

**CANADA-NEWFOUNDLAND and LABRADOR OFFSHORE
PETROLEUM BOARD
CEAA SCREENING REPORT**

Part A: General Information

Screening Date	<u>February 6, 2009</u>
EA Title	Port-au-Port Peninsula Ocean Bottom Cable Seismic/VSP Program Environmental Assessment, 2009-2014
Proponent	PDI Production Inc.
Contact	Vanessa Pennell Mercer
C-NLOPB File No.	7705 P35-2
CEAR No.	07-01-35915
Referral Date	December 03, 2007
EA Start Date	December 05, 2007
Location	Port au Port Peninsula Area

Part B: Project Information

In December 2007, PDI Production Inc. (PDIP) submitted a project description “*3D Combined Land and Transition Zone Seismic Project Description for the Port au Port Peninsula*” (PDIP 2007) to the C-NLOPB, in support of its application to conduct a 3-D seismic/VSP program in the offshore area, including the intertidal zone, off the Port au Port Peninsula. The “*Environmental Assessment of the PDI Production Inc. Port-au-Port Peninsula Ocean Bottom Cable Seismic/VSP Program 2009-2014*” (LGL Ltd. 2008), submitted on October 31, 2008, provided an environmental assessment for a year-round program offshore for the period 2009 to 2014. C-NLOPB provided review comments to PDIP on January 13, 2009 to be addressed before a Screening Report could be issued by the C-NLOPB. The “*Responses to Comments by Reviewers of the Environmental Assessment of the PDI Production Inc. Port-au-Port Peninsula Ocean Bottom Cable Seismic/VSP Program 2009-2014*” (LGL 2009) was submitted on January 26, 2009 to address these comments.

In completing this Screening Report, information from the 2008 EA Report and the 2009 response document addressing review comments, is summarized and included in the following sections.

1. Description of Project

In support of exploration activities, PDIP is proposing to conduct 2D and 3D ocean

bottom cable (OBC) seismic surveys, and vertical seismic profiling (VSP) over part of, and adjacent to the Port au Port Peninsula, in western Newfoundland. The Project Area includes much of the coastal waters off the Port-au-Port Peninsula, except for those occurring along the eastern portion of the south coast of the peninsula. The offshore boundary of the Project Area is located approximately 5-10 km off the coast of much of the peninsula. All water depths within the Project Area are <100 m. The proposed survey will be conducted using OBCs or bay cables. A shallow draft marine vessel will tow a sound source and receiving pairs of hydrophones and geophones will be strung along Kevlar-reinforced ocean bottom cables. The cables will be laid along the sea floor through the surf-zone and onto the beach. The flexible, lightweight, approximately ½” diameter cables are connected to electronic units in waterproof housing.

In 2009, PDIP is proposing to acquire marine OBC 3D seismic survey data in approximately 48 km² of the Garden Hill South (GHS) area located in the southwest part of the Port-au-Port Peninsula. PDIP is also proposing to acquire approximately 150 km of marine OBC 2D seismic survey data in the Shoal Point area in 2009. Additional OBC 2D and/or 3D seismic surveys will be conducted at other locations within the Project Area during the 2009 to 2014 period.

2. Description of Environment

2.1 Physical Environment

A detailed description of the physical environment for the Port au Port area can be found in the “*Environmental Assessment of the PDI Production Inc. Port au Port Peninsula Ocean Bottom Cable Seismic/VSP Program 2009-2014*” (LGL 2008). Raised terraces and marine deltas, paleoclimbs and beaches characterize the coastal geomorphology of the Port au Port Peninsula. Predominant winds are from the southwest and west. West to northwest winds are prevalent during the winter months, northeast or southwest during spring, southwest during summer and southwest to northwest during the fall months. Mean monthly wave heights ranged from 0.5 m in February to 2.0 m in December. Maximum wave heights range from 4.1 m in July to 8.5 m in December. The Project Area is ice free from May to December.

2.2 Biological Environment

2.2.1 Fish and Commercial Fisheries

The Project Area is included within North Atlantic Fisheries Organization (NAFO) Division 4R, specifically within sub-management Unit Areas (UA) 4Rd and 4Rc. There are a number of fish species in the Port au Port Peninsula area, of which a large number are fished commercially. A detailed description of the species that occur within the Project Area (less than 100 m water depth) is provided in the C-NLOPB’s 2005 Western Newfoundland and Labrador Offshore Area SEA Report and 2007 Amendment.

Fish species that are the most important species in the area in terms of cash landings include lobster (*Homarus americanus*), snow crab (*Chionoecetes opilio*), herring

(*Clupea harengus*), mackerel (*Scomber scombrus*), and capelin (*Mallotus villosus*). These are summarized below.

Lobsters are common in the Project Area and within the region generally. Lobsters mate during the summer after the female molts (C-NLOPB 2005). Eggs are not fertilized until the following summer and pre-hatch larvae are released during the next summer. Larvae remain plankton in near surface waters for 3 to 10 weeks before they settle out to the bottom. Lobster larvae can be present in waters near the coast between June and mid-October, depending on the area and the annual variation in water temperatures. The lobster fishery occurs during the spring (from April to July). The area between the outer portion of Port au Port Bay and northward to Shag Island, outside the Project Area, has been identified as a lobster spawning ground.

Adult snow crab occurs in the Gulf at water depths between 70 and 100 m on relatively soft bottoms (C-NLOPB 2005). Moulting usually occurs between March and July with mating in late April and early May on the west coast. Females carry the fertilized eggs for 1 – 2 years prior to larval hatch in late spring or early summer. The newly hatched larvae spend 12 to 15 weeks in the water column before settling to the bottom between late August and late October. Juvenile snow crab prefers hard substrates in relatively shallow water, compared to adults. Snow crab fisheries take place from April to June.

Herring eggs attach to the hard bottom substrate nearshore or to kelp leaves. Larvae hatch after about 30 days at 5°C and after 10 days at 15°C. The amount of time the larval stage remain pelagic is temperature dependent. Recent DFO data show that Gulf of St. Lawrence herring more recently have been discovered spawning in Port au Port Bay. The herring fishery in the Gulf is conducted in two phases: spring harvest (May-July) and fall harvest (October-December). The main method of fishing is with mobile purse seines.

The Atlantic mackerel is common to temperate waters of the open sea and is one of the most active and migratory of fishes. They migrate to the Gulf of St. Lawrence in spring to spawn. Spawning typically occurs between mid-June and mid-July in open water, resulting in a concentration of fertilized eggs in the upper 10 m of the water column. Larval hatching generally occurs within five to seven days. Highest catches typically occur in Unit Areas 4Rc and 4Rd during September and October. Mackerel are fished primarily inshore with purse seines, traps, gillnets, jiggers and handlines.

Capelin overwinter in offshore waters, move shoreward in early spring to spawn on beaches throughout the region in the spring-summer, and return to offshore water in autumn. Highest catches typically occur in NAFO Divisions 4R and 4ST. Capelin are fished by a fleet of small and large purse seiners as well as by trap fishers in June and the beginning of July.

2.2.2 Marine Mammals and Sea Turtles

Baleen whales most likely found in the Study and Project Areas include the humpback (*Megaptera novaeangliae*), North Atlantic right (*Eubalaena glacialis*), Blue (*Balaenoptera*

musculus), Fin (*Balaenoptera physalus*), Sei (*Balaenoptera borealis*), and Minke (*Balaenoptera acutorostrata*). The toothed whales most likely found in the Study and Project Areas include the Long-finned pilot (*Globicephala melaena*), Sperm (*Physeter macrocephalus*), Northern Bottlenose (*Hyperoodon ampullatus*), Beluga (*Delphinapterus leucas*), Killer (*Orcinus orca*), and the Atlantic white-sided (*Lagenorhynchus acutus*), white-beaked (*Lagenorhynchus albirostris*), short-beaked common (*Delphinus delphis*) dolphins, and the harbour porpoise (*Phocoena phocoena*). Seal species likely in the Study and Project Areas are the grey (*Halichoerus grypus*), harp (*Phoca groenlandica*), harbour (*Phoca vitulina*), and hooded (*Cystophora cristata*) seals.

There are three species of sea turtles that may occur near the Project Area: leatherback turtle (*Dermochelys coriacea*, the Atlantic loggerhead turtle (*Caretta caretta*), and the Kemp's Ridley turtle (*Lepidochelys kempii*). The leatherback turtle is listed as Endangered under the *Species at Risk Act (SARA)*. The northwest Atlantic population estimates of Kemp's Ridley and loggerhead sea turtles are unknown.

A detailed description of the species that occur within the Project Area is provided in the 2005 Western Newfoundland and Labrador Offshore Area SEA Report and 2007 Amendment.

2.2.3 Marine Birds

The marine coast and waters of western Newfoundland have lower abundances of marine birds than other coastal areas of Newfoundland, possibly due to lower productivity of the eastern Gulf of St. Lawrence (LGL 2008). However, coastal marine-associated species (e.g., cormorants, waterfowl, terns, gulls, shorebirds) are well represented in the Study Area on small islands, coastal tidal flats and estuaries. Marine birds in the Project Area include shearwaters, fulmars, petrels, jaegers, skuas, phalaropes, gannets, cormorants, alcids, kittiwakes and gulls. Specific information can be found in the 2008 EA Report.

The period of peak concentrations of pelagic marine birds along the west coast of Newfoundland is between January and March and least abundant during the period from October to December. Black-legged Kittiwake (*Rissa tridactyla*) is the only pelagic marine-associated species that nests in the Project Area. The largest colony is estimated at 2,000 pairs in 2007. Cape St. George, within the Study Area, contains a breeding colony of cormorants with a 2007 estimate of 101-500 individuals.

2.2.4 Species at Risk

There are a number of Species at Risk, as defined under Schedule 1 of the SARA that are likely to be in the Study Area. The following table identifies the species likely to be present and their SARA and COSEWIC listing.

Species	SARA Status	COSEWIC Status (Date of most recent status report)
Blue whale (<i>Balaenoptera</i>	Schedule 1 - Endangered	Endangered (May 2002)

Species	SARA Status	COSEWIC Status (Date of most recent status report)
<i>musculus</i>)		
North Atlantic right whale (<i>Eubalaena glacialis</i>)	Schedule 1 - Endangered	Endangered (May 2003)
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	Schedule 1 - Endangered	Endangered (May 2001)
Northern bottlenose whale (Scotian Shelf population) (<i>Hyperoodon ampullatus</i>)	Schedule 1 – Endangered	Endangered (May 2000)
Piping Plover (<i>Charadrius melodus</i>)	Schedule 1 - Endangered	Endangered (May 2001)
Northern wolffish (<i>Anarhichas denticulatus</i>)	Schedule 1 – Threatened	Threatened (May 2001)
Spotted wolffish (<i>Anarhichas minor</i>)	Schedule 1 - Threatened	Threatened (May 2001)
Beluga whale (<i>Delphinapterus leucas</i>)	Schedule 1 - Threatened	Threatened (May 2004)
Fin whale (<i>Balaenoptera physalus</i>)	Schedule 1 – Special Concern	Special Concern (May 2005)
Atlantic (Striped) wolffish (<i>Anarhichas lupus</i>)	Schedule 1 – Special Concern	Special Concern (November 2000)
Ivory Gull (<i>Pagophila eburnea</i>)	Schedule 1 – Special Concern	Endangered (April 2006)
Harlequin Duck (<i>Histrionicus histrionicus</i>)	Schedule 1 – Special Concern	Special Concern (May 2001)
Barrow's Goldeneye (eastern population) (<i>Bucephala islandica</i>)	Schedule 1 – Special Concern	Special Concern (November 2000)

The blue whale is listed as a Schedule 1 Endangered Species under the SARA, and a recovery strategy is being developed. Blue whales can be found in the Gulf of St. Lawrence from January through November and are typically most abundant during the August to October period (LGL 2008). They enter the Gulf through the Cabot Strait during ice breakup from late March to early April, after wintering in southern latitudes. In the waters off Newfoundland, very little is known regarding their presence or distribution.

The North Atlantic right whale is the most endangered species in the northwest Atlantic. The current population estimates indicate that there are approximately 300 individuals

and sightings are likely to be rare in the western Newfoundland offshore region (LGL 2008).

Adult leatherback turtles are commonly sighted in the waters off Newfoundland from June to October. They may occur regularly in the western Newfoundland offshore region during the summer and fall. A Recovery Strategy was released by DFO in June 2006 and finalized in December 2006. Leatherback turtles have been caught incidentally during commercial fish harvesting in Newfoundland waters.

Northern bottlenose whales typically live in deep water areas of the North Atlantic and are rarely found in waters less than 500 m deep (LGL 2008). They are known to occur in the Gulf of St. Lawrence, however, they are uncommon in the western Newfoundland offshore region because it is not a known area of concentration.

Piping Plovers nest on sandy beaches mostly in the southwestern part of the island (LGL 2008). Within the Study Area, as many as three pairs of Piping Plover have been known to breed on Flat Bay Island (St. George's Bay); however, this site has been abandoned in recent years. A pair has also nested at Stephenville Crossing (St. George's Bay). They are typically known to occur in the Study Area between April and September.

The likelihood of wolffish occurring in the Study Area is unknown, but assumed to be likely. Northern wolffish spawn in September and the fish remain near their eggs to guard them. They are known to be located at depths ranging from 150 to 600 m, but have been found in the shallower areas. Spawning is believed to occur late in the year. Northern wolffish in the Gulf are much less common than in other areas. Spotted wolffish occur at depths greater than 450 m and spawn during late summer and early autumn. Spotted wolffish in the Gulf are much less common than on the Northeast Newfoundland Shelf. Recovery strategies were released by DFO in 2008 for the spotted and northern wolffish. Atlantic wolffish can be found at depths ranging from 200 to 750 m, but is typically found further south than the northern or striped species. They are common in the deeper parts of the Gulf of St. Lawrence. A management plan was prepared by DFO in 2008 for the Atlantic wolffish. Mature wolffish migrate to shallow, inshore waters in the spring and spawn in September.

The St. Lawrence Estuary population of the beluga whale is estimated to be approximately 900 - 1,000 individuals (LGL 2008). A recovery framework has been proposed for the population. It is unlikely, but possible, that the beluga whale could be found in the Study Area.

Fin whale abundance in the east and west North Atlantic is currently thought to be 43,700 individuals (JW 2007). They are common in the Gulf of St. Lawrence during the summer, ranging into the St. Lawrence estuary. An aerial survey of the Gulf of St. Lawrence in the summer estimated a few hundred fin whales. They were most common along the margins of the Laurentian Channel.

Ivory Gull occurrence in the Study Area is considered rare but may appear from November to April (LGL 2008). There is one record of an Ivory Gull in the Study Area in Stephenville in 1999. They nest in the high Arctic but may winter along northeast Newfoundland. They are typically found on the edge of pack ice in late winter.

Harlequin Duck breed along rivers to the north of the Project Area and may be found in coastal waters at the mouths of streams during spring and fall staging (LGL 2008). The Harlequin Duck has been sighted off Cape St. George as recently as 2003, however, its occurrence in the Study Area is considered scarce.

Barrow's Goldeneye breed in small, high-elevation lakes draining into the north shore of the Gulf of St. Lawrence. About 90% of the eastern Barrow's Goldeneye winter in the St. Lawrence estuary. Two were observed overwintering at Stephenville Crossing in December 2006. The Barrow's Goldeneye probably occurs regularly in small numbers in the Study Area during the October to April period.

2.2.5 Sensitive and Special Areas

The EA Report and EA review comments response document identified sensitive and special areas in and proximate to the Study Area. The Cod Spawning Box overlaps with the western corner of the Project Area and the western edge of the Study Area. This area is closed to groundfish fisheries between April 1 to April 23 due to cod spawning activity. There are two Black-legged Kittiwake colonies on the southwestern tip of the Port au Port Peninsula, which lie in the Garden Hill South discovery. These colonies are two of the largest kittiwake colonies (501-1,000 birds and >1,000 birds) in western Newfoundland. The Project Area is within one of five Large Ocean Management Areas (LOMA) in Canada identified for unique ecological importance. As well, the Project Area is within Ecologically and Biologically Significant Area (EBSA) Number 10. This EBSA includes main concentration areas for juvenile cod, redfish, American plaice and Atlantic wolffish in the Estuary and Gulf of St. Lawrence. The overlap area may also represent important migration corridors for particular species including Atlantic cod and redfish. It is also known for cod spawning, and an abundance of capelin and Atlantic herring larvae. St. Georges's Bay is a typical location for herring spawning during May and June and a coastal area north of Port au Port Bay is known as a lobster spawning/nursery area. Both of these areas do not occur within the Project Area but are in the Study Area.

2.2.6 Research Surveys, Vessel Traffic, and Recreation

Information regarding DFO vessel research surveys is provided in the 2008 EA Report. The 2009 DFO survey schedules will be confirmed prior to finalizing the seismic survey schedules. Offshore seismic activities will be planned to avoid conflicts. PDI Production Inc. will be required to communicate with DFO to avoid any potential conflict with research surveys that may be operating in the area. In winter, the main North Atlantic shipping lanes between Europe and North America are along the southern Grand Banks into the Gulf of St. Lawrence. In the summer, that traffic shifts to the main shipping lanes to the north of the Grand Banks into the Strait of Belle Isle. Vessel traffic with respect to fishing vessels is discussed in terms of amount of commercial fishing

activity. The majority of hunting of seabirds (mostly murre) in Newfoundland and Labrador waters occurs near shore from small boats. It is likely that a limited hunt of seabirds occurs around Port-au-Port Peninsula. Marine recreational fishery activity is likely limited to the cod food fishery (July-August and September-October in 2008) and sea-run trout fishing in estuarine areas in the springtime.

Part C: Environmental Assessment Process

3. Procedures

In December 2007, PDIP submitted a project description "*3D Combined Land and Transition Zone Seismic Project Description for the Port au Port Peninsula*" (PDIP 2007) to the C-NLOPB, in support of its application to conduct a 3-D seismic/VSP program. Pursuant to Section 12.2(2) of the 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. Input was sought from federal and provincial regulatory agencies and interested stakeholders respecting the scope of project and environmental assessment review.

A FCR notification was sent on December 5, 2007 regarding PDIP's proposed program. DFO, Environment Canada (EC), and Transport Canada responded that they would participate as FAs in the EA review.

On December 21, 2007, the C-NLOPB notified PDIP that a screening level of assessment was required and the proponent was provided with a Scoping Document.

PDI Production Inc. submitted the 2008 EA Report to the C-NLOPB on 31 October 2008. The C-NLOPB, as Responsibility Authority (RA), forwarded the 2008 EA on 03 November 2008 to the DFO, EC, Transport Canada, Health Canada, National Defence, Natural Resources Canada, and the provincial Departments of Fisheries and Aquaculture, Natural Resources, and Environment and Conservation. The FFAW and One Ocean were also provided with a copy of the EA report to review. Comments were received from DFO, EC, Health Canada and NL Department of Fisheries and Aquaculture.

On 13 January 2009, the C-NLOPB requested additional information from PDIP in order to satisfy the requirements of the CEAA and to complete the Screening Report. PDIP provided a response to this request on 26 January 2009.

It is the obligation of the C-NLOPB to consider which physical works and undertakings in relation to the proposed project fall within the scope of the Project. First, there are no physical works that should be included in the scope of the Project. Second, if the Project were to proceed, as set out in the application and supporting EA report and supporting information, it would constitute a single project for the purposes of Section 15(2) of CEAA. For the purposes of Subsection 15(3) of CEAA, the C-NLOPB's scoping exercise is complete because an assessment was conducted in respect of

every physical activity or other undertaking proposed by PDIP that is likely to be carried out in relation to their proposed Project.

4. Environmental Assessment Review

Comments on the EA report were received from DFO, EC, Health Canada and NL Department of Fisheries and Aquaculture.

Environment Canada provided a response on 16 December 2008. They provided information on two Black-legged Kittiwake colonies on the southwestern tip of the Port au Port Peninsula and recommended mitigation for seismic activities in these areas. They also provided further information on marine associated birds in the area.

DFO provided comments on 09 January 2009. They requested further information on Sensitive and Special Areas, in particular seismic activities near the Cod Spawning Box. PDIP responded that seismic activities in the portion of the Study Area that overlaps with the Cod Spawning Box will not occur during the important spawning time (i.e., April-June). They also provided further information on Ecologically and Biologically Significant Area (EBSA) No. 10 that overlaps with the Study Area.

In addition, DFO agreed that a monitoring program respecting potential effects of the proposed seismic survey on lobster should be implemented. *The C-NLOPB will request PDIP to implement a lobster monitoring program for the proposed seismic survey. The details of the program are to be determined in consultation between PDIP, DFO scientists and the C-NLOPB.*

Health Canada provided comments on December 5, 2008. They stated that although recreational fishing is mentioned in the EA, more information is required on the use of the area. They also requested that recreational water users be included in advisory/communication efforts. PDI Production Inc. provided information in the January 26, 2009 response to review comments stating that recreational fishery is likely limited to the cod food fishery and sea-run trout fishing in estuarine areas. They also agreed that recreational fishers would be included in advisories and communications.

Newfoundland and Labrador Dept. of Fisheries and Aquaculture provided a response on November 18, 2008 agreeing with PDIP's mitigation for sensitive fishing seasons and their commitment to consult with fishers prior to conducting surveys.

5. Scope of Project

PDI Production Inc. is proposing to conduct an OBC seismic/VSP program in the offshore adjacent to the Port au Port Peninsula in western Newfoundland. The Project Area includes much of the coastal waters of the Port au Port Peninsula, except for those occurring along the eastern portion of the south coast of the peninsula. The offshore boundary of the Project Area is located approximately 5-10 km off the coast of much of the peninsula. All water depths within the Project Area are <100 m. In 2009, PDIP is proposing to acquire marine 3D seismic survey data in approximately 48 km² of the Garden Hill South (GHS) area and approximately 150 km of marine 2D seismic survey data in the Shoal Point area. Additional OBC 2D and/or 3D seismic and VSP surveys

will be conducted at other locations within the Project Area during the 2009 to 2014 period.

The proposed survey will be conducted using OBCs or bay cables. A shallow draft marine vessel will tow a sound source and receiving pairs of hydrophones and geophones will be strung along Kevlar-reinforced ocean bottom cables. The cables will be laid along the sea floor through the surf-zone and onto the beach. The flexible, lightweight, approximately ½ inch diameter cables are connected to electronic units in waterproof housing. The Project Area includes the area required by a seismic vessel to turn around during survey transect changes.

In addition to activities associated with the proposed marine OBC seismic program, VSP for future drilling projects on the Port au Port Peninsula may be undertaken. The sound source for VSP will be an airgun array with an approximate volume of 200 in³ at a pressure range of 1,800-2,000 psi. The airgun array will likely be hung off a boom extended four to five metres from an anchored vessel at an approximate depth of three to five metres.

This screening report therefore considers the year-round activities associated with the OBC seismic/VSP program from 2009 to 2014. The approximate duration of each OBC seismic survey in the program is anticipated to be four weeks but could vary depending on survey size and delays encountered during acquisition. VSP surveys typically take approximately 14 hours but may be extended if limited to daylight hours.

At the time of application for the OBC seismic/VSP surveys to be undertaken beyond 2009 in the Project Area, the Operator will be required to provide information to the C-NLOPB which outlines the proposed activities, confirms that the proposed program activities fall within the scope of the previously assessed program, and indicates if with this information, the EA predictions remain valid. In addition, the Operator will be required to provide information regarding the adaptive management of requirements of the SARA into program activities (e.g., introduction of new species or critical habitat to Schedule 1; additional mitigations; implementation of recovery strategies and/or monitoring plans). If there are any changes in the scope or information available, which may alter the EA conclusions, then a revised EA will be required at the time of authorization renewal. The Canadian Environmental Assessment Registry will be updated as required.

5.1 Boundaries

The boundaries of the Project are defined in the 2008 EA Report as follows.

Boundary	Description
<i>Temporal</i>	OBC Seismic/VSP Surveys – year-round between 2009 and 2014.
<i>Project Area</i>	Defined as the area in which project related activities will occur. It encompasses the offshore area below the low water mark and includes space to accommodate a seismic vessel-turning

	radius.
<i>Affected Area</i>	The geographic extent of a specific potential effect on a species or species group. Varies with the project activity, potential environmental effect as well as the spatial and temporal distributions of the biophysical VECs under consideration.
<i>Regional Area</i>	The Gulf of St. Lawrence.
<i>Assessment Area</i>	Will vary based upon the activity interaction with the biophysical VEC.

There would 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.

6. Consultation carried out by PDI Production Inc.

PDI Production Inc., as reported in the 2008 EA, discussed the proposed project with federal and provincial government agencies, municipal councils, economic development boards, local fishers, conservation groups, union representatives, One Ocean, and area residents. The complete list of stakeholders contacted is provided in the EA report. Representatives of PDIP and its consultant team met with relevant community and business agencies, local interest groups, representatives of the fishing industry and area residents in September and October 2009. A variety of information materials, background data and displays/maps was distributed in advance. A project description was sent to various agencies and other interest groups based in St. John's. The FFAW provided preliminary information on the fishery (e.g. lobster, crab, cod) seasons in the vicinity of the Project Area. Issues raised during the consultation process related mainly to the timing of the proposed survey and its potential conflict with fishing activities and fish spawning times, and the potential effects of seismic operations on lobster.

The C-NLOPB is satisfied that the consultations carried out by PDIP during the preparation of the environmental assessment and reported on in the 2008 EA Report included all elements of the Project. The C-NLOPB is not aware of any further public concerns with respect to the environmental effects of the project, and requires that further consultations, as committed in the 2008 EA, be undertaken prior to the field season.

7. Environmental Effects Analysis

7.1 Scope of Assessment

For the purpose of meeting the requirements of the CEAA and the “*Geophysical, Geological, Environmental and Geotechnical Program Guidelines*” (C-NLOPB 2008), the factors that were considered to be within the scope of an environmental assessment are those set out in subsection 16(1) of the CEAA and those listed in the “*PDI Production Inc. Port au Port Peninsula 3D Transitional Zone Seismic Program Scoping Document*” (C-NLOPB 2007).

7.2 Methodology

The C-NLOPB reviewed the environmental effects analysis presented by PDIP in the 2008 EA. The environmental assessment methodology and approach used by the Proponent is acceptable to the C-NLOPB. The following environmental effects analysis uses the information presented by the Proponent (in LGL 2008 and 2009) and takes into consideration mitigation proposed by the Proponent and those required by the C-NLOPB, to assess the potential for residual environmental effects.

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

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

after taking mitigation measures into account;

- significance of residual effect.

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

- 0 = No Detectable Adverse Effect*
- 1 = Detectable Effect, Not Significant*
- 2 = Detectable Effect, Significant*
- 3 = Detectable Effect, Unknown*

In the 2008 EA, PDIP presented information regarding the potential effects of seismic activities on the macroinvertebrates and fishes, commercial fisheries, marine-associated birds, marine mammals, sea turtles, and Species at Risk. Information regarding hearing effects in fish, sound detection and behavioural changes in invertebrates, behavioural and disturbance effects in marine mammals, and discussion of marine mammal monitoring results from recent seismic programs in the Newfoundland and Labrador offshore area were presented. Upon review of the information and review of the mitigations proposed by PDIP, the effects assessment is as follows.

7.3 Valued Ecosystem Components/Potential Environmental Effects

7.3.1 Impacts on Fish and Shellfish

1

In the natural environment, fish show avoidance responses and swim away as the array ramps up or as the survey slowly approaches. The airgun will be ramped-up, thereby allowing fish in the area to leave. Other studies referenced in the 2008 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. Behavioural responses to seismic have been documented in a number of studies and reported by Christian *et al.* (2003). 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. However, some studies show that this effect was temporary, whereas other studies report that fish behaviour was altered for a number of days (LGL 2008). LGL Limited (2008) reports that the temporary nature of these responses varies depending on the fish species and the sound source. Studies to determine effects on the auditory thresholds of fish have shown that the Temporary Threshold Shift (TTS) can occur in fish exposed to seismic, under certain conditions.

The results from an ESRF sponsored study (Christian *et al.* 2003), indicate that there was no pathological (acute or chronic mortality) effect on caged male or female snow crab from an airgun array passing over at close range. However, there was a significant difference in development rates between exposed and unexposed fertilized eggs from a single female. Christian *et al.* (2003) reported that there was no significant difference in stress indicators between exposed and non-exposed adult male snow crab. In the Christian *et al.* (2003) study, a decrease in catch rate of the snow crab was not observed after seismic shooting commenced.

DFO laboratory and field pilot study (Payne 2007) showed no effects on delayed mortality or equilibrium and posture. The study indicated the potential for seismic surveys to cause some sub-lethal effects on lobster. However, it also recommended further studies to investigate these potential effects. PDI Production Inc. have committed to participating in a lobster monitoring program during the conduct of its seismic program. The details of the monitoring program will be determined in consultation with DFO prior to the start of the seismic survey.

As stated above, a portion of the Cod Spawning Box overlaps slightly with the western edge of the Study Area and the westernmost corner of the Project Area. PDIP will not conduct seismic activities in the portion of the Study Area that overlaps with the Cod Spawning Box during the important spawning time (i.e. April to June). In addition, PDIP has committed to avoiding key lobster spawning and nursery areas and spring and fall herring spawning areas in the Study Area.

LGL (2008) reports that, taking avoidance behaviour into account, physical effects on fish will be of negligible to low magnitude, with a <1 km² geographic extent, for a duration of 1-12 months. Given the attenuation of the energy in shallow water and

spatial and temporal avoidance of project activities during sensitive periods, the likelihood of effects (behavioural and physical) is low and therefore **not significant**.

7.3.2 Commercial Fishing and DFO Vessel Research Surveys **1**

Interactions with this VEC include the potential for a decrease in catch rates (loss of access to fishing grounds), interference with fishing gear and potential impact on DFO's research survey trawls and the sentinel fishery program. As indicated above, seismic activity has resulted in a dispersion of fish species, and subsequently reduced catch rates for a short duration in the studies referenced by LGL (2008). There is potential for interaction between seismic operations (e.g. vessels and OBC or VSP arrays) and fishing gear.

PDI Production 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 peak fishing activity, use of a Fisheries Liaison Officer (FLO) at sea, communication with fishers (notice to mariners) and DFO research vessels (both before surveys and during), and a fish gear compensation plan.

It is predicted that seismic activity, including vessel movement and OBCs, on fish harvesting will have negligible residual effects, of a duration of 1-12 months, and with a geographic extent of <1km². Taking mitigations into account, effects to the commercial fishery and research surveys are therefore not likely and **not significant**.

7.3.3 Marine Mammals and Sea Turtles **1**

Potential effects of the proposed operation upon marine mammals and sea turtles, which may be present in the area, is that of sound pulses from the survey equipment, the presence of vessels, and the OBC deployment/presence/retrieval. The EA Report (LGL 2008) describes in more detail the numbers and the species of cetaceans, which have been observed in, or which are considered likely to frequent, the Study Area. The 2008 EA Report provides an effects assessment, based on available data on the effects of seismic surveys on marine mammals. Several different surveys in other marine areas indicate that avoidance behaviour is usually exhibited in response to airgun seismic surveying. There is a risk that auditory damage may occur, including temporary hearing impairment, at close range to the array.

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 (JW 2007). If little or no overlap occurs between the industrial noise and the frequencies used, communication and echolocation are not expected to be disrupted. There is not enough information on sea turtle temporary hearing loss and no data on permanent hearing loss to reach any definitive conclusions about received sound levels that trigger TTS. Sea turtles may show behavioural responses to an approaching airgun array at a received level around 166 dB re 1 µPa rms. If sea turtles were present, the mitigation measures applied (as outlined in the 2008 EA Report) should reduce impact.

Although it is unlikely that sea turtles will occur in the Project Area, 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 2008 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 Proponent has committed to a 500 m safety zone. In addition to those mitigations listed in the 2008 EA Report, the following mitigations will be required:

- *Monitoring for marine mammals and sea turtles shall be consistent with the approach outlined in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2008), and includes monitoring during ramp-up and at all times when the airgun(s) are active;*
- *During ramp-up, and when the airgun array is active, airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array; and*
- *During line changes, the seismic airgun array shall be reduced to a single airgun and the airgun shall remain active during the line change. If for any reason, the airgun is shut down for a period greater than 30 minutes, then ramp-up procedures shall be implemented as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines.*

The effects on marine mammals and sea turtles are predicted to be negligible to low magnitude, short duration (<1 month to 1-12 months), over a geographic extent of <1 km². With the application of mitigation measures, the likelihood of effects occurring is low, and effects will be **not significant**.

7.3.4 Marine Birds

0

Marine birds may be affected by underwater sound from airgun arrays, spills, presence of vessels, and attraction to ship lights at night. The 2008 EA Report indicates that diving birds such as loons, cormorants, seaducks, and the alcids (dovekie, common murre, thick-billed murre, razorbill, black gillemot and puffin) may potentially be the most sensitive group due to their time spent underwater diving for food. Sound from the array, above the water, is similar to a muffled shot and should have little or no effect on birds that do not have their heads in the water. There are no specific data relating to levels of low-frequency underwater sound that are either harmful to waterbirds, or cause temporary hearing impairment (LGL 2008). There will be limited amounts of fuel and hydrocarbons onboard that could potentially spill. The vessel is also required to carry a “Shipboard Oil Pollution Emergency Plan” pursuant to MARPOL 73/78. The Leach’s Storm-petrels is the seabird most often attracted to lights at night in Newfoundland waters and become stranded on survey vessels. Deck light will be minimized to reduce the likelihood of stranding. However, if birds do become stranded on the vessel, PDIP or its contractor will release the birds in a manner consistent with the Canadian Wildlife Service (CWS) bird handling procedures. The MMO will be monitoring during seismic

surveys.

PDIP has stated that seismic activities are not planned near the two Black-legged Kittiwake colonies on the southwestern tip of the Port au Port Peninsula during breeding season. However, if some activity does occur during breeding season, mitigation measures recommended by the CWS to mitigate effects from seismic activities will be implemented.

The effects on marine birds are predicted to be negligible to low magnitude over a geographic extent of <1 km² for a duration of 1-12 months. Therefore, an environmental effect is not likely and **not significant**.

7.3.5 Species at Risk

1

LGL (2008) report that leatherback turtles are likely a regular part of the marine fauna in the area. As indicated above, effects on turtles are likely to be not significant, therefore effects on the Leatherback turtle are likely to be adverse but **not significant**.

Blue whales, as reported in the 2008 EA Report, are more likely to occur in the Gulf of St. Lawrence during spring, summer, and fall. The North Atlantic right whales historic range included Atlantic Canada to Labrador and are only occasionally sighted in the Gulf of St. Lawrence. Sightings are likely to be rare in the western Newfoundland offshore region. The Northern bottlenose whale typically live in deep water areas of the North Atlantic and are rarely found in waters less than 500 m deep. They are likely to be uncommon in the western Newfoundland offshore region as it is not within the known areas of concentration of this species. Beluga whales could potentially occur in the western Newfoundland offshore region but only rarely. The following mitigations will be required to reduce or prevent impacts to SAR:

- ◆ *During ramp-up, and when the airgun array is active, airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array; and*
- ◆ *During line changes, the seismic airgun array shall be reduced to a single airgun and the airgun shall remain active during the line change. If for any reason, the airgun is shut down for a period greater than 30 minutes, then ramp-up procedures shall be implemented as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2008).*

With the implementation of these mitigations, and with the rare likelihood of these marine mammals occurring, effects therefore will be **not significant**.

Two species of wolffish, the northern and spotted, are likely to occur. They are much less common in the Gulf than in other areas because they are deep-water species. Both northern and spotted wolffish are expected to be infrequent in nearshore waters off western Newfoundland. As indicated above, effects on wolffish are likely to be not significant, therefore effects on wolffish are not likely to be adverse and therefore **not**

significant.

Piping Plover in the Study Area is considered scarce, with the typical time of occurrence between April and September. They have occurred on sandy beaches on Flat Bay Island (St. George's Bay), Stephenville Crossing (St. George's Bay), and Piccadilly Beach (Port au Port Bay). As indicated above, effects on Piping Plover are likely to be not significant, therefore effects on Piping Plover are not likely to be adverse and therefore **not significant**.

7.3.6 Water Quality/Discharges 0

Routine discharges, which are likely to occur during operation, are similar to those associated with many typical vessel operations. Ballast water will be stored in dedicated ballast tanks. Solid waste will be transferred to shore and disposed of by a licensed waste contractor. Vessels proposed for the survey will have equipment, systems and protocols prepared for the prevention of pollution in accordance with the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2008). The effect of the seismic operation survey on marine water quality will be negligible and **not significant**.

7.4 Accidents and Malfunctions 1

Accidental discharge of oil into the marine environment may result from improper operational procedures 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 "operational" releases. The vessel will also carry an "Oil Spill Response Plan" that complies with PDIP's HSE Policy and Management Standards.

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.

7.5 Cumulative Environmental Effects 1

The activities that may overlap in time and space with the seismic program are likely to be commercial fishing, recreational fishing, vessel traffic (e.g., transportation, defence, yachts), and offshore geophysical (seismic including 2-D, 3-D and VSP) activities. There is the potential for seismic surveys to be conducted in other Exploration Leases with the Western Newfoundland and Labrador Offshore area, Laurentian Sub-Basin Offshore area. 2-D seismic programs will likely be ongoing off the coast of Labrador and Greenland until late November. Overlap of geophysical activities will not overlap temporally or spatially, as this may interfere with data collection. The temporal duration of seismic activity within the Project Area is expected to be less than one week, thereby limiting the duration of cumulative effects associated with the Project. The seismic program will be scheduled to such an extent to avoid spatial overlap in areas of

concentrated fishing and to reduce interference with research surveys. Loss of access to fishing areas will only occur with the seismic survey activities for less than one week. The cumulative effects may be additive, however the geographic extent is small. Therefore, in consideration of the mitigation measures to be applied for the Project, the cumulative environmental effects of Project activities on marine birds, fish, mammals, and sea turtles are rated as **not significant**.

7.6 Follow-up Monitoring Required Yes No

The C-NLOPB will require that PDIP implement a monitoring program respecting potential effects of its proposed seismic survey on lobster in the general survey area.

8. Other Considerations

The C-NLOPB is satisfied with the environmental information provided by PDIP regarding the potential adverse environmental effects, which may result from the proposed ocean bottom cable seismic/VSP program, and satisfied with the operator's proposed monitoring and mitigative measures.

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

The C-NLOPB is of the view that if the proposed environmental mitigative measures outlined in the 2008 EA Report and the response to EA review comments document, and those listed below are implemented, the Project is not likely to cause significant adverse environmental effects.

9. Recommended Conditions and/or Mitigations

The C-NLOPB recommends that the following conditions be included in the authorization if the Project is approved.

- *PDIP 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 "Environmental Assessment of the PDI Production Inc. Port-au-Port Peninsula Ocean Bottom Cable Seismic/VSP Program 2009-2014" (LGL October 2008) and the "Responses to Comments by Reviewers of the Environmental Assessment of the PDI Production Inc. Port-au-Port Peninsula Ocean Bottom Cable Seismic/VSP Program 2009-2014" (LGL January 2009).*
- *PDIP shall implement or cause to be implemented the mitigation measures outlined in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2008) respecting 2D/ 3D seismic surveys and VSP surveys.*

- *During ramp-up, or when the airgun array is active, airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array.*
- *That PDIP, as committed in the 2008 EA report, be required to design and implement a monitoring program respecting potential effects of its proposed seismic survey on lobster in the general survey area. The program should be designed in consultation with staff of DFO and C-NLOPB's Environmental Affairs department, and in consideration of fisheries interests in the associated area. PDIP must submit its proposed study design to the C-NLOPB at least 3 months prior to the planned survey commencement.*

The following mitigations are recommended by the C-NLOPB for OBC seismic/VSP activities.

- *For project activities that may occur near the two Black-legged Kittiwake colonies on the southwestern tip of the Port au Port Peninsula, additional mitigations (i.e. avoidance during the sensitive breeding season May to mid August) may be required. As well mitigations provided by the CWS and committed to by PDIP in the "Responses to Comments by Reviewers of the Environmental Assessment of the PDI Production Inc. Port-au-Port Peninsula Ocean Bottom Cable Seismic/VSP Program 2009-2014" may be required.*
- *For project activities that may occur in the nearshore shallow areas where the inshore lobster fishery occurs, additional mitigations (i.e., avoidance) may be required.*
- *For project activities that may occur near the Cod Spawning Box, additional mitigations (i.e. avoidance during the important spawning time (i.e. April-June)) will be required.*

Part D: Screening Decision

10. Decision/Decision Date

The Canada-Newfoundland and Labrador Offshore Petroleum Board is of the opinion that, taking into account the implementation of proposed mitigation measures set out in the conditions above and those committed to by PDIP, the Project **is not likely to cause significant adverse environmental effects**. This represents a decision pursuant to Section 20(1)(a) of the CEA Act.

Responsible Officer Original Signed by K. Coady
 Kimberly A. Coady
 Environmental Assessment Officer

Date: February 6, 2009

References:

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