CANADA-NEWFOUNDLAND and LABRADOR OFFSHORE PETROLEUM BOARD SCREENING REPORT PART A: GENERAL INFORMATION

Part A: GENERAL INFORMATION

Screening Date	**September 28, 2012**
EA Title	Environmental Assessment of Husky's Jeanne d'Arc Basin/Flemish Pas Regional Seismic Program, 2012-2020
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CEAA Law List Triggers	Paragraph 138(1) (b) *Canada-Newfoundland Atlantic Accord Implementation Act* (Accord Act)

Part B: PROJECT INFORMATION

On December 1, 2011, Husky Energy (Husky) submitted a project description, *Seismic Environmental Assessment Jeanne d'Arc/Flemish Pass Area Project Description (*LGL 2011) to the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), describing its plans to undertake 2-D, 3-D and/or 4-D seismic surveys, well site geohazard surveys, and vertical seismic profile (VSP) surveys in the Jeanne d'Arc and Flemish Pass area in one or more years within a 2012 through 2020 timeframe. Husky will conduct 2-D, 3-D and/or 4-D seismic surveys and well site geohazard surveys between March 1 and November 30 of any given year in the 2012 to 2020.timeframe. VSP surveys will be conducted year-round, 2012-2020. Husky submitted the *Environmental Assessment of Husky's Jeanne d'Arc/Flemish Pass Regional Seismic Program, 2012-2020* (LGL 2012a) on February 27, 2012, herein referred to as the EA Report. On May 7, 2012, the C-NLOPB requested additional information from Husky in order to satisfy the requirements of the *Canadian Environmental Assessment Act* (CEAA). On

May 22, 2012, Husky responded to this request for additional information with the *Environmental Assessment of Husky's Jeanne d'Arc/Flemish Pass Regional Seismic Program, 2012-2020 Addendum* (LGL 2012b).

The remainder of Part B summarizes the proposed project, the related environmental setting and existing human use of the area, based on the above mentioned information.

1 Description of Project

The program in 2012, as proposed by Husky, is to conduct one or more 2-D, 3-D, and/or 4-D seismic surveys during the 1 March to 30 November timeframe and at least three well site geohazard surveys. VSP surveys may be conducted in 2012.

The Project Area includes the areas of interest plus a 10-km buffer area to accommodate the ships' turning radii. The total area of the Project Area is 34,948 km^2. The Study Area includes the Project Area plus a 20-km buffer area around the Project Area to account for the propagation of seismic survey sound that could potentially affect marine biota. The total area of the Study Area is 51,258 km^2.

In 2012, priority will be to conduct seismic surveys within a 2,479 km^2 area near the White Rose Field. The duration of the 2012 seismic surveying will be 20 to 60 days of data acquisition.

The three well site geohazard surveys planned for 2012 will also be conducted in the area of the White Rose field. The additional two to four contingent well site surveys could be conducted outside the specified primary 2012 activity area but within the Project Area. Geohazard surveying could take as long as seven days per survey block. Therefore, the total duration of geohazard surveying in 2012 will range from about 21 to 49 days, depending on the number of blocks surveyed.

The proposed 2012 component of the Project is a ship-based seismic program which is designed to acquire 2-D, 3-D and/or 4-D data, as well as wellsite geohazard survey data within the White Rose field. The seismic survey vessel(s) used during the Project will be approved for operation in Canadian waters and will be typical of the worldwide seismic fleet. In the case of either 2-D or 3-D surveys, the seismic survey ship will have airgun arrays and multiple streamers (up to approximately 8 km in length). If geohazard surveys are required, they will be conducted over a much reduced geographic and temporal scope using a combination of acoustic equipment including a much smaller airgun array (reduced number of airguns and volume), or sparkers, boomers, and sonars. VSP surveys would occur in close proximity to the drill rig.

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 these reports.

2.1 Physical Environment

The survey will be conducted in water depths ranging from 100 to 1,000 m. The Labrador Current is comprised of two main streams; an inshore stream near the coast, and a more intense offshore stream over the shelf break between the 400 and 1,200 m isobaths. There is some exchange between these two streams which occurs in the channels and saddles that separate the banks offshore Labrador and Newfoundland. The inshore branch of the Labrador Current flows through the Avalon Channel, while the offshore branch flows along the northern slope of the Grand Banks. This branch of the Labrador Current divides east of

48°W, resulting in part of the branch flowing to the east around Flemish Cap and the other flowing south around the eastern edge of the Grand Banks and through Flemish Pass.

The Gulf Stream, a major current system situated to the south of the Grand Banks branches into two streams. The southern branch continues east at approximately 40°N. The northern branch, known as the N Atlantic Current, turns north and runs along the east side of the Grand Banks and Flemish Cap, and then turns east following approximately 50°N latitude across the Atlantic.

The Project Area was divided into four sub-areas with depth ranges of 0 m to 100 m, 100 m to 200 m, 200 m to 400 m, and greater than 400 m for the analysis of underwater currents. Detailed information on these currents may be found in the EA Report.

Wind and wave climate statistics for the area were extracted from the MSC50 N Atlantic wind and wave climatology database. Three grid points located within the Project Area were chosen to represent conditions within the area of interest. These grid points are: GP11809 located at 47.1°N;48.4°W, GP11818 located at 47.1°N;47.5°W and GP10636 located at 46.5°N;48.1°W. The White Rose area experiences predominately southwest to west flow throughout the year.

The presence of advection fog increases from April through July. In August the temperature difference between the air and the sea begins to narrow and by September, the air temperature begins to fall below the sea surface temperature. As the air temperature drops, the occurrence of fog decreases. Reduction in visibility during autumn and winter is relatively low and is mainly attributed to the passage of low-pressure systems. Snow is the main cause of reduced visibilities in the winter. September and October have the lowest occurrence of reduced visibility since the air temperature has, on average, decreased below the sea surface temperature and it is not yet cold enough for snow.

During autumn and winter, the dominant direction of the combined significant wave height is from the west. This corresponds with a higher frequency of occurrence of the wind wave during these months, suggesting that during the late fall and winter, the wind wave is the main contributor to the combined significant wave height. During the months of March and April, the wind wave remains predominately westerly, while the swell begins to back to southerly, resulting in the vector mean direction of the combined significant wave heights being from the southwest. A mean south-westerly direction for the combined significant wave heights during the summer months is a result of a mainly south-westerly wind wave and a south-westerly swell. As winter approaches again, during the months of September and October, the wind wave will veer to the west and become the more dominant component of the combined significant wave height. This will result in the frequency of occurrence of the combined significant wave heights being from the west once again.

The wave rose shows that the majority of wave energy comes from the west-southwest to south-southwest, and accounts for 35.7% of the waves at GP10636, 35.8% of the waves at GP11809 and 35.5% of the waves at GP11818. The majority of significant wave heights lie between 1.0 and 3.0 m. There is a gradual decrease in frequency of wave heights above 3.0 m and only a small percentage of the wave heights exceeding 7.0 m can be found. Significant wave heights on the Grand Banks peak during the winter months with the majority of data sources peaking in January. The lowest significant wave heights occur in the summer with July month the lowest mean monthly significant wave height of only 1.7 m at all three grid points.

Combined significant wave heights of 10.5 m or more occurred in each month between September and April in the MSC50 data, with the highest waves occurring during the month of February. The highest

combined significant wave heights of 14.7 m and 12.0 m in the Terra Nova and Hibernia data sets, respectively, occurred during a February 11, 2003 storm event.

Air and sea surface temperatures for the area were extracted from the International Comprehensive Ocean-Atmosphere set (ICOADS) data set. Temperature statistics show that the atmosphere is coldest in February with a mean monthly air temperature of -0.4°C, and warmest in August with a mean monthly air temperature of 14.4°C. Similarly, sea surface temperature is warmest in August with a mean monthly temperature of 14.0°C and coldest in February with mean monthly temperatures of 0.2°C. The mean sea surface temperature is cooler than the mean air temperature from March to August, with the greatest difference occurring in the month of July. From September to February, sea surface temperatures are warmer than the mean air temperature. The colder sea surface temperatures from March to August have a cooling effect on the atmosphere, while relatively warmer sea surface temperatures from September to February tend to warm the overlying atmosphere.

The frequency of precipitation type shows that annually, precipitation occurs 22.0% of the time within the ICOADS region. Winter has the highest frequency of precipitation with 34.8% of the observations reporting precipitation. Snow accounts for the majority of precipitation during the winter months, accounting for 58.6% of the occurrences of winter precipitation. Summer has the lowest frequency of precipitation with a total frequency of occurrence of 12.9%. Snow has been reported in each month from August to May; however, this is may be due to coding error rather than the actual presence of snow. Thunderstorms occur relatively infrequently over the study area though they may occur in any month of the year. Spring has the least number of thunderstorms occurring only 0.02% of the time while summer has the highest frequency of thunder storms with 0.12%.

A weekly analysis of the Canadian Ice Service's 30-Year Frequency of Presence of Sea Ice over the area shows that the Project Area is affected by sea ice beginning the week of January 22 and lasting until the week beginning April 30. The week of March 19 is the time when the frequency of presence of sea ice is the greatest over the area. The frequency of presence of sea ice over the majority of the region south of 47°N is 1 to 15%. Within the portion of the project area north of 47°N the frequency of presence of sea ice is mainly between 16 to 33%. The predominant ice type within the area from January 15th to the week of February 12th is a mixture of grey and grey-white. By February 19th, thin first-year ice begins to form. First-year ice is the predominant ice type from February 26 until the week of May 28, though other types are also present. The 30-year median concentration of sea ice reaches its maximum the week of March 12. The median of ice concentration does not extend into the project area. The maximum median sea ice extent reaches to 48°N. A monthly analysis shows that icebergs have been spotted within the region from January to August, October and December however they are most prominent during the month of April. With respect to size, the most prominent icebergs are small, accounting for 28.7% of observed icebergs within the region. Large icebergs occur 9.8% of the time.

2.2 Biological Environment

2.2.1 Species at Risk

There are a number of Species at Risk, as defined under Schedule 1 of the *Species at Risk A*ct (SARA) that are likely to be within the Study Area. The following table identifies species likely to be present and their SARA listing and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designation. A brief description of species listed as endangered or threatened on Schedule 1 is included below.

SPECIES	SARA Status	COSEWIC Status
Blue Whale (*Balenoptera musculus*)	Schedule 1 – Endangered (May 2012)	Endangered (May 2012)
North Atlantic Right Whale (*Eubalaena glacialis*)	Schedule 1 – Endangered (2003)	Endangered (May 2003)
Leatherback Turtle (*Dermochelys coriacea*)	Schedule 1 – Endangered (May 2012)	Endangered (May 2012)
Ivory Gull (*Pagophilia eburnea*)	Schedule 1 – Endangered (April 2006)	Endangered (April 2006)
White shark (*Carcharodon carcharias*)	Schedule 1 – Endangered (April 2006)	Endangered (April 2006)
Northern Wolffish (*Anarhichas denticulatis*)	Schedule 1 – Threatened (May 2001)	Threatened (May 2001)
Spotted Wolffish (*Anarhichas minor*)	Schedule 1 – Threatened (May 2001)	Threatened (May 2001)
Atlantic Wolffish (*Anarhichas lupus*)	Schedule 1 – Special Concern (2000)	Special Concern (November 2000)
Fin Whale (*Balaenoptera physaalus*)	Schedule 1 – Special Concern (May 2005)	Special Concern (May 2005)
Sowerby's beaked whale (*Mesoplodon bidens*)	Schedule 1 – Special Concern (November 2006)	Special Concern (November 2006)
Harbour porpoise (*Phocoena phocoena*)	Schedule 2 – Threatened (April 2006)	Special Concern (April 2006)
Humpback whale *(Megaptera Novaeangliae*)	Schedule 3 – Special Concern (May 2003)	
Atlantic cod (*Gadus morhua*)	Schedule 3 – Special Concern (May 2003)	
Loggerhead sea turtle (*Caretta caretta*)		Endangered (April 2010)
Atlantic cod (*Gadus morhua*) NL population		Endangered (April 2010)
Porbeagle shark (*Lamna nasus*)		Endangered (May 2004)
Cusk (Brosme brosme)		Threatened (May 2003)
Shortfin mako shark (*Isurus oxyrinchus*)		Threatened (April 2006)
Blue shark (*Prionace glauca*)		Special Concern (April 2006)
American plaice (*Hippoglossoides platessoides*) NL population		Threatened (April 2009)
Basking shark (*Cetorhinus maximus*)		Special Concern (November 2009)
Roughead grenadier (*Macrourus berglax*)		Special Concern (April 2007)
Roundnose grenadier (*Coryphaenoides rupestris*)		Endangered (November 2008)
Atlantic salmon (*Salmo salar*) South NL population		Threatened (November 2010)
Acadian redfish (*Sebastes fasciatus*) Atlantic population		Threatened (April 2010)

Deepwater redfish (*Sebastes mentella*) Northern population		Threatened (April 2010)
Spiny dogfish (*Pagophila ebumea*)		Special Concern (April 2010)

The blue whale tends to be more frequently observed in deep water than in coastal environments. A recently finalized recovery strategy for blue whales in the NW Atlantic is available with a long-term recovery goal to reach a total of 1,000 mature individuals through the achievement of three 5-year objectives. No critical habitat was identified. Blue whales likely number in the low hundreds in the NW Atlantic and have been sighted only sporadically off the NE coast of Newfoundland. There were no sightings of blue whales in the Study Area in the DFO cetacean sightings database. During a CSEM monitoring program in 2007, there were two sightings of blues whales in the Study Area, both occurred in August and in water depths of 2,366 m and 2,551 m. Blue whales feed primarily on krill and their distribution is often associated with areas of upwelling or shelf edges where their prey may concentrate. Blue whales are considered rare in the Study Area.

The total population of North Atlantic Right Whale currently numbers about 325 individuals and is considered extremely rare in the Study Area. However, there have been some relatively recent sightings of small numbers of right whales off Iceland and Norway, and it is possible that this species may occur in the Study Area. Right whales were recorded once in the Study Area; on 27 June 2003 during a Provincial Airlines (PAL) reconnaissance survey. The Recovery Strategy (Brown *et. al.* 2009) noted a goal "to achieve an increasing trend in population abundance over three generations" via seven recovery objectives. Critical habitat has been identified outside of the C-NLOPB jurisdiction.

The Leatherback sea turtle is the largest and most widely ranging of sea turtles. There are an estimated 26,000 to 43,000 individuals globally. Adult leatherbacks are considered regular summer visitors to eastern Newfoundland, with the northernmost records occurring off Labrador at nearly 54^{o} N. Observations around Newfoundland and Labrador occur from June to November, but are most common in August and September. DFO Newfoundland Region has maintained a database of leatherback turtle sightings and entanglements in Newfoundland and Labrador. One leatherback turtle observation was recorded in the southwestern portion of the Study Area in August 2007. In the recovery strategy (ALTRT 2006) for leatherback sea turtle in the Canadian Atlantic Ocean, the recovery goal is to "achieve the long-term viability of the leatherback turtle populations frequenting Atlantic Canadian waters" via six supporting objectives. No critical habitat has been designated.

The Ivory Gull is a rare gull species that is associated with pack ice at all times of the year. Ivory Gulls occur among the pack ice of the Davis Strait, the Labrador Sea, Strait of Belle Isle, and northern Gulf of St. Lawrence. Currently, the Canadian breeding population is estimated at 500 to 600 individuals. Surveys conducted during 2002 to 2005 indicate a total decline of 80% and an annual decline of 8.4% over the last 18 years. During heavy ice winters, the Ivory Gull may occasionally reach the southern Orphan Basin and northern Grand Banks in the Study Area. The thirty-year median of ice concentration shows ice extending into the northern edge of the Grand Banks east to 48°W during late February to late March. This species is expected to be very rare in the Study Area.

The northern and spotted wolffish have a very similar life history, except that the northern wolffish inhabits slightly deeper water. Atlantic wolffish is primarily demersal and inhabits shallower areas than northern and spotted wolffishes. During 1980-1984, wolffish were most concentrated on the northeast Newfoundland and Labrador shelf and banks, the southwest and southeast slopes of the Grand Banks, along the Laurentian Channel, and in the Gulf of St. Lawrence. Between 1995 and 2003, the area occupied and density within the area was considerably reduced. The species is still relatively widespread,

and therefore exists in considerable numbers. A recovery strategy for the northern wolffish and spotted wolffish, and a management plan for Atlantic wolffish in Canada was published in 2008 (Kulka *et. al*., 2008).

Off Atlantic Canada, the white shark has been recorded from the NE Newfoundland Shelf, the Strait of Belle Isle, the St. Pierre Bank, Sable Island Bank, the Forchu Misaine Bank, in St. Margaret's Bay, off Cape La Have, in Passamaquoddy Bay, in the Bay of Fundy, in the Northumberland Strait, and in the Laurentian Channel as far inland as the Portneuf River Estuary. The species is highly mobile, and individuals in Atlantic Canada are likely seasonal migrants belonging to a widespread NW Atlantic population. It occurs in both inshore and offshore waters, ranging in depth from just below the surface to just above the bottom, down to a depth of at least 1,280 m. A Recovery Strategy for the White Shark has not yet been published.

2.2.2 Fish and Fish Habitat

A detailed description of the plankton, benthos, and deep-water corals and sponges communities can be found in the EA Report (LGL 2012a) and EA Addendum (LGL 2012b). There are three main types of marine fish present in the Study Area: pelagic fish, those that live and feed close to the surface; demersal or groundfish, those that live and feed close to the bottom; and shellfish, which include crustaceans and bivalves.

Five fish species, capelin (*Mallotus villosus*), skate, Atlantic halibut (*Hippoglossus hippoglossus*), Greenland halibut (*Reinhardtius hippoglossoides*), and Atlantic cod (*Gadus morhua*), were reported to account for at least 0.2% of average total catch weight within the Study Area from 2005 to 2010. These species are profiled in the EA Report (LGL 2012a) and EA Addendum (LGL 2012b).

Two macroinvertebrate species, snow crab (*Chionoecetes opilio*), and northern shrimp (*Pandalus borealis*), dominate the reported landings of commercial catches within the Study Area during 2005 to 2010 (combined average catch weight nearly 96% of total). Other macroinvertebrates that account for at least 4% of the 2005 to 2010 average total catch weight include Stimpson's surf clam (*Mactromeris polynyma*; 3.6%), cockles (0.4%), and rock crab (*Cancer irroratus*; <0.1%).

Other species that have been harvested within the Study Area during recent years include: Redfish (*Sebastes* spp.); American plaice (*Hippoglossoides platessoides*); Squid (*Illex* sp.); Wolffishes (*Anarhichas* spp.); Roughhead grenadier (*Macrourus berglax*); Bluefin tuna (*Thunnus thynnus*); Witch flounder (*Glyptocephalus cynoglossus*); White and blue Hakes (*Urophycis tenuis*; *Antimora rostrata*); Whelks; and Yellowtail flounder (*Limanda ferruginea*). These are profiled in the EA Report.

The snow crab, a decapod crustacean, occurs over a broad depth range in the NW Atlantic from Greenland south to the Gulf of Maine. Large males are most common on mud or mud/sand, while smaller crabs are common on harder substrates. The snow crab life cycle features a 12 to 15 week planktonic larval period, following spring hatching, involving several stages before settlement. Benthic juveniles of both sexes molt frequently, and at about 40 mm CW (~4 years of age) they may become sexually mature. Female crabs carry the fertilized eggs for about two years. Georeferenced commercial catch data for the May to November period, 2005-2010, indicate a wider distribution of catch locations for snow crab than for northern shrimp. Most snow crab catches were made between the 100 and 200 m isobaths of the Jeanne d'Arc Basin in the northwestern, central, and south-central portions of the Study Area. Scattered harvest locations were also reported for the shallower regions of the Jeanne d'Arc Basin and the Flemish Pass, in the western and eastern portions of the Study Area, respectively. Based on DFO RV survey data collected in the Study Area from 2006 to 2010, most of the snow crab was caught at mean water depths around 170 m during both

spring and fall surveys. In terms of total catch weight, the greatest proportion of snow crab was caught in the north-western portion of the Study Area during DFO RV surveys from 2006 to 2010.

The northern shrimp is distributed from Davis Strait to the Gulf of Maine. It usually occupies soft muddy substrates up to depths of 600 m in temperatures of 1°C to 6°C. Larger individuals generally occur in deeper waters. They migrate up the water column at night, feeding on pelagic copepods and krill. After insemination, female shrimp may migrate to shallower water areas where the water temperatures are most appropriate for embryonic development and subsequent larval hatch. Eggs are typically extruded in the summer and remain attached to the female until the following spring, when the female migrates to shallow coastal waters to spawn. The hatched larvae float to the surface and commence feeding on planktonic organisms. Georeferenced commercial catch data for the May to November period, 2005-2010, indicate that most northern shrimp catches within the Study Area occurred on the northeastern Newfoundland Slope, between the 200 and 500 m isobaths in the north-central region of the Study Area. Scattered shrimp catches were also reported on the slopes of the Jeanne d'Arc Basin and Flemish Pass. Based on DFO RV survey data collected in the Study Area from 2006 to 2010, most of the northern shrimp were caught at mean water depths around 200 m during both spring and fall surveys. In terms of total catch weight, the greatest proportion of northern shrimp was caught in the central and north-central portions of the Study Area during DFO RV surveys from 2006 to 2010.

The Stimpson's surf clam is the largest clam in the north-western Atlantic Ocean and occurs from Labrador to Rhode Island. In the Canadian part of its range, this species occurs in commercial quantities in the offshore areas of the Scotian Shelf and Eastern Grand Banks, and inshore areas off southwest Nova Scotia and in the Gulf of St. Lawrence. They appear to prefer medium to coarse sand substrate in which they burrow. Georeferenced commercial catch location data did not indicate any catches for Stimpson's surf clam in the May to November period for 2005-2010 within the Study Area. However, clams were caught in the south-western portion of the Study Area between January and March of 2006, at locations with water depths less than 100 m.

The Greenland cockle is widely distributed throughout the Arctic Ocean and southward in varying degrees. In the Northwest Atlantic Ocean, it is found from Greenland to Cape Cod at sub-tidal depths greater than 9 m. It has been found on sandy substrates within a depth range of 6 to 18 m at various Labrador locations. It is approximately 100 mm in diameter at full growth. The life history of the Greenland Cockle is poorly understood. Georeferenced commercial catch data for the May to November period, 2005-2010, did not indicate any cockle catches within the Study Area. However, some catches were made in the south-western portion of the Study Area between January and March of 2006 in water depths less than 100m.

Rock crabs are found from Labrador to Florida at various depths, ranging from 6 to 456 m. This bottom-dwelling species prefers sandy or mud bottom, but is also commonly found on all types of substrate. Rock crabs increase in size through molting, which occurs primarily in April and May. Males reach a larger maximum size than females. These crabs become sexually mature at a carapace width of around 40 mm and 25 mm for males and females, respectively. Rock crabs reach commercial size at approximately six years of age, and the fishery is regulated by DFO to include mandatory licenses, quotas, minimum size (carapace width of 102 mm), and a ban on catching females or soft-shelled crabs. Georeferenced commercial catch data indicated a single reported rock crab catch for the May to November period, 2005-2010, which occurred in the south-eastern portion of the Study Area in water depths less than 50 m.

2.2.3 Commercial Fisheries

Approximately half of the Study Area is outside Canada's 200-nm EEZ, overlapping portions of NAFO UAs of 3L and 3M. Several key fisheries beyond or overlapping the EEZ are managed by NAFO (e.g., northern shrimp); however, "sedentary" species (e.g., snow crab) are managed by DFO. Most fishing for relevant species in the NAFO Convention Regulatory Area (RA) is conducted using mobile bottom-tending trawls. The domestic harvest within the Study Area is equally northern shrimp and snow crab, with a minor component of Stimpson`s surf clam. Together, these three species have typically made up more than more than 99% of the Study Area harvest in recent years (though with decreasing shrimp quotas the relative importance of the species may change somewhat in the next few years).

Northern shrimp was the most significant species harvested within the Study Area in terms of average quantity, and second most in terms of value, accounting for an average of 9,591 Mt (63.6% of total harvest) between May and November from 2005 to 2010. The Study Area overlaps with parts of Shrimp Fishing Area (SFA) 7. As noted above, SFA 7 (which corresponds to Division 3L) and 3M are managed through NAFO. Snow crab was of the most importance in the Study Area's fisheries in terms of value, averaging 5,474 Mt from May to November, 2005 to 2010, and accounted for 36.3% of the average total harvest in this time period. The season is defined each year, but typically runs from April to July or August. This fixed gear fishery poses more potential than mobile gear fisheries for seismic / fishing gear conflicts in those areas where the two marine activities might overlap in time and space. The Study Area overlaps with portions of Crab Fishing Areas (CFA) 8B (southern Avalon, outside of 50 miles), Msex (mid-shore extended), 3Lex (from 170 miles to 200 miles from shore) and 3L200 (beyond 200 nautical miles), which are partly within Divisions 3L and 3M. Stimpson's surf clam represents 3.6% of the Study Area catch by quantity and 2.5% by value, with a catch weight value of 481 Mt in 2006. Most of this harvest in the Study Area is taken using clam dredges, although some are also taken as by-catch in other dredge fisheries.

The commercial fisheries within the Study and Project Areas are conducted using both mobile gear (shrimp trawls) and fixed gear (crab pots and gillnets). Crab pots are set on the seabed in strings buoyed at the surface. Crab gear generally has a highflyer (radar reflector) at one end and a large buoy at the other. Although they only account for about 0.1% of the harvest by quantity, Greenland halibut gillnets (e.g., 200 nets per boat) are also fixed gear. Shrimp are harvested with shrimp trawls.

2.2.4 Marine Mammals and Sea Turtles

A total of 20 marine mammals, including 17 cetacean and three seal species, are known or expected to occur in the Study Area. Most marine mammals use the Study Area seasonally, and the region likely represents important foraging areas for many. Sea turtles regularly occur on the Grand Banks and adjacent waters with three species potentially occurring within the Study Area. The EA Report provides a summary of the marine mammals and sea turtles known or expected to occur in the northern Grand Banks Study Area. It also provides a summary of sightings from data sources including commercial whaling, fisheries observers, marine Mammal Observers (MMOs) on board seismic vessels, and the general public. Sighting dates ranged from 1961 to 2009.

Six species of baleen whales occur in the Study Area. The four more common baleen whales are the Fin Whale, Sei whale (*B.borealis*), Humpback whale (*Megaptera novaeangliae*) and Minke whale (*B. acutorostrata*). Some baleen whales are present in offshore waters of Newfoundland year-round but most species presumably migrate to lower latitudes during winter months. Based on the most recent data in the DFO cetacean sightings database, fin whales have been sighted throughout the Study Area year-round, but predominantly during the summer and seven sei whale sightings have been reported. Humpbacks are the most commonly recorded mysticete in the Study Area, with sightings occurring year-round, but

predominantly during May to October. Within the Study Area, minke whales were sighted thirty one times during seismic programs in 2008, with sightings predominantly recorded during summer months.

Eleven species of toothed whales occur in the Project Area. Many of these species seem to be present in the Study Area only seasonally. The most common toothed whales found in the Study Area include the Sperm Whale (*Physter macrocephalus*), Northern bottlenose whale (*Hyperoodon ampullatus*), Killer whale (*Orcinus orca*), Longfinned pilot whale (*Globicephala melas*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), Shortbeaked common dolphin (*Delphinus delphis*), White-beaked dolphin (*L. albirostris*), Common bottlenose dolphin (*Tursiops truncates*), Striped dolphin (*Stenella coeruleoalba*), and Harbour porpoise (*Phocoena phocoena*). Sperm whales were regularly sighted in the deep waters of Orphan Basin during the summers of 2004-2007 but were not observed in the shallower waters of Jeanne d' Arc Basin in 2005-2008. There are 15 sightings of sperm whales reported in the DFO cetacean sightings database that occurred in the Study Area from May to December. The total abundance of northern bottlenose whales in the North Atlantic is unknown, but there is no abundance estimate for Davis Strait, and few sightings were made during recent surveys. Based on the DFO cetacean sightings database, there have been only few sightings of northern bottlenose during recent surveys. Killer whales may occur at relatively low densities, but are considered year-round residents of NL. Sightings seem to be increasing in recent years, but it is unclear if this is due to increasing abundance or observer effort. There were 10 killer whale sightings in the Study Area in water less than 500 m deep; sightings in the DFO cetacean sightings database occurred from May through November. Four sightings of killer whales were recorded in Jeanne d'Arc Basin during the Statoil/Husky seismic monitoring program in 2008. Long-finned pilot whales were the most commonly recorded toothed whale in the DFO cetacean database, occurring in the Study Area from February to October. Atlantic white-sided dolphins occur regularly from spring to fall in offshore areas of Newfoundland, but less is known of their winter distribution. There were 5 sightings in the DFO cetacean sightings database. There were four sightings of short-beaked common dolphin recorded in the Study Area in the DFO database. 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. Sightings of white-beaked dolphins are considered uncommon in the Study Area. There were five sightings recorded in the Study Area in shelf waters. The common bottlenose dolphin is considered rare in the Study Area; there were no sightings of bottlenose dolphins in the DFO cetacean database for the area. There were no sightings of the striped dolphin recorded in the Study Area based on the DFO cetacean database. Harbour porpoises typically occur singly or in small groups of up to three individuals, occasionally occurring in larger groups. There were up to four sightings of harbour porpoise in the Study Area in the DFO cetacean sightings database.

Three species of seals including harp (*Pagophilus groenlandicus*), hooded (*Cystophara cristata*) and perhaps grey seals (*Halichoerus grypus*) occur in the Project Area. Harp seals are common during late winter and early spring off NE Newfoundland and southern Labrador where they congregate to breed and pup on the pack ice; the majority of the NW Atlantic population uses this region. Hooded seals aggregate in eastern Greenland to moult during early summer before dispersing to Davis Strait or the Greenland Sea for late summer and fall. Grey seals inhabit cold temperate to sub-Arctic regions of the N Atlantic, ranging in Canada from Nova Scotia to Labrador. An unknown number range into eastern Newfoundland. Grey seals are considered rare in the Study Area.

Sea turtles regularly occur on the Grand Banks and adjacent waters; two species could potentially occur within the Study Area. Information to date indicates a seasonal population of juvenile loggerheads in Atlantic Canada. Loggerheads may be seen in the open seas during migration and foraging. Although they have not been reported in the Study Area, juvenile loggerhead turtles tagged in U.S. waters were recorded just south of the Study Area. Most loggerhead records offshore Newfoundland have occurred in deeper waters south of the Grand Banks. The Kemp's Ridley sea turtle is more restricted in distribution, primarily occurring only in

the Gulf of Mexico, but some juveniles sometimes feed along the U.S. east coast and rarely range into eastern Canada waters. Juveniles have been sighted along the southern Newfoundland coast, in St. Mary's Bay, and off of Nova Scotia, but there are no known reports in the Study Area.

2.2.5 Marine Birds

The Grand Banks area supports large numbers of seabirds during all seasons. There are approximately 26 seabird species that occur in the Study Area that are described in the EA Report. Results of seabird surveys, including the more recent Canadian Wildlife Service (CWS) and monitoring programs for geophysical surveys are also included in the EA Report. During the Eastern Canadian Seabirds at Sea (ECSAS) surveys of Newfoundland and Nova Scotia waters the Sackville Spur, Orphan Basin and Flemish Pass all emerged as important to one or more species/groups in one or more seasons. Northern Fulmar (*Fulmaris glacialis)* and gulls (*Larus* spp.) were found in the highest concentrations in the Newfoundland and Labrador Shelf region on the Sackville Spur during spring. Significant numbers of these birds were also present in winter. Northern Fulmars, Leach's Storm-Petrels (*Oceanodroma leucorhoa)* and shearwaters (*Puffinus* spp.) were found in summer along the southern edge of the Orphan Basin. The ECSAS surveys in the Flemish Pass and Flemish Cap showed local hotspots during winter and spring for Northern Fulmar, Black-legged Kittiwake (*Rissa tridactyla)*, Dovekie (*Alle alle)*, gulls (spring only) and murres (*Uria aalge)*. Shearwaters were in high densities in summer.

2.2.6 Sensitive and Special Areas

Potential sensitive areas include: important bird areas (IBA); important coral areas; Ecologically and Biologically Significant Areas (EBSAs), Marine Protected Areas (MPAs) and MPA Areas of Interest (AOI) identified pursuant to the *Oceans Act*; and National Marine Conservation Areas (NMCAs) identified pursuant to the *National Marine Conservation Areas Act*.

There are nine significant seabird nesting sites on the SE coast of Newfoundland from Cape Freels to the Burin Peninsula. Each meets the criteria for an Important Bird Area (IBA).

The Study Area includes a portion of the Placentia Bay Grand Banks (PBGB) Large Ocean Management Area (LOMA), one of the marine regions established to form the planning basis for implementation of integrated-management plans by DFO. DFO Newfoundland and Labrador Region has identified 11 EBSAs within the PBGB LOMA as potential Areas of Interest (AOIs) for Marine MPA designation, one of which overlaps the Study Area, namely the NE Shelf and Slope EBSA. The Northeast Shelf and Slope EBSA has an overall "low priority" rating relative to other EBSAs within the PBGB LOMA. Aspects of this EBSA are described in the EA Report.

As well, the *Oceans Act* provides the Minister of DFO with a leadership role for coordinating the development and implementation of a federal network of MPAs, which can include areas within and outside of the Integrated Management (IM) area that have yet to be developed within the Region. Therefore, there remains potential for further identification of EBSAs, AOI, MPAs and other sensitive areas within the Study Area.

In 2008 and 2009, the NAFO Scientific Council identified areas of significant coral and sponge concentrations within the NAFO Regulatory Area. Based on these identifications, areas for closure to fishing with bottom contact gear were delineated. Figure 4.34 in the EA Report shows the locations of 11 of these areas that occur either within or close to the Study Area. Implementation date of the closures started on 1 January 2010.

In 2003, as protection for the Northern cod, the Fisheries Resource Conservation Council (FRCC) recommended the establishment of an experimental "cod box" in the Bonavista Corridor. The Corridor

has been identified as an area important for cod spawning and juvenile cod. The FRCC recommended that this area be protected from all forms of commercial fishery (excluding snow crab trapping) and other invasive activity such as seismic exploration. In April 2003, DFO announced that special conservation measures were required for the Bonavista Corridor, including the Bonavista Cod Box, located about 120 km North-west of the Study Area.

A search of the Department of National Defence (DND) records was conducted to determine the possible presence of unexploded ordinates (UXO) within the Study Area. Their records indicate no wrecks are present within the survey area.

2.2.7 Research Surveys and Vessel Traffic

Fisheries research surveys conducted by DFO, and sometimes by the fishing industry, are important to the commercial fisheries to determine stock status, as well as for scientific investigation. In any year, there may be overlap between the Study Area and DFO research surveys in NAFO 3LM, depending on the timing in a particular year. Typically, DFO conducts a spring survey in sections of 3LNOPs (April to July), and a fall survey of 2HJ3KLMNO (September or October to December). The fall survey may employ two vessels. The deeper waters of 3L (slope areas) are typically surveyed in October, and the shallower areas in November or December. There is also an annual spring acoustic survey for capelin in NAFO Division 3L.

Members of the FFAW have been involved in an industry survey for crab in various offshore harvesting locations over the past few years, such as the snow crab DFO-industry collaborative post-season trap survey. This survey is conducted every year. It starts on September 1 and may continue until November before it is completed. The set locations are determined by DFO and do not change from year to year. Many of the eastern stations fall within Husky's Study Area.

The Department of National Defence (DND) is likely to be transiting and conducting navy exercises within the study area during the April to October 2012 to 2020 timeframe. It will be necessary to maintain contact with DND throughout each work season.

There are three existing offshore production developments (Hibernia, Terra Nova, and White Rose) on the northeastern part of the Grand Banks which fall outside of the boundaries of the Study Area. There may be up to three other seismic programs ongoing at the same time. Seismic ships will maintain at least a 40 kilometer buffer between themselves.

Part C: ENVIRONMENTAL ASSESSMENT PROCESS

3. Review Process

On December 1, 2011, Husky submitted a project description *Seismic Environmental Assessment Jeanne d'Arc Basin/Flemish Pass Area Project Description* (LGL 2011). The Project requires 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 CEAA *Federal Coordination Regulations* (FCR) Section 5 Notification on December 5, 2011 to: DFO; Environment Canada (EC); 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. On December 20, 2011, the C-NLOPB notified Husky that a screening level of assessment was required and the proponent was provided with a Scoping Document.

Pursuant to paragraph 12.4(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 was responsible for coordinating the review activities by the expert government departments and agencies that participated in the review.

On February 27, 2012, Husky submitted the "*Environmental Assessment of Husky's Jeanne d'Arc/Flemish Pass Regional Seismic Program, 2012-2020*" (LGL 2012a). The C-NLOPB forwarded the EA Report on February 28, 2012 to DFO, EC, DND, and the provincial Departments of Environment and Conservation, Fisheries and Aquaculture, and Natural Resources. The FFAW and One Ocean were also provided a copy of the EA Report for review.

On July 6, 2012, the *Canadian Environmental Assessment Act* (S.C. 1992, c. 37) was repealed when the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) came into force. As a result, environmental assessment for the *Husky Energy Jeanne d'Arc Basin/Flemish Pass Regional Seismic Program* was no longer a federal requirement. However, all other applicable legislative, regulatory and constitutional requirements still must be fulfilled. In particular, safety and environmental protection are priority responsibilities of the C-NLOPB pursuant to the Accord legislation, and the C-NLOPB still must consider the potential environmental effects of activities that are proposed for its authorization. Therefore, the C-NLOPB informed Husky on July 17, 2012 that it would be continuing and completing this EA.

Comments on the EA Report were received from DFO, EC, DND and the FFAW. In order to address deficiencies in the EA Report, Husky was required to provide a response to the EA Report review comments. Husky responded on May 22, 2012 and the C-NLOPB forwarded the responses to DFO, EC, DND and the FFAW.

It is the obligation of the RAs 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

The Project is located in an offshore area about 240 km northeast of St. John's, Newfoundland and Labrador. In terms of spatial boundaries, the Project Area includes areas of interest plus a 10-km buffer area to accommodate the ships' turning radii. The Study Area includes the 34,948 km^2Project Area plus a 20-km buffer area around the Project Area to account for the propagation of seismic survey sound that could potentially affect marine biota. The total area of the Study Area is 51,258 km^2. The proposed 2012 component of the Project is a ship-based seismic program which is designed to acquire 2-D, 3-D and/or 4-D data, as well as wellsite geohazard survey data within the White Rose field. From 2013 to 2020, the Operator may conduct more seismic, wellsite geohazard and vertical seismic profile (VSP) surveys. Survey design will be determined based on interpretation of the previous surveys and business requirements.

The seismic survey vessel(s) used during the Project will be approved for operation in Canadian waters and will be typical of the worldwide seismic fleet. In the case of either 2-D or 3-D surveys, the seismic survey ship will have airgun arrays and multiple streamers (up to approximately 8 km in length). If geohazard surveys are required, they will be conducted over a much reduced geographic and temporal

scope using a combination of acoustic equipment including a much smaller airgun array (reduced number of airguns and volume), or sparkers, boomers, and sonars. VSP surveys would occur in close proximity to the drill rig.

In 2012, priority will be to conduct seismic surveys within and near the White Rose Field. The maximum extent of the survey area, including the area required for vessel turning, is indicated in the EA Report. The duration of the 2012 seismic survey will be 20 to 60 days of data acquisition.

3.2 Boundaries

The boundaries of the Project are defined in the EA Report as follows and are acceptable to the CNLOPB.

Boundary	**Description**
Temporal	2-D, 3-D, & 4-D Seismic and Well Site Geohazard Surveys - Between March 1 and November 30, 2012 to 2020 VSP Surveys – Year round, 2012 to 2020
Project Area	Defined as a 34,948 km^2 area including a 10 km buffer area for vessel turning. The geographic coordinates (latitude, longitude; WGS84 datum) are: 47.66667 ^{o}N,49.25000^{o}W 47.66667 ^{o}N,46.50000 ^{o}W 46.16667 ^{o}N,46.50000 ^{o}W 46.16667 ^{o}N,49.25000 ^{o}W
Affected Area	Defined as a 51,258 km^2 area that includes the Project Area plus a 20 km buffer area around the Project Area. 47.84655"N,49.51635^{o}W 47.84655"N,46.23400^{o}W 45.98673"N,46.23400^{o}W 45.98673"N,49.51635^{o}W
Regional Area	Jeanne d'Arc Basin and Flemish Pass Area

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 paragraphs 16(1) (a) through 16(1) (d) of the CEAA (1992), and those listed in the *Husky Energy Jeanne d'Arc/Flemish Pass Regional Seismic Program 2012-2020 Scoping Document* (C-NLOPB 2011).

4. Consultation

4.1 Consultation carried out by Husky

Consultations for Husky's 2012-2020 geophysical program were undertaken with the following agencies, stakeholders and interest groups:

- Fisheries and Oceans Canada (DFO)

- Environment Canada (EC)
- Nature Newfoundland and Labrador (NNL) and various member organizations
- One Ocean
- Fish, Food and Allied Workers Union (FFAW) and fleet representatives
- Association of Seafood Producers (ASP)
- Ocean Choice International (OCI)
- Groundfish Enterprise Allocation Council (GEAC, Ottawa)
- Clearwater Seafoods
- Icewater Seafoods
- Newfoundland Resources Limited/Fame Fisheries

The DFO did not have any significant concerns about the proposed program and deemed it unnecessary to meet in person. The DFO's guidance on seismic programs is based upon the "*Statement of Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*" (*SOCP*). The *SOCP* is designed to protect fish (including marine mammals), *SARA* species and fisheries. It was suggested that relevant mitigations from the *SOCP* should be incorporated into the EA, as well as updated fisheries and *SARA* information.

Environment Canada did not feel it was necessary to meet with representatives of the Proponent, and did not indicate any significant concerns about the proposed seismic program.

Though NNL representatives did not have any particular concerns with the proposed program, they did offer some comments regarding the use of Passive Acoustic Monitoring (PAM) technology (including its limitations in detecting and monitoring marine mammals in the vicinity of seismic operations), and the appropriate application of mitigative measures for marine mammals, particularly during nighttime operations. NNL representatives also encouraged the proponent to consider collecting meta-data (i.e., information on water salinity and temperature) during seismic surveying and to subsequently make this information available to independent researchers.

One Ocean stated that fisheries representatives require notification of and information about proposed surveys as early as possible in the planning process.

A number of general issues and specific concerns were discussed at a meeting with FFAW managers and fisher representatives. Key concerns raised during this consultation are summarized below:

1. Fisher representatives noted that the lack of details about where the proponent planned to conduct the 2012 survey made it somewhat difficult to offer specific comments on potential fisheries impacts. [Note that more information related to type and location of activities proposed for 2012 has been included in the EA since the consultation with the FFAW was conducted.]

2. Fish harvesters stated a concern about the gradual expansion of oil exploration and development activities within their established fishing grounds near the Shelf Break, and are particularly worried about any incursion of seismic operations on shrimp grounds in the area they call the "Triangle" (located within SFA 7). They are very worried about the development of additional Safety Zones in the area north of the White Rose production facility and would prefer that no more exploration licences be issued in that particular fishing zone, especially in areas with water depths of 40-50 fathoms.

3. With respect to seismic surveys, harvesters have very strong concerns about their potential impacts on economically important species such as shrimp. They contend that 2011 seismic operations conducted close to established shrimp harvesting grounds (i.e., the "Triangle" within SFA 7) in the summer of 2011 might have been the cause of a significant, "overnight" decline in shrimp Catch Per Unit of Effort (CPUE) levels in that area. Fishers reported that SFA 7 shrimp CPUEs did not return to normal levels in the weeks following completion of the 2011 survey vessel activities.

4. In light of these poor catch rates, fisher representatives noted that many operators vacated their 3L shrimp grounds and moved north to quota area SFA 6 where they found that shrimp CPUEs were higher. As a result, a large portion of the 3L shrimp quota remained uncaught and they believe this translated into millions of dollars worth of lost income.

5. FFAW representatives strongly urged the oil industry to conduct a detailed analysis of the 2011 3L shrimp catch and related enterprise CPUE data, in order to determine whether or not their concerns are valid and significant. During the consultation meeting, fisher representatives acknowledged that there is uncertainty as to whether or not seismic sound has an effect on shrimp behaviour. Considering these unknowns, they suggested that a joint research initiative might be able to shed further light on this matter.

Association of Seafood Producers did not respond.

OCI reported that during 2011, the company had also experienced very poor shrimp catches in SFA 7 but could not say what might have caused this.

GEAC also noted that it was difficult to comment on potential interactions with the planned program and the extent to which survey operations might or might not affect the 2012 shrimp harvesting activities because the proponent's information had not provided enough details about where the 2012 seismic activities would be locate.

Clearwater Foods did not respond.

Icewater Fisheries reported that its vessels have not fished in the proposed Study Area during the last several years, but company representatives noted that this situation could change over the next several years if there are increases in biomass levels for species such as Greenland halibut, cod or redfish.

Newfound Resources Ltd./Fame Fisheries did not respond.

The C-NLOPB are satisfied that the consultations carried out by Husky, and reported on in the EA Report and Addendum, included all elements of the Project, and that Husky has addressed substantive concerns about the proposed Project.

4.2 Review of the March 2011 EA Report

The C-NLOPB forwarded the EA Report on February 28, 2012 to DFO, EC, DND, and the provincial Departments of Environment and Conservation, Fisheries and Aquaculture, and Natural Resources. The FFAW and One Ocean also were provided a copy of the EA Report for review. The consolidated review comments were provided to Husky on May 7 2012. Husky responded on May 22, 2012 and provided an EA Addendum. This EA Addendum was forwarded to reviewers for their consideration.

DFO provided comments on the EA Report on 12 April 2012. Their comments focused on the Statement of Canadian Practice (SOCP), monitoring SARA species over the 9 year program, referencing of the fish data and the transmittal of MMO reports. They also had a number of specific comments pertaining to the accuracy of fish data/landings, SARA information and the placement of the MMO. DFO replied to the Addendum on 30 May 2012 stating that they were satisfied with Husky's response.

DND provided comments on the EA Report on 11 April 2011. They will be present in the area, in a non-interference manner, but no UXOs were found. If any UXO(s) are found, they should be located, not disturbed and the Coast Guard informed immediately. If contact with the ocean bottom is to occur then the use of remotely operated vehicles should be used to survey the area to prevent accidental contact with harmful UXO items. DND replied to the Addendum on 4 June 2012 stating that they were satisfied with Husky's response.

EC provided comments on the EA Report on 10 April 2012 and requested that Husky collect seabird data to share with them and provided protocol and proper bird-handling advice. EC replied to the Addendum on 22 May 2012 stating that they were satisfied with Husky's response.

The FFAW provided comments on the EA report on 7 May 2012. The key issues were: concerns of the impact on shrimp and crab; the dynamics of the fishing industry; and the identification of the possibility of gear contact.

All reviewers were satisfied that their comments had been adequately addressed. The C-NLOPB believes that all substantive comments within the scope of the
EA have been satisfactorily addressed.

5. Environmental Effects Analysis

5.1 Methodology

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

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

- magnitude of impact;
- geographic extent;
- duration, likelihood, and frequency;
- reversibility;
- ecological, socio-cultural and economic context; and
- significance of residual effects following implementation of mitigation measures.

The potential effect significance of residual effects, including cumulative effects, for each VEC was 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, were considered in determining overall significance of residual effects.

In the EA Report and Addendum, Husky presented information regarding the potential effects of the geophysical program activities on fish and fish habitat, commercial fisheries, marine mammals and sea turtles, sea birds, and species at risk. A summary of the effects assessment follows.

5.2 Valued Ecosystem Components/ Potential Environmental Effects

5.2.1 Fish, Fish Habitat and Invertebrates 1

The seismic program and other geophysical activities will not result in any direct physical disturbance of the bottom substrate. During seismic surveys, survey equipment is not expected to come in contact with the seafloor and deep-water corals and sponges. Therefore the negligible residual effects on fish habitat (i.e., water and sediment quality, phytoplankton, zooplankton, and benthos) are predicted to be **not significant**.

The potential effects of exposure to sound on fish and marine invertebrates can be either physical or behavioural.

In the natural environment, fish have shown avoidance responses and swim away as an airgun array ramps up or as the survey slowly approaches. The airgun will be ramped-up, thereby allowing fish in the area to move away. Studies referenced in the 2012 EA Report indicated that fish mortality did not result from exposure to seismic sound sources. Stress responses (physiological effects) to seismic exposure occur in fish, but these are temporary and reversible. Behavioural responses to seismic have been documented in a number of studies and are reported and discussed in the 2012 EA Report. Although research on the effects of exposure to airgun sound on marine invertebrates and fishes is increasing, many data gaps remain. Spatial and temporal avoidance of critical life history times (e.g., spawning aggregations) should mitigate the behavioural effects of exposure to airgun sound. To date, there have been no documented cases of acute mortality of juvenile or adult fish exposed to seismic sound characteristic of typical 2D and 3D seismic surveys. Limited data regarding physiological impacts on fish and invertebrates indicate that these impacts are both short-term and most obvious after exposure at close range. The physical effects of exposure to sound with frequencies >500 Hz are *negligible*, based on the available information from the scientific literature. Effects of exposure to >500 Hz sound and marine vessel sound appear to be primarily behavioural and somewhat temporary. Mitigations consistent with those outlined in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012), will be implemented. The effects assessment concluded that physical effects on fish due to Project activities will be negligible to low in magnitude, in an area of less than 100 km^2, and of duration of one to 12 months. The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

There is less knowledge of the effects of seismic sound on marine invertebrates, although some studies have been conducted on the sensitivity of certain invertebrate species to underwater sound. They may be capable of detecting vibrations but they do not appear to be capable of detecting pressure fluctuations. Snow crab, which is sensitive to the particle displacement component of sound only, will be at approximately 100 m from the airguns and will not likely be affected by any particle displacement resulting from airgun discharge. Available experimental data suggest that there may be physical impacts on the fertilized eggs of snow crab and on the egg, larval, juvenile and adult stages of cod at very close range. Considering the typical source levels associated with commercial seismic airgun arrays, close proximity to the source would result in exposure to very high sound pressure levels. While egg and larval stages are not able to actively escape such an exposure scenario, juvenile and adult cod would most likely

avoid it. Developing embryos, juvenile and adult snow crab are benthic and generally far enough from the sound source to receive energy levels well below levels that may have impact. In the case of eggs and larvae, it is likely that the numbers negatively affected by exposure to seismic sound would be similar to those succumbing to natural mortality. The limited studies done to date on the effects on marine invertebrates have not demonstrated any serious pathological or physiological effects. A recent study concluded that planktonic coral larvae can detect and respond to sound, the first description of an auditory response in the invertebrate phylum Cnidaria (Vermeij et al. 2010). Any potential physical or behavioural impact to invertebrate species is considered to be negligible to low in magnitude, within an area of less than 100 km^2, over duration of one month to 12 months. The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

5.2.2 Commercial Fishing and DFO Research Surveys **1**

Potential interactions with this VEC include a decrease in catch rates, interference with fishing gear and impact on DFO research survey trawls. As indicated above, seismic activity can result in a dispersion of fish species, and subsequently reduced catch rates for a short duration. The survey vessel will be present within Unit Areas of NAFO Division 3L. Seismic streamers and vessels can conflict with and damage fishing gear, particularly fixed gear (i.e. snow crab pots and turbot gillnets).

There has been substantial harvesting within NAFO Units 3Lh, 3Li, 3Lr and 3Lt in the Study Area between 2005 and 2010. Snow crab and shrimp made up the bulk of harvest within the Study Area during the 2005 to 2010 period. Shrimp and snow crab accounted for about 50% each of the catch by landed weight within the planned survey window. Stimpson's surf clam made up 3 to 4% of the overall catch by weight and value. The potential for impacts on fish harvesting will, therefore, depend on the location of the surveying activities in relation to these fishing areas, and the type of fishing gear used in any given season. If the survey work is situated away from these fishing areas, the likelihood of any impacts on commercial harvesting will be greatly reduced. The fixed gear (e.g., pot fishery for snow crab, and to a lesser extent the Greenland halibut gillnet fishery) poses the highest potential for conflict, particularly if they are deployed concurrently with seismic survey operations. During seismic surveying, operations will be conducted continuously for 20-90 days; while a geohazard well site survey typically takes 4-5 days to complete. The turning radius required between each track line extends the assessment area beyond the actual survey area. During transit to the seismic survey area, streamers may be deployed. Therefore, a separate route analysis will be prepared by Husky and provided to the C-NLOPB. Discussions with fishing interests will be conducted before the transit. When gear conflict events occur that damage gear or result in gear loss due to the survey, they will be assessed and compensation will be paid for losses attributable to the seismic survey.

Seismic surveys can sometimes result in reduced trawl and longline catches immediately following a survey as the fish temporarily move from the area. There are various research studies on this subject as discussed in the EA Report. While some of the behavioural effects studies report decreases in catch rates near seismic arrays, there is less agreement on the duration and geographical extent of the effect, ranging from a quick return to several days, and from very localized effects to decreased catch rates as far as 15 km to 20 km away. As commercial catches are quota based, the overlap between fishing and seismic activity is unknown, but will be determined by Husky prior to the commencement of the surveys. The effects of seismic surveys on the catchability of fish and shellfish are predicted to be negligible to low, during <1 to 1-12 months, over an area of 11 to 100 km^2 and reversible.

Husky indicated that a number of mitigations, consistent with those outlined in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012), will be implemented. Husky will adhere to all relevant minimum mitigations outline in the Statement of Canadian Practice. These include: avoidance of heavily fished areas; use of a FLO on the vessel to be a

communication link between the two industries and to help ensure effective communication between petroleum operators and fishers at sea; communication with fishers (via a Notice to Mariners and a Notice to Fishers) and scheduling of surveys to reduce interference with DFO research vessels; single point of contact (SPOC), and a fishing gear damage compensation plan. Husky will maintain regular communications with the FFAW and fishers before and during surveys.

To avoid potential conflict with DFO Research surveys, Husky will maintain communications with DFO personnel to keep up-to-date on the timing of planned research surveys. In addition, a temporal and spatial buffer zone will be implemented, in consultation with DFO, to reduce any potential interference with fish behavioural patterns.

With application of the mitigations discussed in the EA Report, Addendum and associated documents, effects of vessel presence, including all gear being towed by the seismic vessel, on the commercial fishery VEC are predicted to be a *negligible* to *low* magnitude during *<1* to *1-12 months* over an area of *<1* to *11-100 km^2*. Based on these criteria ratings, the *reversible* residual effects of vessel presence during the seismic program on the Fishery VEC are predicted to be **not significant**.

5.2.3 Marine Mammals and Turtles 1

Airgun arrays used during marine seismic operations introduce strong sound impulses into the water. These sound impulses could have several types of effects on marine mammals. The effects of human-generated noise on marine mammals are quite variable and depend on the species involved, the activity of the animal when exposed to the noise, and the distance of the animal from the sound source.

Marine mammals and sea turtles will likely exhibit certain behavioural reactions, including displacement from an area around seismic and geohazard acoustic sources. The size of this displacement area will likely vary amongst species, during different times of the year, and even amongst individuals within a given species. There is also a risk that marine mammals (and perhaps sea turtles) that are very close to a seismic array may incur temporary hearing impairment. The assessment of impacts presented here is based upon the best available information. Note that the 2012 EA Report discusses potential impacts separately for toothed whales, baleen whales, seals, and sea turtles given their different hearing abilities and sensitivities to sound. The 2012 EA Report describes in more detail the numbers and the species of cetaceans which have been observed in, or which are considered likely to frequent, the Project Area.

The assessment of impacts is based upon the best available information; however, there are data gaps that limit the certainty of these impact predictions. The limited available data indicate that sea turtles will hear airgun sounds. There are no specific data that demonstrate the consequences to sea turtles if seismic operations do occur in important areas at important times of year. The discontinuous nature of sonar pulses makes significant masking effects unlikely; however the extent of avoidance is unknown. The EA Report states that turtles might experience temporary hearing loss if the turtles are close to the airguns. There are a number of mitigations which, when applied, can reduce impacts to marine mammals and sea turtles in the vicinity of a seismic survey (e.g. ramping up of airguns, use of observers, shut-down procedures). The 2012 EA Report lists a number of mitigations that will be implemented during the geophysical program, some of which are consistent with the mitigations recommended in Appendix 2 of *The Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012). However, Husky will adhere to all relevant minimum mitigations outlined in the Statement of Canadian Practice.

It has been theorized that some species of cetaceans may use geomagnetic cues to assist their migrations (LGL 2012a). This theory is based on several studies that have related whale strandings to geomagnetic anomalies. However, this phenomenon appears to be site-specific because other studies with the same

methods and species in other areas were unable to find this relationship. Given that these animals likely use a variety of navigations cues and that any exposure will be brief, likely on the order of minutes, any effect on their navigation is predicted to be negligible.

Disturbance effects from Project activity noise on toothed whales would likely be *low* for a *<1 month* to *1-12 months* (20 to 60 days in 2012) over an area of *11-100* to *101-1,000 km²*. Therefore, potential effects related to disturbance, are judged to be **not significant** for toothed whales.

It is uncertain how many baleen whales may occur in the Study Area during the period when seismic and geohazard activity is most likely to occur (March to November). The Project Area is not known to be a unique feeding or breeding area for baleen whales. Disturbance effects on species of baleen whales would likely be *low* for a duration of *<1 month* to *1-12 months* over an area of *11-100 km²* to *101-1,000 km²*. Therefore, residual effects related to disturbance, are judged to be **not significant** for baleen whales.

The seismic and geohazard program is predicted to have *negligible* to *low* hearing impairment and/or physical effects on seals for a duration of *<1 month* to *1-12 months* over an area *<1 km²*. Therefore, hearing impairment and physical effects on seals would be **not significant**.

The seismic program is predicted to have negligible to low physical effects on sea turtles for a duration of <1 month to 1-12 months over an area <1 to 1-10 km^2. Therefore, auditory and physical effects on sea turtles would be **not significant**.

5.2.4 Marine Birds 1

There are three main potential types of effect sources on seabirds due to the proposed seismic program: (1) underwater sound from airgun arrays; (2) leakage of petroleum product from streamer(s); and (3) attraction to ship lights at night. The sound created by airguns is focused downward below the surface of the water. Above the water the sound is reduced to a muffled shot that should have little or no effect on birds that have their heads above water or are in flight. Most species of seabirds that are expected to occur in the Study Area feed at the surface or less than 1 m below the surface of the ocean. Northern Gannets (*Morus bassanus*) plunge dive to a depth of 10 m. They are under the surface for a few seconds during each dive so they would have minimal exposure to underwater sound. Greater Shearwater (*Puffinus gravis*), Sooty Shearwater (*Puffinus griseus*) and Manx Shearwater (*Puffinus puffinus*) feed mainly at the surface but also chase prey briefly beneath the surface down to a distance of 2-10 m below the surface. There is only one group of seabirds occurring regularly in the Study Area that require relatively considerable time under water to secure food. They are the *Alcidae* (Dovekie, Common Murre (*Uria aalge*), Thick-billed Murre (*Uria lomvia*), Razorbill (*Alca torda*) and Atlantic Puffin (*Fratercula arctica*)). All are capable of reaching considerable depths and spending considerable time under water. An average duration of dive times for the five species of *Alcidae* is 25 to 40 seconds reaching an average depth of 20 to 60 m, but murres are capable of diving to 120 m and have been recorded underwater for up to 202 seconds. The effects of underwater sounds on *Alcidae* are unknown. Sound produced as a result of the proposed Project is predicted to cause effects on seabirds of *negligible* to *low* magnitude for a duration of *<1 month* to *1 to 12 months* over a geographic extent of *<1* to *1-10 km²*. With the implementation of all mitigation measures outlined in the EA Report and Addendum and the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012), the effects of sound emissions on marine birds would be **not significant**.

Since lighting is required at night for safety purposes, mitigation will include routine checks for stranded birds and implementation of appropriate procedures for release that will minimize the effects of vessel lighting on birds in the Project Area. Mitigation measures to rescue stranded storm-petrels on board the seismic vessel will be the responsibility of the MMO. The MMO will conduct daily searches of the ship

and the ship's crew will also be notified to contact the MMO if a bird is found. Procedures developed by the CWS and Petro-Canada (now Suncor) will be used to handle the birds and eventually release them (Williams and Chardine, n.d.). Personnel on other vessels working on the Project will be made aware of the potential problem of storm-petrels stranding on their vessels. Each vessel will have a copy of the manual on proper procedure and handling of stranded storm-petrels. A CWS *Bird Handling Permit* will be obtained by Husky. Deck lighting can be minimized (if it is safe and practical to do so) to reduce the likelihood of stranding. Mitigation and monitoring for stranded birds will result in residual effects of attraction to lights of *low* to *medium* magnitude for a duration of *<1 month* to *1* to *12 months* over a geographic extent of <1 to *1-10 km*^{2} and therefore **not significant**.

The streamers may be solid-filled or contain a paraffinic hydrocarbon called Isopar. The specific effects of Isopar M on seabirds are not known. However, petroleum products typically have detrimental effects on the insulating attributes of seabird feathers. Isopar M is a kerosene-like product that leaves a relatively thin layered slick on the surface of water and evaporates readily. Typical fluid-filled streamers are constructed of self-contained 100 m long units. Therefore, a single leak in a streamer could result in a maximum loss 208 L of Isopar M. Birds that spend most of their time on water, such as the murres, Dovekie and Atlantic Puffin, are the species most likely to suffer negative effects from an accidental release of Isopar M.

However, because potential accidental releases would likely be small and evaporation/dispersion rapid, the effects on seabirds are predicted to have *low* to *medium* magnitude for a duration of *<1 month* over a geographic extent of *<1 km*^{2} to *1-10 km*^{2}. Therefore, the residual effects of an accidental release (e.g., Isopar M) on the seabird VEC are predicted to be **not significant**.

5.2.5 Species at Risk **1**

The EA Report indicates that the area for potential surveys has no unique habitat for fish species at risk. The mitigation measure of ramping up the airgun array (over a 30 min period) is expected to minimize the potential for impacts on white sharks and wolffishes. As per the detailed effects assessment contained in the EA Report, physical effects of the Project on the various life stages of the white shark and two wolffish species will range from *negligible* to *low* for a duration of *<1 month* to *1-12 months* over an area of *<1 km*^{2}. Behavioural effects may extend out to a larger area but are still predicted to be **not significant**.

Based on available information, blue whales, right whales and leatherback sea turtles are not expected to occur regularly in the Study Area. It is extremely unlikely that a North Atlantic right whale will occur in the Study Area. There is a finalized recovery strategy for blue whales in Atlantic Canada (Beauchamp et al. 2009) as well as a final recovery strategy for North Atlantic right whales (Brown et al. 2009). A recovery strategy for leatherback sea turtles is available (ALTRT 2006). However, critical habitat in the Study Area has not been proposed or designated for any SAR whales or leatherback sea turtles. With the mitigation and monitoring designed to minimize potential effects of airgun array noise on *SARA*-listed marine mammals and sea turtles.

The predicted effects of the Project on blue whales, right whales and leatherback sea turtles will range from *negligible* to *low* for a duration of *<1 month* to *1-12 months* over an area of *<1* to *101-1,000 km*^{2}. Based on these criteria, the predicted effects of the Project on blue whales, right whales and leatherback sea turtles are predicted to be **not significant.**

Ivory Gull foraging behaviour would not likely expose it to underwater sound, and this species is unlikely to occur in the Study Area, particularly during the time when seismic surveys are likely to being conducted. Furthermore, Ivory Gulls are not known to be prone to stranding on vessels. The mitigation measures of monitoring the seismic vessel and releasing stranded birds (in the unlikely event that an Ivory

Gull did strand on the vessel) and ramping up the airgun array will minimize the potential for impacts on this species. The predicted effects of the Project on Ivory Gulls will be *negligible*. Therefore, the predicted effects of the Project on Ivory Gulls are predicted to be **not significant**.

5.2.6 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 will meet all Canadian regulations and standards to work in Canadian waters. Ship operations will adhere to Annex I of the *International Convention for the Prevention of Pollution from Ships* (MARPOL 73/78). Hydrocarbon concentrations associated with ship discharges are not generally associated with formation of a surface slick. They are therefore not likely to have a measurable effect on the marine environment. The waste generated by a geophysical survey vessel will be limited due to the length of the survey program and will be brought back to shore. All domestic waste will be transported to shore and all routine discharges will meet the *Pollution Prevention Regulations* of the *Canada Shipping Act*. The effect of the seismic program operation on marine water quality should be undetectable and **not significant**.

5.3 Cumulative Environmental Effects 1

This EA has assessed cumulative effects within the Project and thus, the residual effects described in preceding subsections include any potential cumulative effects from the Husky seismic program activities in the Project Area.

It is also necessary to assess cumulative effects from other non-Project activities that are occurring or planned for the Regional Area. These activities may include:

- Commercial and research survey fishing;
- Vessel traffic (e.g., transportation, defense, yachts);
- Hunting (e.g., seabirds, seals), and
- Offshore oil and gas industry.

Fishing activities, by their nature, cause mortality and disturbance to fish populations and may cause incidental mortalities or disturbance to seabirds, marine mammals, and sea turtles. It is predicted that the seismic surveys will not cause any mortality to these VECs (with the potential exception of small numbers of petrels) and thus, there will be either *no* or *negligible* cumulative mortality effect. There is some potential for cumulative disturbance effect (e.g., fishing vessel noise) but there will be directed attempts by both industries to mitigate such effects by avoiding each other's active areas and times. The seismic surveying will also spatially and temporally avoid DFO research vessels during multi-species trawl surveys. Any cumulative effects (i.e., disturbance), if they occur, will be additive (not multiplicative or synergistic) and predicted to be **not significant**.

In the summer, the main North Atlantic shipping lanes between Europe and North America lie to the north of the Grand Banks into the Strait of Belle Isle. In the winter, that traffic shifts to the main shipping lanes along the southern Grand Banks into the Gulf of St. Lawrence. Thus, potential for cumulative effects with other shipping is predicted to be **low**.

The vast majority of hunting of seabirds (mostly murres) in Newfoundland and Labrador waters occurs near shore from small boats. Also, it is predicted that murres will not suffer mortality from the Project's routine activities. Thus, there is little or no potential for cumulative effects on this VEC. Similarly, most, if not all, seal hunting would occur inshore of the Project Area and the project will cause no mortality to seals even in the event of an accidental spill of petroleum hydrocarbons.

Potential offshore oil and gas industry activities in the Regional Area (as per the C-NLOPB public registry, www.cnlopb.nl.ca) include:

- Multi Klient Invest ASA (MKI) 2D seismic program on Northeast Newfoundland Shelf (i.e., Labrador Basin, Orphan Basin, Flemish Pass, Jeanne d'Arc Basin), 2012-2017 (2012 surveying planned);
- Statoil 3D/2D geophysical program including geohazard and electromagnetic surveys in Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019 (2012 surveying planned);
- WesternGeco 3D/2D seismic program in the Jeanne d'Arc Basin, 2012-2015 (2012 surveying planned);
- Investcan Energy Corporation 2D/3D seismic program including geohazard and VSP surveys on Labrador Shelf, 2010-2017;
- Chevron Canada Resources 3D/2D seismic program including geohazard survey in offshore Labrador, 2010-2017;
- Chevron Canada Resources 3D and/or 2D seismic program including geohazard survey in the North Grand Banks Region, 2011-2017;
- Statoil exploration, appraisal, and delineation drilling program in Jeanne d'Arc Basin area, 2008-2016;
- Suncor exploration drilling in Jeanne d'Arc Basin, 2009-2017;
- Husky White Rose new drill centre construction and operations program, 2008-2015; and
- Husky exploration and delineation drilling program in Jeanne d'Arc Basin, 2008-2017.

While the above list suggests potential for many programs to run concurrently, it should be noted that the East Coast operators tend to coordinate their logistics. As a result, based on historical levels of activities, there typically would be no more than two or three drill rigs and two or three seismic programs operating off Newfoundland and Labrador during any one season.

In addition, there are three existing offshore production developments (Hibernia, Terra Nova, and White Rose) on the northeastern part of the Grand Banks. A fourth development (Hebron) is anticipated to commence installation in the near future. These existing developments fall inside the boundaries of the Husky's Study Area but do not create the same levels of underwater noise as seismic, geohazard, or VSP programs. Any cumulative effects (i.e., disturbance), if they occur, are predicted to be additive (not multiplicative or synergistic) and **not significant**.

There is potential for cumulative effects with other seismic programs proposed for 2012 (e.g., Statoil, WesternGeco, and MKI). Different seismic programs could potentially be operating in relatively close proximity. During these periods, VECs may be exposed to noise from more than one of the seismic survey programs. It will be in the interests of the different parties for good coordination between programs in order to provide sufficient buffers and to minimize acoustic interference. Assuming maintenance of sufficient separation of seismic vessels operating concurrently in the Project Area, cumulative effects of seismic sound on fish and fish habitat, fisheries, seabirds, marine mammals, sea turtles and species at risk are predicted to be **not significant**. However, there are uncertainties regarding this prediction. The potential for temporal and spatial overlap of future activity of seismic programs (2013-2020) in the area will be assessed in the EA update process. Uncertainty due to the large identified Study Areas will be reduced as specific survey designs (covering smaller area) become available.

As discussed in the EA, negative effects on key sensitive VECs such as marine mammals appear unlikely beyond a localized area from the sound source. In addition, all programs will use mitigation measures such as ramp-ups, delayed start ups, and shutdowns of the airgun arrays. Thus, it seems likely that while

some animals may receive sound from one or more geophysical programs, the current scientific prediction is that *no significant residual effects* will result.

5.4 Accidents and Malfunctions **0**

Accidental discharge of oil into the marine environment may result from improper operational procedures (e.g., improper draining of streamer reel trunks), loss of streamer fluid due to breakage, or, as a worst case, as a result 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 which should prevent unintended releases. The vessel will also carry a copy of Husky Energy's "Spill Response Plan". Inspections of seismic equipment will be conducted regularly.

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

5.5 Follow-up Program **Required** **Yes☐** **No☒**

The C-NLOPB does not require follow-up monitoring, as defined in the CEA Act, to be undertaken for this Project.

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 project, 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.

7. Recommended Conditions and /or Mitigations

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

- *The Operator 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 "Environmental Assessment of Husky's Jeanne d'Arc Basin/Flemish Pass Regional Seismic Program, 2012-2020" (LGL, February 2012),the "Addendum to the Environmental Assessment of Husky's Jeanne d'Arc Basin/Flemish Pass Regional Seismic Program, 2012-2020" (LGL, May 2012).*

- *The Operator, 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 in the safety zone during ramp- up procedures and when the array is active. The safety zone shall have a radius of at least 500 m, as measured from the centre of the air source array(s).*

Part D: Screening Decisions

8.1 C-NLOPB Decision

The C-NLOPB is of the opinion that, taking into account the implementation of the proposed mitigation measures set out in the conditions above and those committed to by Husky Energy, the Project **is not likely to cause significant adverse environmental effects**. This represents a determination pursuant to Section 20(1) (a) of the CEA (S.C. 1992).

Responsible Officer *Original signed by Elizabeth Young* Date: September 28, 2012

Elizabeth Young
Environmental Assessment Officer
Canada-Newfoundland and Labrador Offshore Petroleum Board

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