised that the proponent adhere to all relevant minimum mitigations outlined in the SOCP including the Planning Seismic Surveys, Safety Zone and Start-up, Shut-down of Air Source Array(s), Line Changes and Maintenance Shut-downs, Operations in Low Visibility and Additional Mitigative Measures and Modifications sections of the SOCP. DFO suggest that the proponent remove the phrase *"to the extent reasonable practical"* in the description of mitigation measures.

MKI Response
Comment noted. The Addendum does not state that the proponent intents to adhere to only some sections of the SOCP. The MMO will verify deviations from the SOCP with respect to operations..

Section 6.3.4.1 – Noise Emissions, page 182 - There exists evidence that at longer received ranges multiple seismic pulses become temporally "smeared" such that the "ambient noise" level intervals evident in the seismic pulses at short range become smaller; at distances of 100s of kilometres from the source a sound from a seismic operation can be received as an almost constant acoustic signal (albeit at very low intensity levels). Colleagues using the SOSUS hydrophone array in the Atlantic have noted this effect, and have been unable to identify and track blue whales as they normally could, for instance, on the Grand Banks during summer seismic operations (Dr. C. Clarke, pers. comm.). Whether blue whales, in this example, are able to modify their vocal patterns or attend to other acoustic features of their environment to overcome this new noise source remains unknown.

MKI Response
Comment noted

Section 6.3.4.3 – Monitoring and Follow-up, page 183 par 5 - Note that “shut-in” should be shut-down.

MKI Response
The terminology means the same in the industry. Change text from shut-in to shut-down.

Section 6.4.4.3 – Accidental Event, page 187 - Accidental events could include ship strikes as leatherback turtles are very difficult to detect when they are at the surface relative to baleen whales and odontocetes (as suggested on p. 196 as well). When they are handling prey at the surface, or breathing after an extended dive, leatherbacks often have their heads out of the water, or at shallow depths, both locations which have relatively low sound propagation values. It is possible that these surfaced turtles may not receive a very loud seismic pulse or ship noise and might therefore be less likely to respond to the approaching source vessel, and more prone to ship strike, than a more mobile marine mammal.

MKI Response
Agreed. This is a problem for sea turtles with all marine vessel throughout the world’s oceans. The seismic vessels steam at a very slow rate, similar to fishing vessels towing gear.

Section 6.5 - Effects Assessment Species at Risk, page 190, par 3 - This section discusses 3 SARA-listed marine mammals potentially occurring in Study Area. This should be changed to 4 to include Sowerby's Beaked Whale (recently listed).

MKI Response
Repeat comment. Comment addressed above

Section 6.5.4.3 – Marine Mammals at Risk, page 195, par 5 - The "proposed" Recovery Strategy for Blue Whale is final (as of Nov 2009). The reference for the Recovery Strategy is given as COSEWIC 2002, but the correct reference is Beauchamp et al 2009. It would be beneficial to reference the SOCP and relevant components in this section.

MKI Response
Comment on referencing is addressed above. SOCP is referenced throughout the document as a mitigation for VECs, but not for each species.

Table 6.6 – Summary of Environmental Assessment for Species at Risk, page 198 (Mitigation, bullet #1) - This bullet indicates that “Adherence to the *Statement of Canadian Practice on the Mitigation of Seismic Noise in the Marine Environment* to the extent reasonable practical*”* Please be advised that the SOCP specifies the mitigation requirements that must be met during the planning and conduct of marine seismic surveys, in order to minimize impacts on life in the oceans. These requirements are set out as minimum standards, which will apply in all non-ice covered marine waters in Canada. As such it is advised that the proponent adhere to all relevant minimum mitigations outlined in the SOCP including the Planning Seismic Surveys, Safety Zone and Start-up, Shut-down of Air Source Array(s), Line Changes and Maintenance Shut-downs, Operations in Low Visibility and Additional Mitigative Measures and Modifications sections of the SOCP.

MKI Response
Repeated Comment. Addressed above

Section 6.6 - Effects Assessment - Sensitive Areas - This section includes effects assessments of National Marine Conservation Areas, National Parks and Historic Sites, Ecological Reserves and Important Bird Areas; however, it does not include any effects assessments on Marine Protected Areas, Coral Protection Zones or Highly Productive Areas. Marine Protected Areas, Coral Protection Zones and Highly Productive Areas are also sensitive areas; however, the EIA does not mention if the project will have any effects on these areas. It is unclear why some sensitive areas have effects assessments while

others do not, but it seems that the EIA should have effects assessments on all sensitive areas.

MKI Response
Change Nain Bight and Hamilton Inlet (RMAs)

Add to the bulleted list of sensitive areas:
Coral Protection Zone (Coral Conservation Priority Area)
Gilbert Bay Marine Protected Area
Highly Protective Areas (Hawke Channel and Hamilton Bank)

Add text to Boundaries
Navigation of the seismic vessel for turning purposes will be a minimum of 10 km distance.
There will be no excursions into any of the sensitive areas with except of the southern portion of the Coral Conservation Priority Area.

With regards to administrative boundaries, Parks Canada is responsible for NMCA's, while Environment Canada/CWS is responsible for the protection of birds. DFO is responsible for marine protected areas and ecologically and biologically significant areas designations. The Coral Conservation Priority Area is voluntary.

Section 6.6.4 Effects Assessment and Mitigation

Change the text as follows: The most northerly boundary of the Study Area is located about 30 km from the coastline. There is no approach to bird nesting colonies or the coastline (including the Gilbert Bay MPA), and hence no interaction with critical coastal habitats from routine activities.

Change the text as follows: Although the Affected Area borders with the two RMAs (Nain Bank and Hamilton Inlet), no seismic surveys will take place within the boundaries.

Add text after fourth paragraph under Vessel Presence
The seismic survey vessel and equipment are restricted to surface waters, thus no equipment is dragged along the seafloor. Therefore no interaction with corals, coral habitat or demersal fish habitat will result in the Coral Conservation Priority Area.

Section 6.6.5 Noise Emissions
Add the following text:
..or prey sources and supply for fish, marine mammals, sea turtles or seafloor habitat in general in sensitive areas.

6.6.6 Cumulative Effects
Marine traffic from seismic surveys foes not impinge physically on the seafloor habitat like bottom dragging fish gear, therefore no cumulative effects from this Project.

6.6.7 Monitoring and Follow-up
Add text as follows: Coral and fish habitat are not altered by seismic activity.

Section 6.7 **Traditional and Commercial Fisheries and Surveys -** The text notes on the Communal Commercial fisheries of the Nunatsiavut Government, but does not reference the Communal Commercial fisheries for either the Innu Nation or the NunatuKavut Community Council. This could cause some confusion and further, does not make it clear to the reader that there are a number of Aboriginal groups in Labrador conducting Communal Commercial fisheries in the area in question.

MKI Response
MKI and Sikumiut Environmental Inc. held community meetings and discussions with all First Nation and Aboriginal community representatives. These stakeholders are listed in Sections 3.2.1 and 5.10.1.

Information obtained from those meetings are incorporated into the environmental assessment. The traditional, or country food, harvesting activities occurring in the Labrador Shelf SEA Area are described in Section 4.10.6 of the Labrador Shelf SEA and include the harvest of invertebrate and fish (marine and anadromous) species and the hunting of seabirds, waterfowl, and marine mammals, particularly seals.

When an Inuit domestic harvest level is established for a species or stock of fish, Inuit will be able to harvest up to the Inuit domestic harvest level for that species or stock (Nunatsiavut 2009). If necessary, the Inuit domestic harvest level will be divided up amongst individuals or families by the Nunatsiavut Government. The food, social and ceremonial (FSC) species harvested are not listed by Nunatsiavut (2009); however, the Labrador Métis Nation, now the NunatuKavut, which has similar rights for FSC purposes as the Nunasiavut, provides the harvesting regulations for several species on their website (LMN 2009). Species harvested for FSC purposes include Atlantic salmon, Arctic char, trout, herring, smelt, scallop, and whelk. Several seal species are hunted and include harp, grey, ringed, bearded, and hooded. Some examples of the birds harvested include geese, eiders, and gull eggs. Various regulations exist for the harvest of different species for FSC use. Smelt, for example, can only be harvested by angling and harvest limits are restricted to the amount required for FSC purposes. The species can be harvested year-round in tidal waters from Fish Cove to Cape Charles.

The Innu Nation also fish for salmon in Lake Melville from the community of Sheshatshiu and on the north coast from the community of Natuashish. They generally restrict themselves to harvests of around 3 mt. Beginning in 2000 and continuing into 2005, residents of Labrador were able to fish in the sea for brook trout and Arctic char with a permitted bycatch of four salmon. In 2004 to 2005, members of the Labrador Métis Nation (LMN) on the south coast of Labrador negotiated a subsistence fishery of 10 mt with DFO in the area between Fish Cove Point and Cape St. Charles, located in SFA 2.

LMN (Labrador Metis Nation). 2009. Natural Resources. http://www.labradormetis.ca/home/9.

Nunatsiavut. 2009. Department of Lands and Natural Resources: Inuit Harvesting Rights and Interests Beyond Nunatsiavut. http://www.nunatsiavut.com/en/lnr_inuitharvestingrights.php.

Section 6.7.4.1 - Vessel Presence, page 204, par 4 - Please note that the annual summer NSRFDFO northern shrimp survey is from July 12 - Aug 1 while the DFO fall survey is from October – December. It is recommended that mitigation measures to ensure that the seismic project does not have an impact upon population estimates due to startle responses be identified in this section.

MKI Response
DFO as consulted with respect to RV surveys and the information given was provided in the addendum report. Additional information to be added include Northern Shrimp Research Foundation (NSRF)-DFO survey of SFA 2 occurs from July 12 –August 1 and a DFO survey occurs from October to December. As per standard practice, DFO will be contacted during the program period sensitive to their survey to ensure locations and activities are communicate to avoid conflict of space at sea.

Section 8.2 Summary of Mitigation and Follow-up, pages 210-211, Table 8.2 - As per the *Statement of Canadian Practice on the Mitigation of Seismic Noise in the Marine Environment* a qualified Marine Mammal Observer must be present to monitor the safety zone.

MKI Response
MKI committed to having a MMO present during the surveys.

Appendix III, page 10 - To estimate distances, it is strongly suggested that the observer use a pair of reticle binoculars. These are great visual aides and there is a simple formula to obtain distance estimates based on the eye height above water. These are a standard for marine mammal observers everywhere.

MKI Response
There is no Appendix III in the addendum. The third appendix (Appendix C) provides consultation

information. As noted MMO are contracted as trained professionals and conduct the surveys in keeping with expectations.

Editorial Comments The Addendum will not be reissued. The CNLOPB requested address of comments in format of this letter.

Regards,

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ATTACHMENT 1

Table 5.8 (Section 5.6.2): Important Bird Areas (IBAs) Near the Study Area

IBAs on Labrador Coast	Species of Significance	Season of Significance
Bird Islands	**Atlantic Puffin (*Fratercula arctica*)**	Breeding
	Common Murre (*Uria aalge*) (Atlantic)	Breeding
	Great Black-backed Gull (*Larus marinus*)	Breeding
	Leach's Storm Petrel (*Oceanodroma leucorhoa*) (W. Atlantic)	Breeding
	Razorbill (*Alca torda*)	Breeding
	Thick-billed Murre (*Uria lomvia*)(Atlantic)	Breeding
Cape Porcupine	Scoters (Surf, Winged and Black)	Other
	Surf Scoter (*Melanitta perspicillata*)	Summer/Moulting
Galvano Island	**Common Eider (*Somateria mollissima*)**	Breeding, Summer/Moulting
Gannet Islands	**Atlantic Puffin**	Breeding
	Black Guillemot (*Cepphus grylle*)	Breeding
	Black-legged Kittiwake (*Rissa tridactyla*) (W. Atlantic)	Breeding
	Common Murre (Atlantic)	Breeding
	Great Black-backed Gull	Breeding
	Harlequin Duck (*Histrionicus histrionicus*) (Eastern)	Summer/Moulting
	Leach's Storm Petrel (W. Atlantic)	Breeding
	Northern Fulmar (*Fulmarus glacialis*)	Breeding
	Razorbill	Breeding
	Thick-billed Murre (Atlantic)	Breeding
Goose Brook	**Canada Goose (*Branta canadensis*)** (N. Atlantic)	Fall Migration, Spring Migration
Nain Coastline	**Harlequin Duck**	Summer/Moulting
	Peregrine Falcon (*Falco peregrinus)*	Breeding
	Scoters (Surf, Winged and Black)	Summer/Moulting
	Surf Scoter	Summer/Moulting
Northeast Groswater Bay	**Atlantic Puffin**	Breeding
	Black Guillemot (*Cepphus grylle*)	Breeding
	Common Murre (Atlantic)	Breeding
	Great Black-backed Gull	Breeding
	Herring Gull (*Larus argentatus*)	Breeding
	Leach's Storm Petrel	Breeding
	Razorbill	Breeding
	Thick-billed Murre	Breeding
Offshore Islands, Southeast of Nain	**Atlantic Puffin**	Breeding
	Black Guillemot	Breeding
	Common Murre (Atlantic)	Breeding
	Glaucous Gull (*Larus hyperboreus*)	Breeding
	Razorbill	Breeding
	Thick-billed Murre (Atlantic)	Breeding

IBAs on Labrador Coast	Species of Significance	Season of Significance
Quaker Hat Island	Atlantic Puffin	Breeding
	Common Murre (Atlantic)	Breeding
	Razorbill	Breeding
	Thick-billed Murre (Atlantic)	Breeding
Seven Islands Bay	Common Eider (*Somateria mollissima*) (Atlantic)	Breeding
	Harlequin Duck (Eastern)	Summer/Moulting
South Groswater Bay	**Black Scoter (*Melanitta americana*)** (Northeast)	Fall Mig/Summer
	Common Eider (Atlantic)	Breeding
	Surf Scoter (*Melanitta perspicillata*)	Summer/Moulting
St. Peter Bay	**Common Eider** (Atlantic)	Summer/Moulting
	Harlequin Duck (Eastern)	Summer/Moulting
Table Bay	**Common Eider** (Atlantic)	Breeding
	Peregrine Falcon (*anatum*)	Breeding
	Scoters (Surf, Winged and Black)	Summer/Moulting
The Backway	Black Scoter	Summer/Moulting
	Surf Scoter	Summer/Moulting
	White-winged Scoter (*Melanitta fusca*)	Summer/Moulting
The Tumbledown Dick Islands and Stag Islands	Common Eider (Atlantic)	Summer/Moulting
	Harlequin Duck (Eastern)	Summer/Moulting

IBAs on Newfoundland Coast	Species of Significance	Season of Significance
Bell Island	**Common Eider** (Atlantic)	Breeding
	Harlequin Duck (Eastern)	Summer/Moulting
Fischot Islands	**Common Eider**	Winter
Funk Island	Atlantic Puffin	Breeding
	Black-legged Kittiwake (W. Atlantic)	Breeding
	Common Murre (Atlantic)	Breeding
	Great Black-backed Gull	Breeding
	Herring Gull	Breeding
	Northern Fulmar	Breeding
	Northern Gannet (*Morus bassanus*)	Breeding
	Razorbill	Breeding
	Thick-billed Murre (Atlantic)	Breeding
Northern Groais Island	Black-legged Kittiwake (W. Atlantic)	Breeding
	Common Eider	Winter
Wadham Islands	**Atlantic Puffin**	Breeding
	Black Guillemot	Breeding
	Common Eider	Winter
	Leach's Storm Petrel	Breeding
	Razorbill	Breeding

Source: IBA Canada, 2010
Notes: Species shown in bold indicate that their population level exceeds at least one of the IBA thresholds (national, continental or global).