

**CANADA-NEWFOUNDLAND and LABRADOR OFFSHORE
PETROLEUM BOARD
CEA ACT SCREENING REPORT**

PART A: GENERAL INFORMATION

CEA Determination Date	<u>July 23, 2010</u>
Project Title	Husky Energy Labrador Shelf Seismic Program 2010-2017
Physical Activity	Acquisition of Seismic Data
Proponent	Husky Energy Inc. Suite 901, Scotia Centre 235 Water Street St. John's, NL A1C 1B6
Contact	Ms. Francine Wight Environment Lead, East Coast Operations
C-NLOPB File No.	7705 H633
CEAR No.	09-01-45746
Location	Labrador Shelf, Newfoundland and Labrador Offshore Area
Referral Date	January 19, 2009
EA Start Date	February 2, 2009
CEAA Law List Trigger	Section 134(1) (b) <i>Canada Newfoundland Atlantic Accord Implementation Act</i> (Accord Act)

Part B: Project Information

On 19 January 2009, Husky Energy Inc. (Husky) submitted a project description "*Labrador Shelf Seismic Program – Project Description*" (Husky Energy 2009) to the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), in support of its application to conduct 2D and 3D seismic surveys, geohazard, and Vertical Seismic Profiles (VSP) on the exploration licences held by the operator in the Labrador Shelf area of the Newfoundland and Labrador offshore. The "*Labrador Shelf Seismic Program – Environmental Assessment*" (Husky Energy 2010a) submitted on March 3, 2010, provided an environmental assessment (EA) for an eight year program. On May 10, 2010, the C-NLOPB requested additional information from Husky in order to satisfy the requirements of the *Canadian Environmental Assessment Act* (CEAA) and to complete the Screening Report. Husky provided on June 17, 2010 the "*Addendum to Husky Energy's Labrador Shelf Seismic Program, Environmental Assessment Report*" as a response to this request. . The following information is summarized from the EA report (Husky Energy 2010a) (herein referred to as the EA Report) and Addendum.

1 Description of Project

The Labrador Shelf Seismic Program, as proposed by Husky, is a multi-survey (2D and 3D seismic, geohazard, VSP) program on exploration licences (ELs) 1106, 1107, 1108, and 1109. The Project Area includes an approximately 30 km buffer around the exploration leases to accommodate both streamer deployment and seismic vessel turning radius. It is Husky's intention to conduct a 2D seismic survey in the summer of 2010, while other surveys, 2D, 3D, geohazard, and VSP may occur at various times between 2010 and 2017.

The proposed program consists of approximately 2,000 to 3,000 km of 2D survey in 2010 or 2011. 2D and 3D and/or geo-hazard surveys may occur later in the 2010 to 2017 period. Subsequent geo-hazard surveys may be conducted anywhere on ELs 1106 and 1108 within the Project Area boundaries, depending on the final geophysical interpretation using the 2D/3D seismic acquired in the Project Area.

Surveys will occur between July 1 and November 30 of any given year. The duration of the proposed 2010 2D survey is estimated at 40 to 60 days and the duration of a geohazard survey in support of a potential drilling program is approximately four to six days. The duration of a 3D program is approximately 30 to 75 days.

2 Description of Environment

The following sections provide a summary of the environmental factors described in the EA Report and Addendum. A complete description of the biological and physical environment can be found in the EA Report and Addendum.

2.1 Physical Environment

The Labrador Shelf is approximately 150 km wide, with water depths of less than 70 m within 2 km of shore. Deep saddles run in a northeast-southwest direction and there are separate shallow offshore banks with water depths less than 200 m. The banks extend to the edge of the shelf that rapidly drops off to depths greater than 3,000 m. Water masses off Newfoundland and Labrador move generally southward with the Labrador Current. The air temperatures are warmest during July and August, with mean values just over 12°C, and then begin to cool in September, with the coldest values occurring between January and February with temperatures on average approximately -13°C to -14°C. The surface water temperatures from November to June can reach below 0°C, with a minimum ranging from -1.7°C to -1.79°C from December to March. The average number of days per month with fog is highest from May to August. Seasonal landfast and sea (or pack) ice can occur throughout the Study Area from November through July. Sea ice begins to retreat off the Labrador coast in May and the coast is generally ice-free by mid-July. Icebergs are most prevalent during the July to October period. The monthly maximum wind ranges from 16 m/s in July to 27.3 m/s in February. The maximum wind speed is greater than 24.7 m/s from October to March.

2.2 Biological Environment

2.2.1 Species at Risk

Several species listed on Schedule 1 of the *Species at Risk Act* (SARA) are likely to occur within the Project Area. The following table provides the species and their SARA listing as well as species currently under assessment by the Committee on the Status of Endangered Species in Canada (COSEWIC) that may also occur within the Project Area.

SPECIES	SARA Status	COSEWIC Status (Date of Most Recent Status Report)
Blue Whale (<i>Balenoptera musculus</i>)	Schedule 1 - Endangered	Endangered (May 2002)
Leatherback Turtle (<i>Dermochelys coricea</i>)	Schedule 1 - Endangered	Endangered (May 2001)
Eskimo Curlew (<i>Numenius borealis</i>)	Schedule 1 - Endangered	Endangered (November 2009)
Ivory Gull (<i>Pagophilia eburnea</i>)	Schedule 1 - Endangered	Endangered (April 2006)
Northern Wolffish (<i>Anarhichas denticulatis</i>)	Schedule 1 - Threatened	Threatened (May 2001)
Spotted Wolffish (<i>Anarhichas minor</i>)	Schedule 1 - Threatened	Threatened (May 2001)
Peregrine Falcon (<i>Falco peregrinus ssp. anatum</i>)	Schedule 1 - Threatened	Non-active (April 2007)
Atlantic Wolffish (<i>Anarhichas lupus</i>)	Schedule 1 – Special Concern	Special Concern (November 2000)
Fin Whale (<i>Balenoptera physalus</i>)	Schedule 1 – Special Concern	Special Concern (May 2005)
Barrow's Goldeneye (<i>Bucephala islandica</i>)	Schedule 1 – Special Concern	Special Concern (November 2000)
Harlequin Duck (<i>Histrionicus histrionicus</i>)	Schedule 1 – Special Concern	Special Concern (May 2001)
Harbour Porpoise (<i>Phocoena phocoena</i>)	Schedule 2 - Threatened	Special Concern (April 2006)
Sowerby's Beaked Whale (<i>Mesoplodon bidens</i>)	Schedule 3 – Special Concern	Special Concern (November 2006)
Atlantic Cod (<i>Gadus morhua</i>) NL Population		Endangered (April 2010)
Porbeagle Shark (<i>Lamna nasus</i>)		Endangered (May 2004)
Roundnose Grenadier (<i>Coryphaenoides rupestris</i>)		Endangered (November 2008)
Beluga Whale (<i>Delphinapterus leucas</i>)		Endangered (May 2004)
Red Knot (<i>Calidris canutus rufa</i>)		Endangered (April 2007)
American Plaice (<i>Hippoglossoides platessoides</i>)		Threatened (April 2009)
Beluga Whale (<i>Delphinapterus leucas</i>)		Threatened (May 2004)
Roughhead Grenadier (<i>Macrurus berglax</i>)		Special Concern (April 2007)
Beluga Whale (<i>Delphinapterus leucas</i>)		Special Concern (May 2004)
Bowhead Whale (<i>Balaena mysticetus</i>)		Special Concern (April 2009)
Killer Whale (<i>Orcinus orca</i>)		Special Concern (November 2008)

Atlantic Walrus (<i>Odobenus rosmarus rosmarus</i>)		Special Concern (April 2006)
Polar Bear (<i>Ursus maritimus</i>)		Special Concern (April 2008)

The Blue Whale is the largest and one of the rarest marine mammals in the North Atlantic. A recently proposed Recovery Strategy (DFO 2009) for blue whales is available with a long-term recovery goal to reach a total of 1000 mature individuals through the achievement of three 5-year objectives. A Recovery Action Plan will be developed by 2014. The EA Report notes that Blue whales have been known to occur along the north shore of the Gulf of St. Lawrence and off eastern Nova Scotia during spring, summer, and fall and have been sighted only sporadically off the Labrador coast.

Leatherback turtles may range as far as northern Labrador since they travel extensively during migration. They have been observed offshore Newfoundland and Labrador from May to December. There is a high level of discrepancy concerning global population estimates, and no population estimate exists for the Northwest Atlantic. The Recovery Strategy (Atlantic Leatherback Turtle Recovery Team 2006) contains supporting objectives for the Leatherback Turtle.

The Eskimo Curlew is a migratory bird that typically migrated through the Labrador Shelf area in the fall. They were once found from Newfoundland and Labrador to Alberta to the Northwest Territories. It is possible that this species has become extinct, as efforts to locate individuals have been unsuccessful. The Recovery Strategy for Eskimo Curlew (Environment Canada 2007) specifies measures that can be implemented under Canadian jurisdiction to promote the recovery goal, however it is recognized that recovery is not technically or biologically feasible for this species. It is unlikely that the Eskimo Curlew will be encountered in the Project Area.

The Ivory Gull is associated with polar pack ice at all time of the year. A recent survey (March 2004) conducted off the coast of Newfoundland and Labrador shows a decrease in Ivory Gull numbers, with sightings of 0.02 individuals per 10 minutes, compared to 0.69 individuals per 10 minutes observed in 1978. The abundance and seasonal use of the Labrador Sea by Ivory Gulls is unknown.

Three species of wolffish are found in the Labrador Shelf Area: northern wolffish, spotted wolffish; and Atlantic (striped) wolffish. They typically are found in highest concentrations over sand, but occur over all observed bottoms. There is a Recovery Strategy (Kulka *et al.* 2007) for northern and spotted wolffish and Management Plan for Atlantic wolffish to achieve long-term viability of the species.

The best available population estimate for the Western North Atlantic population of Fin Whales is 2,800 individuals between Georges Bank and the mouth of the Gulf of St. Lawrence. Fin whales have been described as highly vocal during late August, through the fall and again in mid-winter, off the Scotian Shelf, which could be indicative of their migration southward in the fall and northward in the late winter and spring. Based on the presence of their common prey, it has been inferred that fin whales commonly aggregate near ocean fronts and areas of upwelling, such as shelf breaks.

Harlequin Duck breeding and moulting sites have been known to occur in the Study Area (but not Project Area), specifically at the Gannet Islands and several breeding sites in inland Labrador. Harlequin ducks often breed on rivers, streams near the ocean, and are sometimes observed in bays and estuaries throughout the northern areas of their breeding ground. Population trends are not available for the breeding population of eastern North America; however, local Aboriginal knowledge from Innu elders of Utshimassit suggests the Harlequin Duck populations in central Labrador declined considerably in the 1980s and early 1990s.

Barrow's Goldeneye prefers to breed at high elevations on alkaline wetlands around freshwater lakes. Wintering populations in Quebec are found on small fishless lakes above 500 m elevation. Barrow's Goldeneye like to nest in tree holes or cavities within 2 to 3 km of a water body. Studies have confirmed Nain Bay as a molting site.

The remaining species are discussed in detail in the EA Report. The Project Area is not known to contain any sensitive areas or critical habitats for species listed on Schedule 1 of SARA.

2.2.2 Fish and Fish Habitat

The Labrador Sea and adjacent shelves in the project area are a highly productive ecosystem. The spring bloom in the southern Labrador Sea starts in March as a continuation of the bloom that begins on the Grand Banks and spreads northward with the increasing irradiance. Distribution of plankton varies spatially and temporally depending on water temperature, winds, and availability of nutrients in the water column. There is a peak in the spring and another in the fall.

Zooplankton reproduction either coincides or immediately follows phytoplankton blooms. Thus, zooplankton reproduction would be expected to vary somewhat for the different portions of the Labrador Sea (zooplankton reproduction in the northern and southern Labrador Sea would be expected to occur in or around May with the central Labrador Sea lagging until sometime in June).

Benthic polychaete structure in the Labrador Sea is strongly influenced by large-scale topographical features. Other types of substrates had distinct benthic assemblages, such as bivalves (which appear to be distributed across inner shelves at approximately 5 to 25 m depths according to functional groupings of deposit (generally associated with fine sediments around 25 m) and suspension feeders, barnacles and sea urchin. The nearshore zone may have a higher bivalve richness due to ice damping effects, which result in decreased wave action and lowered environmental disturbances.

Stony corals (scleractinians), sea anemones (actinarians), soft/leather corals (alcyonaceans), horny corals (gorgonaceans) and sea pens (pennatulaceans) are all included in the generic term "coral" (EA Report). Corals are typically found deeper than 200 m in canyons and along the edges of channels along the edge of the Continental Shelf and slope. Hard (horny and stony) corals are restricted to deep water only; soft corals are distributed in both shallow and deep waters. Congregations of coral in the Study Area are referred to as coral "forests" or "fields" and most grow on hard substrate. Others prefer sand or mud substrates. The southeastern region between Makkovik Bank and Belle Isle Bank on the Labrador Slope (14 identified species) is one of two identified "hotspots" for coral species richness in Newfoundland and Labrador. Other areas with a moderate diversity and high abundance of corals include the Saglek Bank (within the Study Area) and Hatton Basin (to the north of the Study Area). A list of coral species that are known to occur in the Study Area is included in the EA Report. A description of shellfish and finfish, other than those described below under commercial fisheries, can be found in the EA Report.

2.2.3 Commercial Fisheries

The proposed seismic program overlaps NAFO areas 2H and 2J. The EA Report identifies the main commercial species on the Labrador Shelf, including the Project Area. The most important fisheries, in terms of landed value, in and adjacent to the Project Area, are northern shrimp (*Pandalus borealis*) (mobile trawl fishery) and snow crab (*Chionoecetes opilio*) (fixed gear fishery).

Northern Shrimp is reported by Husky (2010a) to be the most important commercial species in the project area. Shrimp range from the southern coast of Greenland to New England. They are concentrated in the depression on the Labrador and Scotian shelves and off the Grand Banks, at depths ranging from 150 – 500 m. The Seismic EA indicates that spawning occurs during late summer and fall. The eggs remain

attached to the female until spring, where they are hatched in inshore areas. Larvae remain in the surface water for a few months then descend to the deeper waters as they mature.

Snow crab is a very important commercial species in Newfoundland and Labrador and makes up approximately five percent of the total harvest in this area. The EA Report notes that snow crab are more commonly found in the mud and sand-mud substrates at temperatures ranging from -0.5 degrees to 4.5 degrees. Young crab, however, are found in substrate that has more gravel. Snow crabs mate in late winter and spring, and the females carry the egg masses for up to two years prior to larval hatch. Hatching typically occurs May to June. Crab is harvested using fixed gear – crab pots – from July to September.

The most important groundfish fishery is Greenland halibut (*Reinhardtius hippoglossoides*), accounting for approximately five percent of the overall harvest. It is harvested primarily from June to September with both fixed (gill nest, longlines) and mobile gear (otter trawlers). It is commonly found at water depths of 500 to 1,200 m. Fishing may occur from 200 to 1,500 m depths but has also been caught at depths of 2,200 m. For the Labrador-eastern Newfoundland population, spawning is thought to occur during December to April in the north and August in the south. A great deal of variability exists in the maturation and spawning of Greenland halibut both temporally and geographically and this variability appears to be a feature common to all areas within its range.

2.2.4 Marine Mammals and Sea Turtles

Cetaceans are common in the Study Area, especially in the summer months, when whales, porpoises and dolphins migrate north through the area. Twenty-three marine mammal and turtle species are known to occur within the Study Area with eleven having SARA or COSEWIC designation. The EA Report states that some of the more common species on the Labrador Shelf are: fin (*Balaenoptera physalus*), humpback (*Megaptera novaeangliae*), minke (*Balaenoptera acutorostrata*), and sei (*Balaenoptera borealis*) whales; grey (*Halichoerus grypus*), harp (*Phoca groenlandica*), harbour (*Phoca vitulina*), and ringed (*Phoca hispida*) seals; white-beaked (*Lagenorhynchus albirostris*) dolphin; and harbour porpoise (*Phocoena phocoena*). Information is available on these species in the EA Report.

The leatherback, the loggerhead (*Caretta caretta*), and the Kemp's Ridley (*Lepidochelys kempii*) turtles may all be found in the Project Area but are considered uncommon in the Project Area. It is reported that they can occasionally be found in Atlantic Canada waters between June and October, with numbers peaking in September. The loggerhead turtle's distribution is largely determined by water temperatures less than 15 degrees. The occurrence of Kemp's Ridley turtle is rare in Atlantic Canadian waters. Population numbers of Kemp's Ridley and loggerhead turtles are unknown.

2.2.5 Marine Birds

The Labrador Current greatly influences the avian biodiversity in the marine environment off Labrador. The Labrador coast is used by numerous species of sea ducks, shorebirds and seabirds for breeding (many of the breeding marine species nest on the islands off the coast), over-wintering, or as a migratory or moulting stopover. The Labrador coast is used during migration from the Arctic and Greenland. Although all areas of the shelf are used, the shelf edge and Hawke Channel show notably high densities during the breeding season. Some species will over-winter off Newfoundland and others will migrate south. For example, the Harlequin Duck breed in inland Labrador, moults off the Labrador coast, and then winters off Greenland. Other bird species like the Black Guillemot and some of the gull species that use the Labrador coast are resident birds. The primary diet for seabirds in the Study Area includes fishes, crustaceans, cephalopods, copepods and offal.

A description of seabird species known to occur in the Study Area is included in the EA Report.

2.2.6 Sensitive and Special Areas

A number of locations have been identified as sensitive areas (see EA Report for definition) within the Study Area and include the following:

- National Marine Conservation Areas (NMCAs): Nain Bight and Hamilton Inlet have been identified as representative marine areas (although there is no NMCA for the Labrador Shelf);
- Battle Harbour is managed under the *Parks Canada Agency Act*'s National Site Historic Program; designated as a National Historic District;
- Gilbert Bay (approximately 60 km²) was designated as a Marine Protected Area (MPA) under the *Oceans Act* in 2005 due to its distinct population of Atlantic cod;
- Hawke Channel-Hamilton Bank is a highly productive area as a result of an areas of regional upwelling, with a number of important commercial fish species (i.e., shrimp, snow crab and capelin); it is also the location of the northern spawning grounds of Atlantic cod;
- Gannett Islands Ecological Reserve includes the largest razorbill colony in North America and the largest seabird colony in Labrador and is situated on seven islands and their surrounding marine waters southwest of the Project Area, just south of the southern boundary of the Zone;
- fourteen IBAs (including the Gannet Islands Ecological Reserve) are located within the Study Area; none are located within the Project Area;
- Torngat Mountains National Park is 9,700 km², located at the northern tip of Labrador; no commercial, industrial or mineral development will be permitted, although traditional fishing and hunting can still occur within the park;
- Mealy Mountains National Park, while outside the Study Area, this 21,000 km² National extends to the coast and the adjacent waters are part of the proposed Hamilton Inlet MPA;
- Coral Conservation Priority Area (Fishing Industry) Voluntary Coral Protection Zone. The Groundfish Allocation Enterprise Council/Canadian Association of Seafood Producers, under the auspices of NAFO, have voluntarily established the 12,500 km² Coral Protection Zone in NAFO Division 3O, which is closed to all fishing using bottom contact gear. This area, off Cape Chidley, conserves large concentrations of species of large corals such as *Primnoa resedaeformis*, *Paragorgia arborea*, *Paramuricia placomus*, *Paramuricia grandis* and antipathorian species; and
- Newfoundland-Labrador Shelves Marine Ecoregion, which is used in guiding the selection of future representative MPAs.

2.2.7 Research Surveys, Vessel Traffic, Recreation and Tourism

Shrimp are surveyed from water depths between 100 to 750 m by the Canadian Association of Prawn Producers (in conjunction with DFO) in NAFO Area 2G (outside the Project Area). This survey has been run annually since 2005 from July 15 through the first week of September and will continue for a minimum of five consecutive years (to 2010 as a minimum). The only portion of the Labrador Shelf Study Area currently surveyed as part of the multispecies survey (conducted annually between October and December) is NAFO Area 2J (Exploration License 1106); surveys have not been conducted since 1999.

Marine transportation in the Study Area involves vessels travelling to and from Labrador ports and other ports in the province, and vessels that are travelling to and from ports in the Canadian High Arctic. Most marine transportation (including the coastal ferry service and fuel transportation) is dependent on the ice-free season (June to November), with the exceptions of offshore fishing activities, freighter traffic between Greenland and eastern North American ports and concentrated ore shipments from Voisey's Bay.

Tourism and recreation activities within the Study Area include cruise ships, tour boats, local and visitor personal boating, ecotourism and prehistoric and historic resources. None of these activities take place within the Project Area (for example, the prehistoric and historic resources are all land-based). Cruise ships would transit the Project Area between 10 ports of call along the Labrador Coast (Saglek Fjord,

Nain, Hebron, Hopedale, Rigolet, Northwest River, Happy Valley-Goose Bay, Cartwright, Battle Harbour and Red Bay.

Part C: Environmental Assessment Process

3. Procedures

On January 19, 2009, Husky submitted a project description to the C-NLOPB in support of its application to conduct 2D and 3D seismic, and geohazard surveys, and VSPs. The Project will require an authorization pursuant to Section 138(1) (b) of the *Canada-Newfoundland Atlantic Accord Implementation Act* and Section 134(1) (a) of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*. The C-NLOPB, as Responsible Authority (RA), forwarded the Federal Coordination Regulations (FCR) Section 5 Notification on February 2, 2009 to: Fisheries and Oceans Canada (DFO); Environment Canada (EC); Department of National Defence (DND); Transport Canada (TC); Natural Resources Canada (NRCan); Health Canada; and the Newfoundland and Labrador Departments of Environment and Conservation, Fisheries and Aquaculture, and Natural Resources; as well as the Nunatsiavut Government (NG). Responses to the proposed scope and identification of each department or agency's role with respect to the Project were to be received by 04 March 2009. Pursuant to Section 12.2 of the *Canadian Environmental Assessment Act* (CEA Act), and the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*, the C-NLOPB assumed the role of the Federal Environmental Assessment Coordinator (FEAC) for the screening and in this role will be responsible for coordinating the review activities by the expert government departments and agencies that participate in the review.

On April 2, 2009, the C-NLOPB notified Husky that a screening level of assessment was required and the proponent was provided with a Scoping Document.

On March 3, 2010, Husky submitted the "*Labrador Shelf Seismic Program – Environmental Assessment*". The C-NLOPB forwarded the EA Report to the DFO, EC, DND, NG and the provincial Departments of Environment and Conservation, Fisheries and Aquaculture, and Natural Resources. The Fish, Food and Allied Workers Union (FFAW) and One Ocean were provided a copy of the EA Report for review. Comments received up to and including 30 April 2010 were considered. The C-NLOPB received comments from NRCan, TC, Health Canada, NL Department of Natural Resources, EC, DND, DFO and the NG. Husky was provided with the EA Report review comments on May 10, 2010 and responded on June 15, 2010. The C-NLOPB forwarded the response for reviewers' consideration.

It is the obligation of the Responsible Authority RA to consider which physical works and undertakings, in relation to the proposed Project, fall within the scope of the Project. First, there are no associated physical works that should be included in the scope of the Project. Second, if the proposed Project were to proceed, as set out in the application, it would constitute a single Project for the purposes of subsection 15(2) of *CEAA*. For the purposes of subsection 15(3) of *CEAA*, the scoping exercise is complete because an assessment was conducted in respect of every construction, operation, modification, decommissioning, abandonment, or other undertaking proposed by Husky that is likely to be carried out in relation to their proposed Project.

3.1 Scope of Project

Husky proposes 2D and 3D seismic surveys, geo-hazard data collection, and VSP on ELs 1106, 1107, 1108 and 1109 on the Labrador Shelf. The Project Area includes a 30-km buffer around the exploration leases to accommodate both streamer deployment and seismic vessel turning. Seismic survey operations will be carried out such that streamer deployment and end-of-survey line turning operations will not extend into the Labrador Inuit Settlement Area (known as the "Zone").

Approximately 2,000 to 3,000 km of 2D seismic data will be collected in 2010. The 2D seismic survey vessel will tow a sound source, one air gun array 4,000 to 7,000 cubic inches in total volume and towed at depths about of approximately 6 to 15 m. The air guns will be operated with compressed air at pressures of 2,000 to 2,500 psi and producing peak-to-peak pressures of approximately 140 to 165 bar-m (14 x 10¹² to 16.5 x 10¹² microPascal (µPa)). There will be one towed streamer, 6,000 to 10,000 m in length, which will be towed behind the vessel at depths of approximately 8 to 30 m. Additional 2D, 3D, and/or geohazard surveys and VSP may be undertaken in subsequent years up to and including 2017. The 3D sound source will consist of a larger air gun array and 8 to 10 streamers of hydrophones 75 to 100 m apart and 6,000 to 8,000 m long. The sound source array would have multiple air gun units, usually operating at 2,000 psi with individual source unit volumes ranging from 70 to 250 in³. The wellsite/geohazard survey will be collected using a closer survey line spacing (250 m) using smaller equipment and lower pressures. A typical VSP source array would be comprised on one or two airguns.

The timing of survey activities will be between July 1 and November 30 of any given year. The duration of the initial 2D survey is estimated at 40 to 60 days and the duration of a typical geo-hazard (well site) survey is approximately four to six days. The estimated duration of a 3D program, depending on the area to be covered, is approximately 30 to 75 days.

3.2 Boundaries

The boundaries of the Project are defined in the seismic EA as follows and are acceptable to the C-NLOPB.

Boundary	Description
<i>Temporal</i>	Between July 1 to November 30 2010-2017.
<i>Project Area</i>	Defined as ELs 1106, 1107, 1108, and 1109 plus a 30 km buffer to accommodate vessel turning. Corner Coordinates (NAD 83) are W-59.1923,N55.8095; W-57.6151,N56.5295; W-54.3606,N55.0654; W-55.3947,N54.2780; W-56.9188,N55.0174; W-57.6516,N55.1154.
<i>Affected Area</i>	Varies according to specific vertical and horizontal distributions and sensitivities of each VEC and with the project component; defined as the area within which effects have been reported to occur.
<i>Regional Area</i>	NAFO Sub Area 2, Divisions 2G, 2H, 2J
<i>Provincial Area</i>	Administrative boundaries under the jurisdiction of the C-NLOPB.

There may also be an area of influence from the sound array. However, depending on the marine species present, this area of influence will vary in size. Hearing thresholds have been determined for a number of species (seals and odontocetes), but the threshold is not known for others (baleen whales). The sound that is actually received by the marine species depends on the energy released from the source and its propagation (and loss) through the water column. Therefore, the hearing ability of the species and background noise will affect the amount of noise from an airgun array detected.

3.3 Scope of Assessment

For the purpose of meeting the requirements of the CEAA, the factors that were considered to be within the scope of the environmental assessment are those set out in subsection 16(1) of the CEAA, and those listed in the “*Husky Energy Labrador Shelf Seismic Program 2009-2017 Final Scoping Document*” (C-NLOPB (2009)).

4. Consultation

4.1 Consultation carried out by Husky

During the course of the assessment, Husky consulted with stakeholders with an interest in the Project. In order to assist in scoping the effects assessment and mitigation plan, and to aid in addressing any issues of concern, Husky and consultants undertook a consultation program with the interested parties in communities chosen within Labrador and relevant stakeholders, including but not limited to: the Nunatsiavut Government; Labrador Métis Nation; Innu Nation; One Ocean; FFAW; Southeastern Aurora Development Corporation; town managers and/or mayors in the various communities visited during the consultation process; fish processors; and other relevant parties as identified.

Consultation was held in Happy Valley-Goose Bay, Nain, Rigolet, Postville, Hopedale, Cartwright. Husky Energy representative met with stakeholders in Makkovik at a later date. Husky senior management on the East Coast met with the Innu Leadership in St. John's and later, a Husky representative attended a public meeting with Sheshatshiu Innu as part of an all-operators session arranged by an Innu Nation consultant.

A mix of public meetings and meetings with governments and organizations were held in the seven communities. Thirteen meetings were held during the initial two weeks, seven of which were public meetings. Depending on the numbers attending, the meetings were either one on one discussions or a slide presentation interspersed with discussion.

The results of those consultations and key issues raised during the public meetings are documented in the EA Report, however the key issues raised included:

- the need for ongoing discussions and information as the project planning proceeds;
- the need for maximizing local opportunities for employment and supply of services and supplies;
- very recent fishing history is important for determining where the fishing effort is likely to occur in the near future (the exploration licenses are areas for fishing shrimp, crab and turbot, which areas change from year to year);
- fishers need to receive factual and scientifically sound information to allay fears of negative effects on the fishing industry;
- communication is critical if fishers and oil and gas activities are to work in harmony;
- the potential effects of the associated noise on whales and other marine mammals;
- the use of Traditional Knowledge and the quality of information on ice, marine mammals and fishing activity;
- the effects of sound on whales and fish; the effects of oil spills (during the drilling/development phases);
- reflection of sound from ice;
- how marine mammal observations are made;
- what are the discharges from the vessels and how are they controlled;
- what are the benefits to the Innu?
- consultation should include the Innu Business Development Office in Goose Bay ; and
- companies should demonstrate their “responsibility” (i.e., both environmental and social).

The C-NLOPB is satisfied that the consultations carried out by Husky and reported on in the EA Report, during the preparation of the EA included all elements of the Project, and that Husky addressed any concerns in the EA. The C-NLOPB is not aware of any public concerns with respect to the environmental effects of the project, and does not require that further consultation be undertaken.

4.2 Consultation with other Federal Authorities and Other Government Departments

In accordance with the *CEAA* and the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements* and the C-NLOPB's environmental assessment procedures, various federal and provincial government departments were notified regarding Husky's proposed program. The C-NLOPB forwarded the EA Report on March 4, 2010 to the DFO, EC, DND, NG, and the provincial Departments of Environment and Conservation, Fisheries and Aquaculture, and Natural Resources. The FFAW and One Ocean were provided a copy of the EA Report to review.

The FFAW provided comments on 15 April 2010. The key issues included the need for constant communication, recognition of a dynamic and important fishery in the area, uncertainties with long-term and cumulative effects, timing conflicts and the use of FLOs to maintain communication while the two industries work in the same geographic area. *The FFAW are satisfied with the response provided by Husky, which included the application of mitigative measures including a Fisheries Liaison Officer (FLO) and picket vessel.*

DFO had replied that it was a federal authority and would provide expert advice. Comments on the EA Report were received on 30 April 2010. They suggested multiple MMOs and FLOs, annual reevaluation of SAR, better data on commercial fisheries, identified more recent studies on sound and commented on cumulative effects. *Husky provided confirmation that a quantitative analysis of cumulative effects would be undertaken with other operators if other programs were scheduled at the same time. They also confirmed that they would have two trained MMOs (one Labrador resident and one resident from the Island of Newfoundland) and an FLO on the crew. DFO were satisfied with the response provided by Husky.*

Environment Canada had responded that it was a federal authority and would provide expert advice. Comments on the EA Report, received on 20 April 2010, stated that the proponent should take advantage of the opportunity to collect seabird data and provided protocol and proper bird-handling advice. *EC were satisfied with the response provided by Husky. Husky confirmed that data would be collected and EC would be contacted to discuss details of their proposed seabird program.*

DND had responded that it was a federal authority and would provide expert advice. DND noted that it will be transiting through the area during the summer of 2010 and that Husky should confirm status of operational activities during each season of the program.

Comments on the EA Report were received from the NG on 15 April 2010. They questioned the effects on Aboriginal fisheries, both from this project, as well as cumulative effects and uncertainties with respect to effects and data gaps. More information was requested on the location of seismic survey lines. They highlighted the lack of Traditional Ecological Knowledge, or Inuit Knowledge and recommended the use of Inuit observers and local resources where applicable. *NG were satisfied with the response provided by Husky and reiterated that the survey should employ Inuit marine mammal observers (or trainees) as well as fishery liaison officers (or trainees) in addition to experienced experts in the industry.*

5. Environmental Effects Analysis

5.1 Methodology

The C-NLOPB reviewed the environmental effects analysis presented by Husky in the EA Report. A Valued Ecosystem Component (VEC) based assessment based on the interaction of project activities on these VECs, was used in assessing environmental effects, including cumulative effects and accidental events. The environmental assessment methodology and approach used by the Proponent is acceptable to the C-NLOPB. The C-NLOPB's environmental effects analysis uses the information presented by the

operator and takes into consideration mitigation proposed by the Proponent to assess the potential for residual environmental effects.

The potential adverse environmental effects, including cumulative effects, were assessed with respect to:

- magnitude of impact;
- geographic extent;
- duration, likelihood, and frequency;
- reversibility; and
- ecological, socio-cultural and economic context;

after taking mitigation measures into account,

- significance of residual impact.

The potential effect significance of residual effects, including cumulative effects, for each VEC is rated in this environmental screening report as follows:

0 = No Detectable Adverse Effect

1 = Detectable Effect, Not Significant

2 = Detectable Effect, Significant

3 = Detectable Effect, Unknown

These ratings, along with the likelihood of the effect, are considered in determining overall significance of residual effects.

In the EA Report, Husky presented information regarding the potential effects of seismic, wellsite/geohazard and VSP activities on marine fish and fish habitat, marine mammals and sea turtles, seabirds, commercial and traditional fisheries, species at risk and sensitive areas. Information regarding hearing effects in fish, sound detection and behavioural changes in invertebrates, and behavioural and disturbance mitigations proposed by Husky, the effects assessment is as follows.

5.2 Valued Ecosystem Components/Potential Environmental Effects

5.2.1 Fish and Invertebrate

1

In the natural environment, fish show avoidance responses and swim away as the array ramps up or as the survey slowly approaches. The airgun will be ramped up, thereby allowing fish in the area to leave. Other studies referenced in the EA Report indicated that fish mortality did not result from exposure to seismic sound sources. Stress responses to seismic exposure occur in fish but are temporary. Husky (2010a) reports that the temporary nature of these responses varies depending on the fish species and the sound source. Behavioural responses to seismic sound have been documented in a number of studies and reported in the seismic EA. In general, fish show a startle response and a change in direction and speed of swimming. In some studies looking at the effects on commercial catch rates, the change in swimming direction accounted for a decreased catch rate. However, some studies show that this effect was temporary, whereas other studies report that the fish behaviour was altered for a number of days (Husky 2010a).

Taking avoidance behaviour into account, any potential physical impact to fish is considered negligible, immediate to sub-local in geographic extent, immediate in duration, and would have a low likelihood of occurrence. Therefore, the likelihood of effects on fish is low and **not significant**.

The literature covering the effects of seismic sound on invertebrates is limited. Some of the existing scientific literature is difficult to compare and draw concrete conclusions because of inadequate

documentation on measurement methods and units. In general, marine animals with gas-filled organs are more vulnerable to acoustic impact because of the impedance difference between air and water. Most invertebrates do not have gas-filled organs and are therefore usually considered less vulnerable than fish. Rather than being sensitive to pressure changes, invertebrates appear to be more sensitive to particle displacement.

There is a variety of studies that show some effect of seismic sound on invertebrates and there are others that show little or no effect of seismic sound. It has been shown that seismic pulses can damage scallop shells and cause sea urchin spines to fall off when air guns are close (2 m). Snow crab eggs showed delayed development under similar conditions. Behavioural effects of seismic sound include moving away from the air gun, startle responses and increased swimming speeds. Mussels, periwinkles, crab species and lobster species have shown little to no response to seismic sound. Catch rates of rock lobster and brown shrimp (*Cragnon cragnon*) have been shown to have not been impacted by seismic sound. In conclusion, invertebrates without gas-filled organs appear less vulnerable to the effects of air guns than animals with gas-filled organs. Benthic invertebrates in water deeper than about 20 m are likely far enough away from the seismic source near the surface so that particle velocity effects become negligible.

Any potential physical or behavioural impact to invertebrate species is considered to be negligible, immediate in geographic scope, immediate in duration, and would have a low likelihood of occurrence. The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

5.2.2 Commercial Fishing and DFO Research Surveys

1

While there is little fishing that occurs within the ELs, species are harvested around the ELs, especially immediately adjacent around EL 1106. The predominant harvested species is shrimp, which are harvested using a trawl and accounts for approximately 85 percent of the commercial catch in the Study Area. Snow crab are harvested (using fixed gear) adjacent to the southwest corner of EL 1106. Of the remaining principal commercial species, turbot is not harvested near the ELs, and only sporadically in the Project Area.

The EA Report discusses studies where snow crab eggs were exposed to 221 dB at 2 m. There were possible signs of retarded development; however, eggs in nature are unlikely to be exposed to noise levels of range or intensity in nature as they are carried by the female on the seafloor (the same is true for shrimp). Results from a DFO study, in 2004, on the effects of seismic activity on adult snow crab indicated no acute or mid-term mortality; nor were embryo survival or mobility of hatched larvae affected.

Mitigation procedures, consistent with the C-NLOPB's guidelines for this activity will include an FLO to facilitate information flow between the survey and vessels and fishing vessels near the seismic survey. In addition, Husky will use a picket (or guide vessel) and will provide Notices to Shipping and advertise their activities on the CBC Radio program Fisheries Broadcast and the Okalakatiget Society radio. In the event of gear damage, Husky will implement a gear and vessel damage compensation contingency plan.

As well, Husky will contact DFO regarding research survey timing and locations and coordinate with DFO to establish a temporal and spatial separation plan. Such planning will allow the seismic program to avoid overlap and interference.

Taking mitigations into account, the impacts to commercial fishing and DFO research surveys is considered to be minor, sub-local to local geographic extent, short-term in duration, and would have a low likelihood of occurrence and is considered not likely and **not significant**.

5.2.3 Marine Mammals and Turtles

1

A potential effect of proposed operation upon marine mammals and sea turtles, which may be present in the area, is that of sound pulses from the survey equipment. The EA Report describes in more detail the species of cetaceans that have been observed in, or which are considered likely, to frequent the project area. The EA Report provides an assessment, based on available data on the effects of seismic sound on marine mammals and sea turtles. Several different surveys in other marine areas indicate that avoidance behaviour is usually exhibited in response to airgun seismic surveying.

There are several recommended mitigations which when applied can reduce impacts to marine mammals in the vicinity of a seismic survey (e.g., ramping up of airguns, use of observers, startup and shutdown procedures). In addition, the EA Report lists a number of mitigations consistent with the mitigations listed in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2008). Husky has indicated that these mitigations (including ramp up and shut down during ramp up if a marine mammal is spotted in the zone) will be implemented during the survey. **In addition to the shutdown procedures during ramp up, the C-NLOPB requires that the airguns be shut down if a marine mammal or sea turtle, listed as Endangered or Threatened (as per Schedule 1 of SARA) is observed within 500 m of the airgun array.**

Husky will collect observation data on marine mammals throughout the program. The effects on marine mammals are predicted to be of minor magnitude, sub-local to local, occasional frequency and short term. With the application of mitigation measures, the likelihood of effects will be **not significant**.

For sea turtles, the EA Report indicates that sea turtles may exhibit avoidance behaviour to noise within an unknown area around the array and that turtles might experience temporary hearing loss if the turtles are close to the airguns. While the impacts of the arrays would not be lethal, the impulses might disrupt foraging patterns and have other behavioural consequences. The cooler waters of the project area may preclude sea turtles from occurring in the area. However, if sea turtles were present, the mitigation measures applied should reduce the impact. The effects on sea turtles are predicted to be of minor magnitude, sub-local to local geographic extent, occasional frequency and reversible. With the application of mitigation measures, in particular, the use of MMOs, the overall likelihood of effects occurring is low, and the effects will be **not significant**.

5.2.4 Marine Birds

1

The sound created by air guns is focused toward the substrate, below the surface of the water. Sound from the array, above the water, is similar to a muffled shot and should have little or no effect on birds that do not have their heads in the water. There are limited data available with respect to the effects of underwater sound on birds. Most species of seabirds that may be present in the Study Area spend only a few seconds underwater during a foraging dive; therefore, there would be minimal opportunity for exposure to noise associated with seismic shooting.

The EA Report states that only the Alcidae (Dovekie, Common Murre, Thick-billed Murre, Razorbill, Black Guillemot and Atlantic Puffin) spend measureable time underwater during forage dives. They typically spend 25 to 40 seconds underwater during each dive, reaching depths of 20 to 60 m, and have the potential to be exposed to the sounds produced by seismic shooting. The effects of seismic noise on Alcids are not well known. It also states that, from a variety of limited research, that diving behaviour, mortality or any ill effects were documented.

Seabirds may also be attracted to vessel lighting; they may become disoriented and fly into vessel lights or infrastructure, or continuously fly around the light, consuming energy and delaying foraging or migration. Studies cited in the EA Report state that during conditions of drizzle and fog, moisture droplets in the air refract the light and greatly increase the illuminated area; disorientation appears to

occur most frequently during these periods. Since the Project operates on a 24-hour basis, lighting is required at night for safety purposes; therefore, mitigative measures will need to be applied (i.e., routine checks for stranded seabirds and implementation of appropriate release procedures).

The seismic vessel is usually supported by another vessel but helicopters are sometimes required to support the seismic vessel. A low flying helicopter could create a startle response in a seabird colony. Husky will ensure that any helicopter supporting the seismic vessel will follow a flight path that avoids the IBAs. The seismic vessel itself (and the picket vessel) will also avoid any seabird colonies.

Husky has indicated that mitigations (FLOs on board, handling and release of birds as per CWS handling instructions, ramp up, shut down during ramp up if marine mammal spotted in the zone, avoidance of seabird colonies) will be implemented during the survey. The magnitude of effects, if likely, is negligible, with a sub-local geographic extent, occasional to periodic frequency, and of immediate to short term duration. Therefore, the impact will be **not significant**.

5.2.5 Species at Risk

1

Husky will conduct annual project updates that include a review of SARA/COSEWIC for any new species or reports.

The EA Report indicates that the area for potential surveys has no unique habitat or spawning areas required by fish species at risk. This lack of critical habitat, coupled with the analysis of seismic sound on fish and the conclusion that it has little or no effect, results in the conclusion that effects on the fish species at risk are not likely to be adverse and therefore **not significant**.

The EA Report indicates that leatherback sea turtles may be occasional or infrequent visitors to the Project Area. The area contains no known critical habitat. As indicated above, effects on turtles are likely to be not significant. Therefore, effects on the Leatherback turtles are not likely to be adverse and therefore **not significant**.

Blue whales are reported by Husky (2010a) to be uncommon in the Project Area and thus, the potential for interaction with project activities is unlikely. However, if this marine mammal were in the Project Area, the mitigations described above, including the use of a MMO, would reduce any impact. Therefore, effects will be **not significant**.

Most of the listed seabirds at risk are thought to be infrequent visitors to the Project Area (Husky 2010a). The Eskimo Curlew and Ivory Gull are rare in all areas and unlikely to be found in the survey zone. As indicated above, effects on marine birds are likely to be not significant, therefore, effects on the marine bird species at risk are not likely to be adverse and therefore **not significant**.

5.2.6 Sensitive Areas

1

There are IBAs along the shoreline within The Zone and any potential environmental effects of helicopter support on the IBAs are addressed in the assessment of environmental effects on Marine Birds, above.

Parks Canada representative Marine Area, located in the south corner of the Project Area boundary in the Hamilton Bank Area, is immediately adjacent to the southern boundary of Exploration License 1106. Hamilton Bank, in conjunction with Hawke Channel is an area of high productivity and species diversity, including several major commercial fish species (e.g., redfish, Atlantic cod, and capelin, shrimp and snow crab) and is important to marine mammals and seabirds.

Given the minimal overlap with Sensitive Areas and the Project Area, and the predicted lack of environmental effect from seismic surveys, the environmental effect on Sensitive Areas is predicted to be **not significant**.

5.2.7 Water Quality/Discharges

0

Routine discharges, which are likely to occur during operation, are similar to those associated with many typical vessel operations. The vessels proposed for the survey are equipped with onboard environmental protection equipment, bilge/oily water separator, oily water/sludge holding tanks, and a sewage treatment system for wastewater. Solid waste will be collected and disposed of according to regulations and guidelines. The effect of the seismic operation on marine water quality will be negligible and **not significant**.

5.3 Cumulative Environmental Effects

Potential cumulative environmental effects external to the seismic program include seismic program(s) by other operators, commercial and traditional fishing, marine transportation and tourism/recreation. The potential exists that the other seismic survey(s) could occur concurrently, resulting in a temporal overlap with the Project. There would be no spatial overlap as there must be enough distance between streamers as to avoid interfering with data acquisition by individual vessels. Therefore, there is some potential for cumulative environmental effects with the seismic program in this context. Given the availability of seismic vessels, it is unlikely that more than one seismic vessel would be available to conduct more than one program at any given time. Vessels not associated with the seismic program will be restricted to distance to the seismic vessel during the seismic survey, the residual cumulative environmental effect with noise and traffic external to the seismic program will be negligible. Compared to existing vessel traffic in the area, the incremental amount of vessel traffic, because of this seismic program, will be negligible. Cumulative environmental effects resulting from any of the seismic program activities will not be additive or cumulative because the seismic program activities are transitory. With the implementation of mitigative measures and the limited spatial, and potentially temporal, overlap with other projects and activities, the cumulative environmental effect of the seismic program in conjunction with other projects and activities is predicted to be **not significant**.

5.4 Accidents and Malfunctions

Accidental discharge of oil into the marine environment may result from improper operational procedures (e.g., improper draining of streamer reel trunks), accidental spills of fuel or lubricants, or as a worst case, because of total vessel loss. The vessel is required to carry a “Shipboard Oil Pollution Emergency Plan” pursuant to MARPOL 73/78. The Plan contains a description of procedures and checklists, which govern operations involving hydrocarbons. Adherence to this Plan should prevent unintended “operational” releases.

Effects due to accidental spills associated with the proposed operation therefore are considered, overall, to be detectable if they occur, negligible, but neither significant nor likely.

5.5 Follow-up Monitoring

Required

Yes

No

The C-NLOPB does not require follow-up monitoring, as defined in the *CEAA*, and supporting guidance material, to be carried out for the seismic program.

6. Other Considerations

The C-NLOPB is satisfied with the environmental information provided by Husky regarding the potential adverse environmental effects, which may result from the proposed seismic program and are satisfied with the operator’s proposed monitoring and mitigative measures.

The C-NLOPB is of the view that the environmental effects from the project, in combination with other projects or activities that have been or will be carried out, are not likely to cause significant adverse cumulative environmental effects.

The C-NLOPB is of the view that if the proposed environmental mitigative measures outlined in the EA Report and Addendum and those listed below are implemented, the seismic program is not likely to cause significant adverse environmental effects.

6.1 Recommended Conditions and /or Mitigations

The C-NLOPB recommends that the following conditions be included in the authorization if the seismic program is approved:

- *Husky Energy shall implement or cause to be implemented all the policies, practices, recommendations and procedures for the protection of the environment included in or referred to in the application and in the “Labrador Shelf Seismic Program – Environmental Assessment” (Husky 2010) and the “Addendum to Husky Energy’s Labrador Shelf Seismic Program - Environmental Assessment” report (Husky 2010).*
- *Husky Energy, or its contractors, shall shut down the seismic airgun array if a marine mammal or sea turtle listed as **Endangered or Threatened** (as per Schedule 1 of SARA) is observed within 500 m of the safety zone during ramp-up procedures and when the array is active.*

Part D: Screening Decision

7. Decision/Decision Date

The C-NLOPB is of the opinion that, taking into account the implementation of the mitigations set out in the conditions above and those committed to by Husky Energy, the seismic program **is not likely to cause significant adverse environmental effects**. This represents a decision pursuant to Section 20(1)(a) of the *CEAA*.

Responsible Officer Original signed by E. Young
Elizabeth Young
Environmental Assessment Officer

Date: July 23, 2010

References:

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