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

PART A: GENERAL INFORMATION

Screening Date	**October 4, 2010**
EA Title	**Corridor Resources Old Harry Prospect Geohazard Survey Program**
Proponent	Corridor Resources Inc. #301-5475 Spring Garden Road Halifax, NS B3J 3T2
Contact	Ms. Dena Murphy Quality, Health, Safety and Environment Manager
C-NLOPB File No.	7705 C47
CEAR No.	10-01-53529
Location	NE Gulf of St. Lawrence Exploration Licence (EL) 1105
Referral Date	February 10, 2010
EA Start Date	February 15, 2010
CEAA Law List Triggers	Paragraph 138(1) (b) *Canada-Newfoundland Atlantic Accord Implementation Act* (Accord Act)

Part B: PROJECT INFORMATION

On February 10, 2010, Corridor Resources Inc. (Corridor) submitted a project description *Project Description for a Proposed Geohazard Survey over a part of the Old Harry Prospect in the Gulf of St. Lawrence* (Corridor 2010) to the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), describing its plans to conduct a geohazard survey on and around its exploration licence EL 1105 in the Gulf of St. Lawrence area offshore Newfoundland and Labrador. On March 2, 2010, Corridor informed the C-NLOPB that it proposed to expand the spatial and temporal scope of its project to comprise most of the northern portion of EL 1105, a strip of land immediately adjacent to the western boundary of the EL, and a three-kilometre border around the total area to accommodate vessel turning. Project activities would comprise a total of up to nine geohazard surveys to be conducted in the period 2010-2020. Corridor submitted the *Environmental Assessment of the Old Harry Prospect Geohazard Program 2010-2020* (Stantec 2010a) on May 20, 2010. On July 23, 2010, the C-NLOPB requested additional information from Corridor in order to satisfy the requirements of the CEAA and to respond to review comments on the May 20 submission. On August 12, 2010, Corridor responded to the review comments and provided a revised and updated version of the *Environmental Assessment of the Old Harry*

Prospect Geohazard Program 2010-2020 (Stantec 2010b)(the EA Report). On September 8, 2010, Corridor reported on consultations it had completed in late August.

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

1 Description of Project

The Old Harry Prospect Geohazard Survey Program 2010-2020, as proposed by Corridor, is a series of up to nine geohazard survey programs offshore western Newfoundland and Labrador over a ten year (2010 to 2020) period. The Project Area encompasses a 349.5 km^2 area in and immediately west of EL 1105 and an additional 3 km buffer zone outside this area for vessel turning. An individual geohazard survey program will include the acquisition of 2-D high resolution airgun seismic, side scan sonar, sub-bottom profiling and multi-beam bathymetric data. Each geohazard survey will require approximately four to six days to conduct (not including provision for weather downtime) and will include approximately 160 line kilometers of shallow penetration 2-D seismic data, seabed sampling, coring and sea bottom photography. Typical geohazard survey equipment will include a high resolution airgun seismic system; a side-scan sonar system; a sub-bottom profiler; and an echosounder.

The initial geohazard survey, proposed for the autumn of 2010, will comprise a single 4.5 km x 5 km (22.5 km^2) survey area, centered on the following NAD27 coordinates: Latitude: 48^o 03' 05.3" W; Longitude: 60^o 23' 41.7 N. The geohazard survey site is located partly within EL 1105 and partly within the area immediately west of EL 1105. Up to eight subsequent surveys of similar size and duration could occur during ice free periods (nominally between April and November) between 2011 and 2020, within the Project Area defined in the EA Report, although none of these have been scheduled at this time.

2 Description of Environment

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

2.1 Physical Environment

The Gulf of St. Lawrence is a semi-enclosed sea, having two openings to the Atlantic Ocean, the Cabot Strait and the Strait of Belle Isle. The Gulf has an average depth of 152 m and maximum depths up to 535 m. There are numerous shallow areas and deep troughs within the Gulf of St. Lawrence. One particularly well known trough, called the Laurentian Channel, is a long, continuous trough that has a maximum depth of 535 m and extends approximately 1,500 km from the continental shelf in the Atlantic Ocean to its end near the St. Lawrence Estuary. The Gulf also contains two secondary troughs, the Esquiman and the Anticosti Channels. Another predominant feature is the Magdalen Shallows, which is a plateau located in the southern Gulf.

Average daily air temperatures in the vicinity of the Project Area ranged from - 6.4°C in February to 15°C in August. Above zero average temperatures were recorded for all months except December through March. The highest amount of precipitation was recorded for the month of December and the least amount for the month of March. October was the month that recorded the highest amount of days (1.6) with rainfall greater than 25 mm.

Wind speed and direction data from 1954 – 2008 were acquired from the MSC50 data set for grid point 13511 (UTM – Northing, 5,331,208 m; Easting, 708,455 m. Most wind speeds at grid point 13511 during the fall (September – November), winter (December – February) and spring (March – May) are between 5 and 9.9 m/s and are from the WNW direction. Approximately 50 % of the wind speeds during the summer (June – August) are also between 5 and 9.9 m/s however, the winds are most commonly from the SW

direction. There were no wind speeds reported during the summer greater than 20 m/s. Wind speeds between 20 and 24.9 m/s were experienced during the fall, winter and spring months, and the highest percent occurrence was reported during the winter, at less than 2 %.

As fall approaches, the temperature difference between the air and the ocean lessens, as does the amount of fog, with October reporting the lowest occurrences of reduced visibility, approximately 2 %.

Generally the flow in the Gulf is counter clockwise around the Gulf to the mouth of the St. Lawrence River, across the Magdalen Shallows, and exits via the Cabot Strait. There are large, seasonally-variable runoffs of freshwater into the Gulf, mainly from the St. Lawrence River and rivers of the northern shore, including the Saguenay River. Masses of water with acutely contrasting temperature and salinity come together and mix. The Gulf can be considered a three-layer system during summer; the two upper layers undergo seasonal variations and become one during the winter months (DFO 2005).

Contrasting temperature and salinity is produced during the spring when an increase in freshwater flow enters the Gulf via the St. Lawrence River, the Saguenay River and other smaller rivers along the shores. The result is a higher temperature, low salinity surface layer of water that then begins to flow out of the Gulf into the Atlantic. Additional freshwater runoff occurs in the fall, driving circulation patterns in the Gulf, and causing the area to show properties of an estuarine environment (DFO 2007).

At the start of winter, the warmer, low salinity surface layer flowing into the Atlantic becomes less buoyant, due to the drop in air temperature and ice formation, and moves downward in the water column. Once spring arrives, a new summer surface layer is created causing the winter layer to be trapped below (DFO 2007).

Wave climate in the Gulf of St. Lawrence was assessed by using the MSC50 data set for grid point 13511. Maximum significant wave heights were greatest during the fall and winter seasons. The majority of the significant wave heights during the fall and winter occurred at 7 m and at 5 m during the spring and summer. Generally, the summer months experienced the highest wave heights. During the fall, winter and spring the typical peak period is approximately 2 seconds and 1 second during summer months.

The maximum extent of pack ice in the Gulf is in March. The 30 year ice concentration data set indicates that in a median year the entire Project Area is covered with ice during the month of March. The general area is typically ice free by the second week in May.

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 Project Area. The following table provides a list of the species likely to be present and their SARA and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listing.

SPECIES	SARA Status	COSEWIC Status
Blue Whale (*Balenoptera musculus*)	Schedule 1 - Endangered	Endangered (May 2006)
North Atlantic Right Whale (*Eubalaena glaialis*)	Schedule 1 – Endangered (2003)	Endangered (May 2003)
Leatherback Turtle (*Dermochelys coriacea*)	Schedule 1 - Endangered	Endangered (May 2001)
Northern Bottlenose Whale	Schedule 1 – Endangered (2006)	Endangered (Nov 2002)

(*Hyperoodon ampullatus*) Scotian Shelf Population		
Ivory Gull (*Pagophilia eburnea*)	Schedule 1 - Endangered	Endangered (Apr 2006)
Northern Wolffish (*Anarhichas denticulatis*)	Schedule 1 – Threatened (2002)	Threatened (May 2001)
Spotted Wolffish (*Anarhichas minor*)	Schedule 1 – Threatened (2002)	Threatened (May 2001)
Beluga Whale (*Delphinapterus leucas*) St. Lawrence Estuary Population	Schedule 1 - Threatened	Threatened (May 2004)
Atlantic Wolffish (*Anarhichas lupus*)	Schedule 1 – Special Concern (2002)	Special Concern (2000)
Fin Whale (*Balenoptera physalus*)	Schedule 1 – Special Concern	Special Concern (May 2005)
Harbour Porpoise (*Phocoena phocoena*) Northwest Atlantic Population		Special Concern (Apr 2006)
Atlantic Cod (*Gadus morhua*) NL Population		Endangered (April 2010)
Atlantic Cod (*Gadus morhua*) Laurentian Southern Population		Endangered (April 2010)
Atlantic Cod (*Gadus morhua*) Laurentian North Population		Endangered (April 2010)
Atlantic Cod (*Gadus morhua*) Southern Population		Endangered (April 2010)
Porbeagle Shark (*Lamna nasus*)		Endangered (May 2004)
Shortfin Mako (*Isurus oxyrinchus*) Atlantic Population		Threatened (Apr 2006)
Blue Shark (*Prionace glauca*) Atlantic Population		Special Concern (Apr 2006)
Killer Whale (*Orcinus orca*) Northwest Atlantic/Eastern Arctic Populations		Special Concern (Nov 2008)
Winter skate (*Leucoraja ocellata*) Southern Gulf of St. Lawrence Population		Endangered (May 2005)
Deepwater redfish (*Sebastes mentella*) (Gulf of St. Lawrence – Laurentian Channel Population)		Endangered (April 2010)
Roundnose grenadier (*Trachyrhynchus murrayi)*		November (2008)
Deepwater redfish (*Sebastes mentella*) (Northern Population)		Threatened (April 2010)
Acadian redfish (*Sebastes fasciatus*) (Atlantic Population)		Threatened (April 2010)
American plaice (*Hippoglossus platessoides*) (Maritime Population)		Threatened (April 2009)

American plaice (*Hippoglossus platessoides*) (Newfoundland and Labrador Population)		Threatened (April 2009)
Loggerhead turtle (*Caretta caretta*)		Endangered (April 2010)

The Blue Whale is the largest and one of the rarest marine mammals in the North Atlantic. A recently proposed Recovery Strategy (DFO 2009a) 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. Blue whales can be found in the Gulf of St. Lawrence from January through November. However, they are most abundant from August to October. A recovery action plan will be developed by 2014. Current threats to the population include ship strikes, disturbance from whale watching activities, fish gear entanglement, and pollution.

The North Atlantic Right Whale, found only in the North Atlantic, was heavily reduced by whaling. The total population currently numbers about 325 individuals. North Atlantic right whales are only occasionally sighted in the Gulf of St. Lawrence and are rare to waters off western Newfoundland. The Recovery Strategy noted a goal "to achieve an increasing trend in population abundance over three generations" via seven recovery objectives. Important areas for the North Atlantic right whale include the Roseway Basin and Grand Manan Basin in the Bay of Fundy, the latter formally being identified as "critical habitat" pursuant to the SARA

The Leatherback Sea Turtle is the only sea turtle considered at risk under SARA and COSEWIC reported within the Regional Area. There has been a severe global decline of leatherback sea turtles, with roughly a 70% decline over 15 years. A major cause of mortality and risk to the population is entanglement in fishing gear. Characteristics of this species that make it vulnerable to even small increases in mortality rates include long lifespan, very high rates of egg and hatchling mortality, and late age of maturity. Although there are no estimates available for the number of leatherback turtles in the western Newfoundland offshore region, they are potentially a regular part of the marine fauna in the Project Area.

The Scotian Shelf population of Northern Bottlenose Whales totals approximately 163 individuals and appears to be currently stable. Bottlenose whales occur elsewhere along the Scotian slope. The Gully, Haldimand Canyon and Shortland Canyon, all on the Scotian Shelf, were identified as "critical habitat" for Northern Bottlenose Whales pursuant to the SARA. The proposed Recovery Strategy for the Northern Bottlenose Whale is specific for the Scotian Shelf population, with mention of the Davis Strait population (DFO 2009b). Northern Bottlenose whales are reported by Stantec (2010a) to be uncommon in the Project Area

The Ivory Gull is a rare gull species that is associated with pack ice at all time of the year. The Ivory Gull are thought to be along the edge of the ice pack in several areas, including the north Gulf of St. Lawrence. Sightings of Ivory Gull are rare in the Project and Regional Areas during October to May and absent during June to October.

Atlantic wolffish populations have been declining over the past 20 years, with the population in Newfoundland waters declining approximately 91% since 1978. Numbers, mean size and the number of locations where Atlantic wolffish are found have also declined. The numbers of Northern and Spotted wolffish have declined over 90% in three generations, and the number of places this fish is found has also decreased. The species is still relatively widespread, and therefore exists in considerable numbers. Threats to these species include by-catch mortality and habitat alteration by bottom trawling

The St. Lawrence Estuary population of the beluga represents the southern limit of the species. Their habitat is generally ice-covered in winter and their summers are spent in warmer, shallow, turbid waters. This species feeds on various types of invertebrates and fish including squid, tube worms, capelin and Greenland and Atlantic cod. These whales are expected to be present in the Gulf of St. Lawrence during the proposed program.

The Atlantic population of the fin whale tends to make seasonal migrations from low latitude areas during the winter to high latitude summer feeding areas. Summer concentrations of the fin whale can be found in the Gulf of St. Lawrence, on the Scotian Shelf, in the Bay of Fundy, and in the nearshore and offshore waters of Newfoundland and Labrador. There is evidence that fin whales are present in the Gulf of St. Lawrence from July to September and tend to migrate through the Laurentian Channel to winter off northern Nova Scotia. Little is known about their breeding areas.

The remaining species at risk in the Project Area are discussed in detail in the EA Report.

2.2.2 Fish and Fish Habitat

A detailed description of the plankton and benthos communities can be found in the EA Report (Stantec 2010b). Approximately twenty species of marine fish are currently, or have been historically, fished commercially or experimentally in the Gulf. Species known to occur in the Project Area are described in the EA Report. There are three main types of marine fish present in the Gulf of St. Lawrence: 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. Approximately two thirds of all marine fish species known to occur in the Gulf are demersal. A list of the most commonly occurring pelagic and demersal marine fish and shellfish known to inhabit the Gulf of St. Lawrence near the proposed Project Area, are presented in the EA Report.

The shallow waters surrounding the Magdalen Islands support high densities of American plaice (*Hippoglossus platessoides*) and Atlantic cod (*Gadus morhua*). These species are the most dominant demersal fish found in the southern Gulf (DFO 2007). The highly productive, warm water areas also serve as important feeding areas for marine fish that migrate to the area looking for food, such as spiny dogfish (*Squalus acanthias*) and bluefin tuna (*Thunnus thynnus*).

Spiny dogfish and Atlantic mackerel (*Scomber scombrus*) migrate completely out of the Gulf to more southern areas in the winter, whereas other species including Atlantic herring (*Clupea harengus*), Atlantic cod, white hake (*Urohycis tenius*), American plaice, witch flounder (*Glyptocephalus cynoglossus*) and thorny skate (*Raja radiata*) stay within the Gulf, moving into the deeper, warmer waters of the Laurentian Channel and slope. Some of these species remain in this area for the entire winter, while others (Atlantic cod and Atlantic herring) migrate to the entrance of the Laurentian Channel in the Cabot Strait. The warmer, deep waters of the Laurentian Channel and slope also serve as feeding, nursing, and spawning grounds for certain deep water and slope species, including redfish (*Sebastes spp.*), Greenland halibut (*Reinhardtius hippoglossoides*), and witch flounder.

Shellfish are also known to inhabit the proposed Project Area within the Laurentian Channel. The Western Newfoundland SEA (LGL 2005) identifies lobster (*Homarus americanus*), snow crab (*Chionoecetes opilio*) and northern shrimp (*Pandalus borealis*) as important commercial invertebrate species. Of these three species, the northern shrimp has the potential to breed in the fall. Mature shrimp typically breed in late fall or early winter.

2.2.3 Commercial Fisheries

This area of the Gulf of St. Lawrence is commercially fished by fleets from Quebec and all four Atlantic provinces. Management of the commercial fishing activity in the Gulf of St. Lawrence by DFO is conducted through the Quebec, the Maritimes, the Gulf, and the Newfoundland Regional offices. Many of the major species are fished according to quota systems (*i.e.*, groundfish) while others are fished according to availability (*i.e.*, herring and mackerel) or specific season lengths (*i.e.*, lobster and crab). All major fish groups, including groundfish, pelagic and shellfish fished in the Project Area, occur in NAFO subdivisions 4Tf and 4Ss.

The proposed geohazard program overlaps NAFO areas 4Tf and 4Ss. Based on the landed weight data collected and analyzed for the years of 2004 – 2008, for both NAFO Divisions 4Ss and 4Tf, the main fish and shellfish species commercially fished in the vicinity of the Project Area included lobster, shrimp, snow crab, rock crab (*Cancer irroratus*), scallops (*Placopecten magellanicus)*, whelk (*Buccinum undatum*), mackerel, herring , cod, deepwater redfish *(Sebastes mentella)* and witch flounder.

2.2.4 Marine Mammals and Sea Turtles

A total of 22 species of marine mammals and sea turtles can be found near the proposed Project Area in the Gulf of St. Lawrence. Of the fifteen Cetacean species found in the Gulf of St. Lawrence, there are six species of baleen whales. The majority of these species use the Gulf as feeding grounds, with the Laurentian Channel and the Magdalen Islands being popular areas. Humpback (*Megaptera novaeangliae*) and minke *(Balaenoptera acutorostrata)* whales are less common off the west and southwest coasts of Newfoundland than elsewhere off the coasts of the Island. Humpback whales feed in the Gulf during the summer however the majority of their sightings have been in the northeastern part of the Gulf. Minke whales have also been observed in the Gulf from July to September but are more frequent in the northern Gulf. Sei whale *(Balaenoptera borealis)* sightings in the vicinity of the Project Area have also been limited.

There are nine species of toothed whales (odontocetes) that could potentially be found near or within the Project Area. The sperm whale *(Physeter macrocephalus)***,** long-finned pilot whale *(Globicephala melas)*, Atlantic white-sided (*Lagenorhynchus acutus)* and common dolphin (*Delphinus delphis*) and harbour porpoise *(Phocoena phocoena)* are likely to be common in the western Newfoundland offshore region, whereas the killer whale *(Orcinus orca),* white-beaked dolphin *(Lagenorhynchus albirostris)* are likely to be uncommon in this area and are considered rare. The distribution of sperm whales is based highly on their social structure, whereby adult females and young are typically found in tropical and subtropical waters and adult males in higher latitude waters. Sperm whales are capable of diving to depths greater than 1200 m to feed and can stay submerged for greater than two hours at a time, however the majority of their dives last approximately a half hour. Sperm whales are generally distributed over areas of steep underwater topography, as are the long-finned pilot whale. The majority of the sightings of the Atlantic white-sided dolphin the Gulf were also recorded in areas with steep bottom topography. Evidence suggests that the harbour porpoise is common to the northern portion of the Gulf from July to September; however sightings also show this species to be present in the southern and central portions of the Gulf as well.

There are four species of seals potentially found near and within the Project Area; harbour seal *(Phoca vitulina)*; harp seal (*Phoca groenlandica*); hooded seal *(Cystophora cristata*); and the grey seal *(Halichoerus grypus)*. Both the harp and hooded seals are migratory species, whereas the harbor and grey seals are year round resident species. The harp seal is likely common in the western Newfoundland offshore area during late fall to early spring and rare during other times of the year. The hooded seal is likely to be common offshore western Newfoundland in the spring and rare during other times of the year. Both the harbour and grey seals are likely to be common in the western Newfoundland offshore regions,

with the distribution of the harbour seal being continuous in the Gulf and that of the grey seal to be more concentrated in the south.

There are three species of sea turtles that could potentially be found within and near the Project Area. The occurrence of both the loggerhead turtle *(Caretta caretta)* and Kemp's Ridley turtle *(Lepidochelys kempii)* in the offshore area of western Newfoundland is considered rare. The Leatherback Sea Turtle was discussed above.

2.2.5 Marine Birds

There are approximately 18 species of waterfowl found in the Gulf. Shorebirds are not present in the Gulf year round, instead they stop to feed in the area (in late summer to early fall) during their migration from the Arctic to more southern environments. Offshore or pelagic birds feed at sea over deep waters and do not have to return to land to rest. However, they return to land to breed in rocky cliffs and on islands. Such species include auks and petrels. There are approximately 18 species of breeding seabirds found in the Gulf of St. Lawrence. The majority of seabirds found in the Gulf nest in the Gaspè Peninsula and along Quebec's north shore, with smaller numbers found in western Newfoundland and the southern Gulf, due to the lack of suitable breeding habitats. At the end of the breeding season (typically fall), seabirds return to their offshore feeding areas (most commonly the waters of the Cabot Strait as they do not freeze over) or migrate to subtopic areas.

Generally, the marine coast and waters of western Newfoundland have lower abundances of seabirds as these areas are less influenced by major oceanic currents, the adjacent waters have lower productivity and there is limited breeding habitat along the west coast of Newfoundland. Seabirds that could be present in the Project Area include shearwaters, fulmars, petrels, jaegers, skuas, phalaropes, gannets, cormorants, alcids, kittiwakes and gulls. Some species of seabirds nest in the South Atlantic during winter, such as the Greater Shearwater, Sooty Shearwater and Wilson's Storm Petrel, and are present in Newfoundland waters during the summer and early fall (July to October).

The most common inshore seabirds found in the Gulf of St. Lawrence include the Great Blackbacked Gull (*Larus marinus)*, the Herring Gull (*Larus argentatus*), the Ring-billed Gull (*Larus delawarensis*), the Black-headed Gull (*Larus ridibundus*), the Caspian Tern (*Sterna caspia*), the Common Tern (*Sterna hirundo*), the Arctic Tern (*Sterna paradisaea*), and the Leach's Storm-Petrel (*Oceanodroma leucorhoa*). The most common offshore seabirds in the Gulf include the Northern Gannet (*Morus bassanus*), the Great Cormorant (*Phalacrocorax carbo*), the Doublecrested Cormorant (*Phalacrocorax auritus*), the Black-legged Kittiwake (*Rissa tridactyla*), the Atlantic Puffin (*Fratercula arctica),* the Black Guillemot (*Cepphus grille*), the Common Murre (*Uria aalge*), the Thick-billed Murre (*Uria lomvia*), and the Razorbill (*Alca torda*). Seabirds, in general, tend to be most abundant near the Project Area between January through September and least abundant during October to December. During the nesting season, seabirds concentrate around large nesting colonies. The most common seabirds found in the 2005 Western Newfoundland SEA study area during the summer period (June – Sept) included the Northern Gannet, the Double-crested Cormorant, the Great Cormorant, the Herring Gull, the Great Black-backed Gull, the Common Tern and the Arctic Tern. The most common seabirds during the autumn period (Oct – Dec) included the Doublecrested Cormorant, the Great Cormorant, the Herring Gull, the Iceland Gull *(Larus glaucoides)* and the Great Blackbacked Gull. Species common to this area during the winter (Jan – Mar) included the Iceland Gull and the Great Black-backed Gull and those common during the spring (Apr-May) included the Double-crested Cormorant, the Great Cormorant, Herring Gull, the Iceland Gull, Great Black-backed Gull, the Common Tern and the Arctic Tern.

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 *Canada National Marine Conservation Areas Act*;

The Gulf of St. Lawrence has also been designated as a Large Ocean Management Area (LOMA) under the *Oceans Act*. Within the estuary and Gulf of St. Lawrence, ten areas have been designated as EBSAs: Western Cape Breton; St. George's Bay; Northumberland Strait; the southern fringe of the Laurentian Channel; the southwestern coast of the Gulf; the lower estuary; Western Anticosti Island; Northern Anticosti Island; the Strait of Belle Isle; and the west coast of Newfoundland. In addition to the EBSAs, there are a few other potentially sensitive areas located near the Project Area, (LGL 2005) which include a cod spawning area, a potential redfish larvae extrusion area and a potential redfish mating area. The cod spawning area is located west of the Port au Port Peninsula and is closed to groundfish fishing between April 1 and June 15. This area was originally established in 2002 and was resized since then. Redfish mate during the fall (September to December). Redfish larvae extrusion also occurs during April to July approximately 20 to 30 kms southeast of the Project Area. A number of Piping Plover key habitat locations were also identified on the coast of Newfoundland (Stephenville Crossing, Sandy Point, Flat Pay Peninsula, Searston, Little Codroy, east of Windsor Point, J.T. Cheeseman Provincial Park, Jerret Point-Windsor Point, Big Barachois,). Three coastal locations in west-southwest Newfoundland have also been designated as IBAs including Codroy Valley Estuary, Grand Bay West to Cheeseman Provincial Park and Gros Morne National Park, each of which are over 75 km from the Project Area.

2.2.7 Research Surveys and Vessel Traffic

The Project Area is adjacent to the major shipping route that traverses the St. Lawrence River estuary and the Gulf of St. Lawrence immediately south of Anticosti Island. Traffic density within this shipping route is four to eight ships per day, many of which are container vessels.

The main navigation lane between the Cabot Strait and the St. Lawrence River is in the vicinity of the proposed Project location. The majority of vessels enter the Gulf of St. Lawrence via the Cabot Strait. However, there may be other vessel traffic along shipping routes through the Strait of Canso and the Strait of Belle Isle. The main shipping lanes through the Gulf of St. Lawrence to Montreal overlap the proposed Project Area.

DFO carries out stock assessment surveys and research activities throughout the marine environment. The DFO Science Advisory Schedule can be accessed on-line to view activities scheduled in Canada http://www.isdm-gdsi.gc.ca/csas-sccs/applications/events-evenements/index-eng.asp .

There is no known military use of the Project Area, nor any other offshore petroleum activities anticipated in the immediate future in the vicinity of Old Harry Prospect. While there are several exploration licences in the coastal waters of Western Newfoundland, none exist in the offshore Old Harry Prospect area other than those held by Corridor Resources.

Part C: ENVIRONMENTAL ASSESSMENT PROCESS

3. Review Process

On February 10, 2010, Corridor submitted a project description "*Project Description for a Proposed Geohazard Survey over a part of the Old Harry Prospect in the Gulf of St. Lawrence"* (Corridor 2010). 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 February 15, 2010 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.

On March 2, 2010, the C-NLOPB notified Corridor that a screening level of assessment was required and the proponent was provided with a Scoping Document.

On April 19, 2010, Corridor submitted a change to the proposed project's temporal and spatial scope. The expanded project area comprised the northern part of EL 1105 and a narrow strip of land immediately adjacent to, and to the west of EL 1105. A revised scoping document reflecting the expanded area and related modifications was issued on 22 April, 2010. Since future activities in certain portions of the expanded area likely would require authorization pursuant to paragraph 5(1)(b) of the *Canada Oil and Gas Operations Act*, the National Energy Board (NEB) also was identified as a Responsible Authority and participated in the revision of the 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, in consultation with the NEB, the review activities by the expert government departments and agencies that participated in the review.

On May 20, 2010, Corridor submitted the "*Environmental Assessment of the Old Harry Prospect Geohazard Program 2010-2020*" (Stantec 2010a). The C-NLOPB forwarded the EA Report on May 21, 2010 to DFO, EC, Department of National Defence (DND), the NEB and the provincial Departments of Environment and Conservation, Fisheries and Aquaculture, and Natural Resources (DNR). The Fish, Food, and Allied Workers Union (FFAW) and One Ocean were also provided a copy of the EA Report for review.

Comments on the EA Report were received from DFO, EC, the FFAW, the Group for Research and Education on Marine Mammals (GREMM), the Regroupement des Palangriers et Petoncliers Unique Madelinots, (RPPUM) and Regroupement des Pecheurs Professionnels des Iles (RPPIM). In order to address deficiencies in the EA Report, Corridor was required to provide a response to the EA Report comments. Corridor responded on August 12 and September 8, 2010 and the C-NLOPB forwarded the responses to DFO, EC, the FFAW, GREMM, RPPUM and RPPIM.

On October 1, 2010, the National Energy Board informed C-NLOPB that it had determined that the Project Area was not within NEB jurisdiction, that it therefore would not be issuing any authorization respecting the Project, and that therefore the NEB should no longer be considered a Responsible

Authority respecting the Project. The *Corridor Resources Inc. Old Harry Prospect Geohazard Program 2010 – 2020 Revised Scoping Document* (C-NLOPB 2010) was substantively unaffected by this change.

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 Corridor that is likely to be carried out in relation to their proposed Project.

3.1 Scope of Project

Data will be collected on and around EL 1105 offshore western Newfoundland in the Gulf of St. Lawrence, as described in *Project Description for a Proposed Geohazard Survey over a part of the Old Harry Prospect in the Gulf of St. Lawrence* (Corridor 2010) and in Corridor's April 19, 2010 correspondence. The geohazard survey program will consists of 2-D high resolution airgun seismic, side scan sonar, sub-bottom profiling and multi-beam bathymetric data. The proposed Project Area is 349.5 km^2. The Affected Area includes a three (3) km buffer around the Project Area to accommodate the survey vessel turning radius.

Each geohazard survey will include the collection of approximately 160 line kms of shallow penetration 2D seismic data. High-resolution, multi-channel seismic reflection data will be acquired to two seconds depth, sampled at one millisecond, on a line spacing of 250 m and tie lines at 500 m. The acoustic source for the seismic data will comprise one or more airguns with a total operational volume of 160 cubic inches. The receiver will be a single, multi-channel hydrophone streamer. Seabed images will be acquired by means of side scan sonar or a multi-beam echo sounder. A mosaic will be created based on geo-referenced data. If side scan sonar or mutli-beam bathymetric systems identify potential debris, a proton magnetometer will be used. A camera system, sediment sampler and/or gravity/piston cores of the seafloor and near surface sediments will be used to corroborate the other data; and high-resolution sub-bottom profiles will be acquired by means of a boomer or sparker acoustic source towed within the water column at approximately 20 to 40 m off the seabed. The depth of penetration for this system is expected to be between 40 to 100 m.

Each geohazard survey will require approximately 4 to 6 days to complete. Geohazard survey activities will occur during ice free periods (nominally April through November) of each year from 2010 to 2020.

3.2 Boundaries

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

Boundary	**Description**
Temporal	During ice free periods (nominally April through November), 2010 to 2020
Project Area	Defined as a 349.5 km^2 area within and to the west of EL 1105
Affected Area	Defined as a 349.5 km^2 area within and just outside EL 1105 and includes a 3 km buffer around the Project Area to accommodate vessel turning.
Regional Area	The area extending beyond the "Affected Area" boundary within the

	Laurentian Channel along the 400 m depth contour, between NL and the Îles-de-la- Madeleine

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, and those listed in the *Corridor Resources Inc. Old Harry Prospect Geohazard Program 2010 – 2020 Revised Scoping Document* (C-NLOPB 2010).

4. Consultation

4.1 Consultation carried out by Corridor

Corridor consulted with the following organizations and agencies:

Environment Canada provided specific guidance regarding concerns associated with the *Migratory Birds Convention Act* and associated regulations. As well, it is intended that a Marine Mammal Observer (MMO) will also take seabird observations as per the pelagic seabird monitoring protocol developed by Canadian Wildlife Service (CWS). Environment Canada has also requested that a contingency plan be developed, as per standards published in the *Emergency Planning for Industry CAN/CSA-Z731- 95*, to enable a quick and effective response in the event of a spill and will include protocols related to streamer-associated spill events.

A joint meeting was held among One Ocean, the FFAW, Corridor and Stantec to discuss the potential interactions with the commercial fishery during the geohazard survey prior to the submission of the May, 2010 EA Report. The FFAW pointed out that the main fishery in the area is the Redfish fishery and that there are only two vessels related to the Redfish fishery from the west coast of Newfoundland. The spring was identified as a potential concern in terms of the timing of a geohazard survey as that is when the Redfish fishery occurs. However, the number of fishers and species harvested can vary from year to year. The FFAW suggested that additional fish catch data be provided, five years of data instead of three. Follow-up commitments by Corridor include meeting with One Ocean and the FFAW prior to the initial fall survey when the vessel tender has been awarded and the specifics of the program have been identified, as well as daily contact when the program is underway.

On August 20, Corridor met with the FFAW and One Ocean to provide an update on the planning for the geohazard survey, including the name of the vessel to be used, the contractors involved, and the approximate timing of the survey start date. No issues were raised by either organization.

Corridor traveled to the Magdelan Islands in late August to carry out consultations with

- The Group for Research and Education on Marine Mammals (GREMM);
- The Regroupement des Palangriers et Petoncliers Unique Madelinots, (RPPUM);
- Regroupement des Pecheurs Professionnels des Iles Madeleines (RPPIM);
- Association des pêcheurs propriétaires des Îles de la Madeleine (APPIM); and
- Municipal representatives.

The main messages received during these meetings were:

- DFO is not understanding of fishers in the gulf. Fisherperson confusion exists on DFO's practices because fishers are under moratorium to protect fisheries, but oil and gas activity has been allowed to continue;
- Will safety plans and procedures and emergency response plans be publicly available;
- The timing and overall impacts of seismic surveys in the gulf;
- Fisheries maps are incomplete and considered inaccurate;
- Impacts on whales, crab and fish;
- Overlap of the proposed program with key life stages of gulf fish, namely redfish;
- The inability to see whales and other animals in poor visibility and at night;
- Vessel observers;
- Future exploration, namely drilling;
- Benefits for fishermen who are taking most of the risk;
- Compensation if fisheries are disrupted or destroyed;
- The intensity of air pulses;
- What NL fishers said about the proposed program;
- Interest in future discussion and the identification of a working committee that Corridor can utilize; and
- Why NL fishers were consulted before fishers of the Magdalen Islands.

Corridor has committed to continuing to consult on its activities and to provide updates once its geohazard survey is complete. Corridor also has posted information on its website, related to the Old Harry geohazard survey.

The C-NLOPB are satisfied that the consultations carried out by Corridor, and reported on in the August 2010 EA Report and in the September 8, 2010 consultation report during the preparation of the EA, included all elements of the Project, and that Corridor has addressed substantive concerns about the proposed Project.

4.2 Review of the May 2010 EA Report

The C-NLOPB forwarded the EA Report on May 21, 2010 to DFO, EC, DND, NEB 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 to review.

DFO provided comments on the EA Report on 06 July 2010. Their comments focused on use of the most up-to-date information on fisheries data, seismic effects, cumulative effects, species at risk, and the inclusion of all fisheries in the Project Area. DFO responded on 30 August 2010 that it was satisfied with the August 19, 2010 response by Corridor Resources.

The FFAW provided comments on the EA report on 08 July 2010. The key issues were: regular communication between the two industries; consistent and up-to-date fisheries data; and the identification of an important redfish spawning period. FFAW responded on 09 September 2010 that it was satisfied with the August 19, 2010 response by Corridor Resources.

Environment Canada provided comments on the EA Report on 13 July 2010 and requested that Corridor collect seabird data and provided protocol and proper bird-handling advice. EC responded on 09 September 2010 that it was satisfied with the August 19, 2010 response by Corridor Resources.

The NEB provided comments on the EA Report on 25 May and indicated that the consultation conducted by Corridor was insufficient. Corridor conducted additional consultation and provided a report in the form

of an Addendum. The NEB responded on 09 September 2010 that it was satisfied with the response by Corridor Resources.

GREMM questioned whether the literature review for cetaceans was complete and that some interpretation seemed incorrect and could possibly underestimate the risks for certain species. It also stated that it believed mitigation measures were debatable and could be insufficient to lower the risks for cetaceans to acceptable levels. GREMM requested a moratorium on exploration in the Gulf of St. Lawrence.

RPPUM questioned the conclusions made by Corridor in its EA report and contended that there was enough scientific evidence available on the negative effects of seismic surveys on fish to warrant a public review and/or a comprehensive study. Also, it stated that the proposed schedule of the seismic program for the early fall corresponds to a time when the Laurentian Channel area is used by many groundfish species. Since these do not exit the Gulf region until November RPPUM felt that seismic surveying would cause serious biological disruptions that could be mitigated by postponing the program until the late fall. The RPPUM stated that cod was now on the COSEWIC endangered list, and that they would be exposed to disruptions in their habitat because cod would be aggregating on the slopes of the Laurentian Channel at the time of the proposed program. The RPPUM is concerned that not taking a precautionary approach in this instance may disrupt a significant link in the gulf ecosystem.

RPPIM felt that a seismic program in the Laurentian Channel would directly and negatively affect redfish, turbot, halibut, witch flounder, and snow crab fisheries. They also contested the EA Report conclusion that there will no serious adverse environmental effects caused by the proposed Project.

The consolidated review comments were provided to Corridor on July 23, 2010. Corridor responded on August 19, 2010 and provided an updated version of its EA Report that incorporated its responses. In addition, it provided a report on September 8, 2010 on its consultations in the Magdalen Islands. Corridor's August 19, 2010 response was forwarded to reviewers for assessment that comments of the response to their comments. 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 Corridor 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, Corridor presented information regarding the potential effects of the geohazard survey program activities on marine fish, shellfish and habitat, marine mammals and sea turtles, marine birds, commercial fisheries and other users, species at risk, and sensitive areas. A summary of the effects assessment follows.

5.2 Valued Ecosystem Components/ Potential Environmental Effects

5.2.1 Fish and Invertebrates 1

The potential effects of exposure to sound on fish and marine invertebrates can be either physical or behavioural. In the natural environment, fish show 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. Other studies referenced in the 2010 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 are temporary and reversible. Behavioural responses to seismic have been documented in a number of studies and reported by Christian *et al.* 2003 and 2004. In general, fish show startle response and 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 decrease catch rate. Some studies show that this effect was temporary, whereas other studies report that fish behaviour was altered for a number of days (Stantec 2010b). Stantec (2010b) reports that the temporary nature of these responses vary depending on the fish species and the sound source. Studies to determine effects on the auditory thresholds of fish have shown that Temporary Threshold Shift (TTS) can occur in fish exposed to seismic noise, under certain conditions. However, in the studies referenced by Stantec (2010b) hearing sensitivity recovered within 14 days of exposure. Mitigations consistent with those outlined in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2008), will be implemented. The program will have a low-volume (160 in^3 airgun) seismic component and take place over a period of two and a half days.

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, let alone the lower-powered arrays used in geohazard surveys. Limited data regarding physiological effects on fish indicate that they are both short-term and most obvious after exposure at close range (Stantec 2010b).

The effects assessment concluded that physical effects on fish due to Project activities will be low to negligible in magnitude, in an area of less than 10 km radius, and of a duration of less than one month. 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. The limited studies done to date on the effects on marine invertebrates have not demonstrated any serious pathological or physiological effects. Studies referenced in the 2010 EA Report indicated that available experimental data suggest that there may be physical impacts on the fertilized eggs of snow crab and on the egg of cod at very close range. The results indicated that effects are short-term and most obvious after

exposure at close range. Spatial and temporal avoidance of critical life history times (e.g. spawning aggregations) should mitigate the behavioural effects of exposure to airgun sound. Any potential physical or behavioural impact to invertebrate species is considered to be negligible to low in magnitude, within an area of less than 10 km radius, over a duration of of less than one month . 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 potential for a decrease in catch rates, interference with fishing gear and potential 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 2010 EA report indicated that fleets from all four Atlantic provinces and from Quebec commercially fish this area of the Gulf of St. Lawrence. During the period of 2004 to 2009, the majority of the harvest was landed in the Quebec region. For the entire NAFO Division 4Ss shrimp, lobster, snow crab and Greenland halibut dominated the landings in 2004, 2005, 2006, 2007, 2008 and 2009. For the entire NAFO Division 4Tf snow crab, lobster and herring dominated the landings in 2004 and 2005, by snow crab, lobster and mackerel in 2006, by lobster, snow crab and rock crab in 2007 and 2009 and by lobster, snow crab and cod in 2008. All catch data reported had been fished between April and December of each year. The main fish and shellfish species commercially fished in the vicinity of the Project Area included lobster, shrimp, snow crab, rock crab, scallops, whelk, mackerel, herring, cod, deepwater redfish and witch flounder. There is potential for interaction between seismic operations (streamers) and fishing gear, especially fixed gear such as crab pots. The potential for impacts on fish harvesting will depend on the location of the surveying activities in relation to fishing areas in any given season. If the survey work is situated away from fishing areas, the likelihood of any effects on commercial harvesting will be greatly reduced.

Corridor Resources Inc. indicated that a number of mitigations, consistent with those outlined in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2008), will be implemented. These include: avoidance of heavily fished areas; use of a Fisheries Liaison Officer (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.

A guard vessel may accompany the survey vessel to provide advance warning of fishing activities in the area and for emergency purposes, and this vessel will meet similar criteria as the survey vessel. If sudden bad weather impedes the retrieval of the gear, the streamers will be lowered into the water column (and the vessel will continue towing), until the weather permits gear retrieval.

To avoid potential conflict with DFO Research surveys, Corridor Resources Inc. 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.

Given the application of mitigation measures, the low-volume seismic component, and the short duration of the program, it is predicted that the effects of seismic activity, including vessel movement, will be negligible to moderate magnitude, of short duration (less than one month), and with a geographic extent of less than 10 km radius. Therefore, effects to the commercial fishery are not likely and **not significant**.

5.2.3 Marine Mammals and Turtles 1

A potential effect of the proposed operation upon marine mammals and sea turtles, which may be present in the area, may be from the sound pulses from the survey equipment. Marine mammals and sea turtles

could likely exhibit certain behavioural reactions, including displacement from an area around an airgun array. The size of the 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 sea turtles that are very close to the seismic array may incur hearing impairment. The 2010 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 results from one program indicate that sighting rates of baleen whales were higher during seismic periods than during non-seismic periods. However, the sighting rate was lowest when the array was operating at full volume. The distance at which baleen whales were observed was closer when airguns were inactive. Overall, Stantec 2010b reports that the analysis of the data suggests that there was no obvious behavioural effect of airgun operations on baleen whales. In another monitoring study, it was reported that dolphins were observed at a further distance when the airguns were active than when airguns were inactive, and this difference was statistically significant.

Sea turtles are likely to show avoidance behaviour during seismic surveys. An industrial sound source will reduce the effective communication or echolocation distance only if its frequency is close to that of the cetacean signal (Stantec 2010b). If little or no overlap occurs between the industrial noise and the frequencies used, communication and echolocation are not expected to be disrupted. Furthermore, 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. If sea turtles were present, the mitigation measures applied (as outlined in the 2010 EA Report) should reduce the effect.

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 2010 EA Report lists a number of mitigations that will be implemented during the seismic program, some of which are consistent with the mitigations recommended in Appendix 2 of *The Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2008).

The effects on marine mammals are predicted to be of low magnitude, short duration (less than one month), medium geographic extent (within an area of radius 10 km during seismic activities), low frequency and reversible. The program will have a low-volume (160 in^3 airgun) seismic component and take place over a period of two and a half days. With the application of mitigation measures, the likelihood of effects occurring is low, and effects will be **not significant**.

The effects on sea turtles are predicted to be of negligible to low magnitude, medium geographic extent, low frequency (<1 month)and reversible. With the application of mitigation measures, the overall likelihood of effects occurring is low, and effects will be **not significant.**

5.2.4 Marine Birds 1

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 may be present in the Project Area spend only a short time underwater during foraging so there would be minimal opportunity for exposure to noise from the seismic shooting associated with the geohazard survey. The Northern Gannet can plunge to a depth of 10 m but tends to only spend a few seconds under water thus minimizing its exposure and as described in the EA Report, this species tends to be common to the Project Area only during the summer (June – Sept). The Double-crested Cormorant and the Great Cormorant are also considered common to the Project Area during summer, as well as autumn and spring, and exhibit pursuit diving as their foraging strategy.

Only those species of the Alcidae (common murre, thick-billed murre, razorbill, black guillemot, and puffin) spend longer amounts of time underwater during forage dives. They, therefore, have the greatest potential to be exposed to the sounds produced by seismic activity associated with a geohazard survey. This group of seabirds uses their wings to propel them to great depths, 20- 60 m in search of food. The average length of time spent underwater is approximately 25-40 seconds. However, some species have reached depths of 120 m and remained underwater for up to 202 seconds. Of the alcid species that could be found within or near the Project Area, their occurrence during each season of the year tends to be rare, scarce and uncommon (LGL 2005).

Sound emissions as a result of the proposed Project activities are predicted to have low environmental effects on Marine Birds. With the implementation of all mitigation measures outlined in the EA Report and the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2008), the effects of sound emissions on Marine Birds are deemed **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. Therefore, the effect of vessel lighting on Marine Birds is deemed **not significant**.

5.2.5 Species at Risk **1**

The EA Report indicates that the area for potential surveys has no unique habitat or spawning areas required by fish species at risk. Mitigation measures include a gradual increase in intensity of air gun discharge to allow fish to avoid the source of sound, and avoidance of seismic activities during known sensitive areas and timeframes. Effects on wolffish species at risk therefore are likely to be **not significant**.

The EA report indicates that leatherback sea turtles may be occasional or infrequent visitors to the Project Area and the area contains no known critical habitat. A recovery strategy for leatherback sea turtles is available. With the implementation of mitigations as indicated above, effects on sea turtles are likely to be not significant. Therefore, effects on the Leatherback sea turtles are not likely to be adverse and therefore **not significant**.

Blue, North Atlantic Right, and the Northern Bottlenose whales are reported by Stantec (2010a) to be uncommon in the Project Area and thus, interaction with project activities is unlikely. However, if these marine mammals were in the project area, the mitigations described above would reduce any impact. A dedicated Marine Mammal Observer will be onboard the seismic vessel. With the implementation of mitigations, including those outlined in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2008*)* and the fact that the program will have a low-volume (160 in^3 airgun) seismic component and take place over a period of two and a half days, effects on marine mammal species at risk are likely to be **not significant**.

Most of the listed seabirds at risk are thought to be infrequent visitors to the Project Area (Stantec 2010b). The Ivory Gull is an unlikely visitor in the Project Area and the risk of hearing impairment to Ivory Gull from seismic activity is low as this species would not spend considerable amounts of time below the surface of the water (as it is a surface feeder) or in close proximity to airgun pulses. 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 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 geohazard 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 geohazard program operation on marine water quality should be undetectable and **not significant**.

5.3 Cumulative Environmental Effects 1

Potential cumulative environmental effects external to the project include seismic program(s) by other operators, commercial and traditional fishing, marine transportation and tourism/recreation. The potential exists that 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. Vessels not associated with the seismic program are restricted from being close 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), 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 Corridor Resource'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 do 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 Corridor regarding the potential adverse environmental effects which may result from the proposed project, and is 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 geohazard survey program is approved:

- *Corridor Resources Inc. 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 the Old Harry Prospect Geohazard Program 2010-2020" (Stantec 2010b) and the Consultation Report (Corridor Resources September 7, 2010).*

- *Corridor Resources Inc., 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 Decision

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 Corridor Resources Inc., the Project **is not likely to cause significant adverse environmental effects**. This represents a determination pursuant to Section 20(1)(a) of the CEA Act.

Responsible Officer *Original signed by E. Young* Date: October 4, 2010
Elizabeth Young
Environmental Assessment Officer
Canada-Newfoundland and Labrador Offshore Petroleum Board

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