

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

Part A: General Information

Screening Date	<u>October 17, 2008</u>
EA Title	Environmental Assessment of Geophysical Surveys for Exploration Licences 1097, 1098, 1103 and 1104 Western Newfoundland
Proponent	Geophysical Service Incorporated 176 Water Street Windsor, Nova Scotia B0N 2T0
Contact	Ms. Darlene Davis
C-NLOPB File No.	7705 N8
CEAR No.	07-01-33771
Referral Date	October 05, 2007
EA Start Date	October 11, 2007
Location	Offshore Western Newfoundland

Part B: Project Information

In October 2007, NWest Energy Inc. (NWest) submitted a project description "*Western Newfoundland Geophysical Survey Project Description for Exploration Licences 1097, 1098, 1103 and 1104*" (Conestoga-Rovers & Associates 2007) to the C-NLOPB, in support of its application to conduct 3-D and 2-D seismic programs, geohazard surveys, and vertical seismic profiles (VSP) offshore western Newfoundland in exploration licences (ELs) 1097, 1098, 1103 and 1104. The "*Environmental Assessment of Geophysical Surveys for Exploration Licences 1097, 1098, 1103 and 1104 Western Newfoundland*" (Conestoga-Rovers & Associates 2008a) (herein referred to as the EA Report), submitted on March 14, 2008, provided an environmental assessment (EA) for an eight year period between 2008 and 2015. As of July 10, 2008, Geophysical Service Incorporated (GSI) became the project proponent, assuming the role of operator for the geophysical survey program. On July 10, 2008, the C-NLOPB provided review comments on the March 14, 2008 EA to GSI which had to be addressed by GSI prior to the C-NLOPB completing the Screening Report. The "*Addendum to Environmental Assessment of Geophysical Surveys for Exploration Licences 1097, 1098, 1103 and 1104 Western Newfoundland*" (Conestoga-Rovers & Associates 2008b) (herein referred

to as the EA addendum) was submitted on August 6, 2008 to address these comments. Geophysical Service Incorporated propose to undertake 2-D and 3-D seismic surveys. Geohazard surveys and VSP surveys will not be conducted by GSI and are outside the scope of this assessment. The program is scheduled to start in the third quarter (October/November) of 2008. Geophysical operations after 2008 will take place between May and December.

In completing this Screening Report, information from the 2008 EA Report and the 2008 EA Addendum, and associated correspondence, is summarized and included in the following sections.

1. Description of Project

In support of exploration activities, GSI is proposing to conduct 2-D and 3-D seismic surveys on the west coast of Newfoundland and Labrador offshore area. The project area, see figure 2.1 in the EA report, includes ELs 1097, 1098, 1103 and 1104, and a 10 km buffer for line changes. Project activities are scheduled to occur between 2008 and 2015. The Project Area is bounded by northern boundary 5578000mN, southern boundary 5450000mN, western boundary 370000mE, and eastern boundary 1.5 to 5 nautical miles (3 to 8 km) from the coastline (see Figure 2.1). Depending on weather and technical delays, it may take up to 75 days to complete each survey.

The total linear length of lines will be between 2,500 to 3,000 km. The energy source will be a dual air source array system with a total volume of 0.05 to 0.10 m³ (3000 to 6000 in³). There will be 4 streamers (strings of hydrophone sound receivers), each approximately 5000 m in length, towed behind the seismic vessel to record the airgun pulses.

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 Geophysical Surveys for Exploration Licences 1097, 1098, 1103 and 1104 Western Newfoundland*" (Conestoga-Rovers & Associates 2008a). Glacial tills and postglacial deposits with smaller areas of iceberg, turbate and glaciomarine sediments predominantly characterize bottom stratigraphy within the Project Area. The Project Area is shallow to mid-water range in depth, extending from 40 m depth about nine kilometres at the closest point from shore to 350 metres depth at the furthest boundary of the blocks. Approximately 75% of the Project Area is on continental shelf (<200 m) and the remainder is on slope (200 to 300 m depths). Predominant winds are from the southwest to northwest in April, south to southwest from May to August, southwest to west in September and October, and west to northwest from November to March. Mean monthly wave heights ranged from 0.58 m in March to 1.98 m in December. Significant wave heights greater than 5 m occur in every month except for June, July and August. The Project Area is ice free from June 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 and Unit Areas 4Rb and 4Rc (19% of the Project Area). There are a number of fish species in the Project Area, of which a large number are fished commercially. A detailed description of the species that occur within the Project Area is provided in the 2008 EA Report and Addendum.

The most significant fisheries, by landed weight, in the Project Area are for shrimp, snow crab, turbot/Greenland halibut, halibut, mackerel, herring and capelin. Within the Survey Area, snow crab accounts for about half the fishing effort in NAFO 4Rb, ranging from 50.3 to 59.8% between 2004 and 2006 and only 0.2 to 0.5% of NAFO 4Rc landings. There was no shrimp fishing in the Seismic Survey Area in 2004 to 2007. Fish species that are the most important species in the area in terms of cash landings include shrimp (*pandalus borealis*), snow crab (*Chionoecetes opilio*), mackerel (*Scomber scombrus*), herring (*Clupea harengus*), Greenland halibut (turbot) (*Reinhardtius hippoglossoides*), and Atlantic halibut (*Hippoglossus hippoglossus*). These are summarized below.

Northern shrimp are generally found in areas with water depths ranging between 150 and 350 m. They breed in the fall and the females carry the fertilized eggs for approximately eight months (September to April) and release their larvae in April and May. Larvae are pelagic upon hatching in the spring but eventually settle to the bottom by late summer (July to September). Shrimp migrations tend to be associated with breeding (berried females move into shallower waters in winter) and feeding (upward movement in water column at night to get to plankton). Most of the shrimp catches in the Project Area are made in Unit Area 4Rb within EL 1104. No shrimp catches were reported in the Project Area portion of 4Rc. The majority of fishing occurs in May and July using shrimp trawl.

Snow crab occurs over a broad depth range (50 to 1,300 m) in the Northwest Atlantic (2008 EA Report) but is known to occur in the Gulf at water depths between 70 and 100 m on relatively soft bottoms. Juvenile snow crab prefers hard substrates in relatively shallow water, compared to adults. 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. Most of the snow crab fisheries have occurred in Unit Area 4Rc and the southern part of 4Rb from April to July. Snow crab are harvested using bottom set crab traps (pots).

The Atlantic mackerel winter outside of the Gulf of St. Lawrence but migrate in spring to the Gulf of St. Lawrence outside the Project Area to spawn. Spawning typically occurs between mid-June and mid-July in open water. Larval hatching generally occurs within five to seven days at water temperatures of 11 to 14°C. Mackerel are caught primarily

using purse seines in water depths less than 50 m and often during the night. There is no regulated season for mackerel, but it is mainly pursued from August to October. About 1.4% of the mackerel catch in 2006, and 2.9% in 2004 within 4Rb occurred in the Study Area.

Herring eggs attach to the hard bottom substrate nearshore (<20 m). Along the Canadian coast, Atlantic herring may spawn in any month between April and October, but spawning is concentrated in May and September. Recently hatched Atlantic herring larvae are pelagic. The amount of time the larval stage remain pelagic is temperature dependent. Recent DFO data show that important feeding areas for herring occur in St. George's Bay, south of the Project Area. Herring account for a large component of the harvest in 4Rb and c but not within the Project Area. Only 1.1% of the herring catch in 4Rc in 2004 was within the Project Area and nothing in recent years. The herring fishery occurs over two seasons; a small spring fishery from April to June and a more substantial fall fishery from October to December. The main method of fishing is with mobile gear (seine) in water depths less than 50 m.

Greenland halibut (turbot) prefer water temperatures between 0 to 4.5°C and depths between 90 to 1,600 m. They spawn during the winter in the Davis Strait, Laurentian Channel, and the Gulf of St. Lawrence. The fertilized eggs are benthic but the hatched young move upwards in the water column and remain at about 30 m below surface until they reach 70 mm in length. Young fish move down in the water column and currents transport them to the continental shelf and slopes of Labrador and Newfoundland. The main method of fishing turbot is by gillnet and longline during May and June. Landed catch data indicated that most of the Greenland halibut caught within the Project Area were taken in Unit Area 4Rb beyond the 100 m isobath. Only 7.1 to 8.0% of turbot caught between 2004 and 2007 were in the Project Area.

Atlantic halibut can be found along the slopes of the continental shelf. They move seasonally between deep and shallow waters avoiding temperatures below 2.5°C. Spawning occurs between January and May. Atlantic halibut are caught primarily on longlines, with some by gillnet and otter trawl from May to August. Most of the halibut caught within the Project Area in 2004 were taken in the offshore areas of 4Rb, primarily beyond the 200 m isobath. Between 2004 and 2007, halibut catch in the 2008 Seismic Survey Area and the Project Area was 8.5 to 12.1% and 13.4 to 34.8% respectively of the 4Rb harvest. There are no records of harvesting in the Project Area in 4Rc.

The North Head Lobster nursery area is located in the Project Area and is closed to fishing for conservation purposes.

2.2.2 Marine Mammals and Sea Turtles

Thirteen species of cetacean and four species of pinniped regularly occur in western Newfoundland waters. Baleen whales most likely found in the Project Area include the humpback (*Megaptera novaeangliae*), fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), North Atlantic right whale (*Eubalaena glacialis*), and minke (*Balaenoptera acutorostrata*). The toothed whales most likely found in the Project Area include the

long-finned pilot (*Globicephala melaena*), beluga (*Delphinapterus leucas*), killer (*Orcinus orca*), Northern bottlenose (*Hyperoodon ampullatus*), and sperm (*Physeter macrocephalus*) whales, and the Atlantic white-sided (*Lagenorhynchus acutus*), short-beaked common (*Delphinus delphis*) and white-beaked (*Lagenorhynchus albirostris*) dolphins, and the harbour porpoise (*Phocoena phocoena*). Seal species likely in the area 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)*. Both loggerheads and leatherbacks are common in the waters off Newfoundland during the summer and fall. Little is known about the distribution of Kemp's Ridley turtles in eastern Canada.

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 limited breeding habitat and lower productivity of the adjacent waters compared to the east coast (Conestoga-Rovers & Associates 2008a). Marine birds in the Project Area include shearwaters, fulmars, petrels, jaegers, skuas, phalaropes, gannets, cormorants, alcids, kittiwakes and gulls. Only large gulls, terns and gannets are reported to be common along the west coast of the island. 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. Larger concentrations of terns, gulls and kittiwakes were identified at Bay of Islands in EL 1097 and St. Paul's Inlet in EL 1103 (mostly Little Island, Middle Island and Western Island) during aerial surveys conducted by the Canadian Wildlife Service (CWS) in 2002. Several islands in the area containing small colonies of seabirds are used from April to October for egg laying and brood rearing. The estimated numbers of pairs of colonial, marine-associated birds nesting in coastal Western Newfoundland in the vicinity of the Project Area can be found in the 2008 EA Report.

One coastal site in Gros Morne National Park (adjacent to EL 1103) has been identified with the Important Bird Area (IBA) designation. At least 207 bird species have been recorded in the park.

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 project 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 musculus</i>)	Schedule 1 - Endangered	Endangered (May 2002)
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)
Beluga whale (<i>Delphinapterus leucas</i>) St. Lawrence Estuary Population	Schedule 1 - Threatened	Threatened (May 2004)
Northern wolffish (<i>Anarhichas denticulatus</i>)	Schedule 1 – Threatened	Threatened (May 2001)
Spotted wolffish (<i>Anarhichas minor</i>)	Schedule 1 - Threatened	Threatened (May 2001)
Atlantic (Striped) wolffish (<i>Anarhichas lupus</i>)	Schedule 1 – Special Concern	Special Concern (November 2000)
Fin whale (<i>Balaenoptera physalus</i>)	Schedule 1 – Special Concern	Special Concern (May 2005)
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)
Porbeagle shark (<i>Lamna nasus</i>)		Endangered (May 2004)
Shortfin Mako (<i>Isurus oxyrinchus</i>) Atlantic population		Threatened (April 2006)
Harbour porpoise (<i>Phocoena phocoena</i>) Northwest Atlantic population		Special Concern (April 2006)

In summer, blue whales occur off the south coast of Newfoundland and in the Davis Strait between Baffin Island and Greenland. Between 20 and 105 blue whales have been sighted in the Gulf of St. Lawrence in any one year (Conestoga-Rovers & Associates 2008a). They usually migrate south for the winter, but in years of light ice cover, some whales remain in the St. Lawrence for much of the winter. The blue whale recovery strategy is being developed.

The North Atlantic right whale is the most endangered species in the northwest Atlantic. The current population estimates indicate that there are approximately 322 individuals (Conestoga-Rovers & Associates 2008a).

Adult leatherback turtles are commonly sighted in the waters off Newfoundland in the summer and fall and expected to be a regular part of the marine fauna in the Project Area. A Recovery Strategy was released by DFO in June 2006 and finalized in December 2006.

The St. Lawrence Estuary population of the beluga whale is estimated to be approximately 2,000 individuals and appears to be stable. The preliminary draft of the recovery strategy for the population has been prepared. It is unlikely, but possible, that the beluga whale could be found in the Project Area.

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. Atlantic wolffish can be found at depths up to 350 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. Mature wolffish migrate to shallow, inshore waters in the spring and spawn in September.

Fin whales sightings remain relatively common off Atlantic Canada. An aerial survey of the Gulf of St. Lawrence in the summer estimated a few hundred fin whales.

Any presence of the Ivory Gull in the Project Area is expected to be incidental. They nest in the high Arctic but may winter along the Atlantic coast as far south as New York. They are typically found on the edge of pack ice in late winter.

Harlequin Duck breed along streams and rivers draining the Long Range Mountains. It may be found in coastal waters of the Project Area at the mouths of streams during spring and fall staging (Conestoga-Rovers & Associates 2008a). A small late summer-fall moulting concentration occurs at Stearing Island off the coast of Gros Morne National Park.

2.2.5 Research Surveys, Vessel Traffic, Recreation and Tourism

Information regarding DFO research vessel and industry surveys is provided in the 2008 EA Report and EA Addendum. DFO surveys are generally undertaken annually in July or August and industry surveys are conducted from late May through to October. The survey schedules will be confirmed prior to finalizing the seismic survey schedules and offshore seismic activities will be planned to avoid conflicts. GSI will be required to communicate with DFO to avoid any potential conflict with research surveys that may be operating in the area. Fishing vessel traffic is discussed in terms of the amount of commercial fishing activity. Shipping lanes are north of the Project Area. The majority of commercial shipping in the northern Gulf of St. Lawrence is to and from Montreal through the Strait of Belle Isle. Domestic commercial shipping also occurs along the

west coast of Newfoundland, via the ports of Stephenville and Corner Brook. A chase vessel will be used to communicate with vessels that may be in the path of the seismic vessel. A cruise ship visits Corner Brook in the fall and pleasure crafts populate the inshore coastal areas in summer.

Part C: Environmental Assessment Process

3. Procedures

In October 2007, NWest submitted a project description "*Western Newfoundland Geophysical Survey Project Description for Exploration Licenses 1097, 1098, 1103 and 1104*" (Conestoga-Rovers 7 Associates 2007) to the C-NLOPB, in support of its application to conduct 3-D and 2-D seismic programs, geohazard surveys, and VSPs. 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 October 11, 2007 regarding NWest's proposed program. DFO and Environment Canada (EC) responded that they would participate as FAs in the EA review.

On October 26, 2007, the C-NLOPB notified NWest that a screening level of assessment was required and the proponent was provided with a Scoping Document.

NWest submitted the 2008 EA Report to the C-NLOPB on 14 March 2008. The C-NLOPB, as Responsibility Authority (RA), forwarded the 2008 EA on 17 March 2008 to the DFO, EC, Natural Resources Canada, 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, NL Department of Fisheries and Aquaculture, and the FFAW.

On 10 July 2008, GSI assumed the role of Operator for the geophysical survey program, and became the project proponent. The C-NLOPB provided GSI at that time with review comments on the 2008 EA report that had to be addressed in order to satisfy the requirements of the CEAA and to complete the Screening Report. GSI provided a response to this request on 06 August 2008. The C-NLOPB, as RA, forwarded the 2008 EA Addendum on 06 August 2008 to the DFO, EC, and the FFAW. Comments were received from DFO, EC and the FFAW.

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

4. Environmental Assessment Review

Comments on the 2008 EA report were received from EC, DFO, NL Department of Fisheries and Aquaculture, and the FFAW. Comments on the 2008 EA Addendum were received from EC, DFO and the FFAW.

Environment Canada provided a response on 30 April 2008 to the 2008 EA Report. They suggested that the more recent MSC50 hindcast data set is available and should be used to describe wind and waves. *EC is satisfied that the commitment has been made in the EA Addendum to use the MSC50 hindcast database for future EAs related to drilling and identified how to obtain this information.*

DFO provided comments on the 2008 EA Report on 28 April 2008. Comments from DFO, which were submitted on 28 April 2008, focused on annual project updates, marine mammal monitoring-safety zones and editorial comments. In addition, DFO recommended that mitigations be in place for the North Head Lobster nursery area, which is presently closed to fishing for conservation purposes, as well as nearshore shallow areas where the inshore lobster fishery occurs. *GSI has stated in the EA Addendum that the program start date for 2008 is mid-September. There will be no temporal overlap as the sensitive time for lobster larvae is June-July. Also, the commitment was made by GSI that any future surveys will involve discussions with fishers and regulatory agencies with respect to location and timing of subsequent surveys. The survey will be planned in such a way to have minimal, if any, vessel and survey excursions towards inshore waters for the 2008 survey and line changes and survey orientation will be in the north-south direction.*

The FFAW provided comments on 12 May 2008 and focused on the timing of the seismic program given that spring and summer months are the best time of year for various species to be harvested. They requested clarification on the length of the program given the discrepancy between consultations and what is stated in the 2008 EA Report. They also stated that Fisheries Liaison Officers (FLOs) are key in avoidance of fishing gear and vessel damage, and conflicting interaction with fish harvesters. *GSI will consult with fishers and regulatory agencies with respect to location and timing of surveys and a FLO will be onboard.*

5. Scope of Project

Geophysical Service Inc. is proposing to conduct 3-D and 2-D seismic surveys offshore western Newfoundland. The Project Area encompasses ELs 1097, 1098, and 1103 and 1104 (Figure 2.1 in 2008 EA Report and email from P. Einarsson to D. Hawkins, October 15, 2008). The Project Area includes a 10 km buffer to accommodate a seismic vessel-turning radius. The orientation of data acquisition is in a southwest to northeast direction. No line changes will be made in a shoreward direction. The total

Project Area is 3,115 km², however, the seismic survey areas will be <1,000 km². The temporal scope of the project is from May to December starting in 2008 through to the end of 2015. The first seismic survey (shown as GSI Survey Area for 2008 on Figure 1 in the “GSI Responses to C-NLOPB Inquires” (September 8, 2008)) will cover an approximate area of 900 km² and is proposed to commence in October 2008.

A single seismic vessel will collect data using a multiple streamer configuration with four 5000 m streamers towed behind the vessel. Two air source arrays (3000 to 6000 in³) will be towed at a depth of approximately 6 to 9 m below surface. Each sub-array is composed of eight airguns with a source level of 138 to 172 bar-m.

At the time of application for seismic surveys to be undertaken beyond 2008 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 and Addendum as follows.

Boundary	Description
<i>Temporal</i>	2008 to 2015 Seismic Surveys - May to December each year up to 2015.
<i>Project Area</i>	Defined as the area bounded by: Northern Boundary: 5578000mN Southern Boundary: 5450000mN Western Boundary: 370000mE Eastern Boundary: 3 to 8 km from coastline It includes a 10 km buffer to accommodate a seismic vessel-turning radius.
<i>Affected Area</i>	Will vary 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>	NAFO Unit Areas 4Rb and 4Rc.

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 NWest and GSI

NWest, as reported in the 2008 EA, discussed the proposed project with federal and provincial government agencies, non-government organizations, and fisher groups. The complete list of 12 stakeholders contacted is provided in the 2008 EA Report. Stakeholders were contacted to provide an opportunity to inform the stakeholders about the survey, to identify issues or concerns that should be considered in the EA, and to gather additional information relevant to the EA report. Issues raised during the consultation process related mainly to the timing of the proposed survey and its potential conflict with fishing activities and sensitive stages for a variety of species. GSI committed to further consultations with fishers prior to the start of the 2008 survey (as per the 2008 EA report, EA addendum, and September 16, 2008 correspondence with C-NLOPB). GSI have agreed to hold consultations with fishers the week of October 20, 2008. The FFAW and One Ocean have agreed to the consultations being held after the commencement of survey activities. GSI will be required to submit the report on fisheries consultations no later than October 27, 2008.

The C-NLOPB will require GSI to submit a consultation plan to the C-NLOPB in January 2009, which outlines how GSI intends to consult with interested stakeholders and government agencies.

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 “*NWest Energy Inc. Seismic Survey Program for Western Newfoundland Offshore Area, 2008-2016 Scoping Document*” (C-NLOPB 2007) and “*Geophysical Service Inc. Scoping Document Geophysical Surveys on ELs 1097, 1098, 1103 and 1104 Offshore Western NL, 2008-2015*” (C-NLOPB 2008).

7.2 Methodology

The C-NLOPB reviewed the environmental effects analysis presented by NWest in the 2008 EA Report. 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 Conestoga-Rovers & Associates 2008) 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 Report, NWest presented information regarding the potential effects of seismic activities on marine mammals and sea turtles, marine fish, commercial fisheries, marine birds, 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 presented in both the EA Report and Addendum and review of the mitigations proposed by NWest and GSI, 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.* (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 decreased 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 (Conestoga-Rovers & Associates 2008). Conestoga-Rovers & Associates (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.* 2004), indicated that there was no pathological (acute or chronic mortality) effects 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.* (2004, as reported in Conestoga-Rovers & Associates 2008) reported that there was no significant difference in stress indicators between exposed and non-exposed adult male snow crab. In the Christian *et al.* (2004) study, a decrease in catch rate of the snow crab was not observed after seismic shooting commenced. The 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. For surveys near the North Head Lobster Nursery Area, DFO recommends that mitigations to avoid this area during sensitive time periods (June-July when larvae are most abundant in the water column) be implemented to ensure that the seismic sound source is minimized when transiting this area. Also, in subsequent years, if project activities occur in the nearshore shallow areas where the inshore lobster fishery occurs seismic activities should be scheduled to avoid potential conflict with lobster fisheries.

Conestoga-Rovers (2008) reports that, taking avoidance behaviour into account, physical effects on fish will be low in magnitude, in an 11-100 km radius, of intermittent frequency and immediate duration. GSI will consult with fishers and regulatory agencies with respect to location and timing of surveys to avoid sensitive periods. Given the attenuation of the energy in shallow water and the avoidance of peak egg and larval densities in the spring and summer, the likelihood of effects (behavioural and physical) on fish and shellfish 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, interference with fishing gear and potential impact on DFO research survey trawls. 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 Conestoga-Rovers & Associates (2008). There is potential for interaction between seismic operations (streamers) and fishing gear, especially fixed gear such as crab pots.

NWest and GSI 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; and a fish gear compensation plan.

It is predicted that seismic activity, including vessel movement, will be of medium magnitude, of immediate duration, and with an immediate geographic extent. 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

A potential effect 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 2008 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 2008 EA Report provides an impact assessment, based on available data on the effects of seismic surveys on marine mammals. Data is lacking concerning the potential for sub-lethal effects, with the exception of avoidance behaviour. Several different surveys in other marine areas indicate that avoidance behaviour is usually exhibited in response to airgun seismic surveying (as reported in Conestoga-Rovers & Associates 2008). For instance, in one study referenced by Conestoga-Rovers & Associates (2008) baleen whales generally avoid an operating air gun, however the avoidance radii appeared to be variable. There is a risk that auditory damage may occur, including temporary hearing impairment, at close range to the array. However, as Conestoga-Rovers & Associates (2008) reports, there is uncertainty in predicting these effects because of the data gaps.

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 (Conestoga-Rovers & Associates 2008). If little or no overlap occurs between the industrial noise and the frequencies used, communication and echolocation are not expected to be disrupted. Sea turtles may show behavioural responses to an approaching airgun array at a received level around 166 dB re 1 μ Pa (rms) and avoidance at approximately 176 dB re 1 μ Pa (rms) (Conestoga-Rovers & Associates 2008).

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 safety zone of 500 m. In addition to those mitigations listed in the 2008 EA Report and Addendum, 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*
- *During ramp-up, and/or when the airgun array is active, the 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.

The effects on marine mammals and sea turtles are predicted to be of low magnitude, immediate duration, local to regional geographic extent, <1 week to 3 months frequency and reversible. 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, and attraction to ship lights at night. The 2008 EA Report indicates that Alcidae (dovekie, common murre, thick-billed murre, razorbill, black guillemot 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 will be limited amounts of fuel and hydrocarbons onboard that could potentially spill and although non-solid streamers will be used, GSI has increased the thickness of the streamer skin (12% thicker than the original manufacturer) to further reduce the possibility of a leak or spill. The vessel is also required to carry a "Shipboard Oil Pollution Emergency Plan" pursuant to MARPOL 73/78. Storm-petrels may be attracted to vessel lighting and become stranded on the survey vessel. Efforts will be made to minimise operations that require high-intensity work lights. However, if birds do become stranded on the vessel, GSI or its contractor will release the birds in a manner consistent with the Canadian Wildlife Service (CWS) bird handling procedures. An Environmental Observer will be monitoring during seismic surveys.

The effects are predicted to be negligible to low magnitude, with an intermediate geographic extent, and of immediate duration (1-3 months). Therefore, an environmental effect is not likely and **not significant**.

7.3.5 Species at Risk

0

Conestoga-Rovers (2008) report that leatherback turtles are frequent visitors to the Gulf of St. Lawrence and may occur during the summer and fall. As indicated above, effects on turtles are likely to be not significant; therefore, effects on the Leatherback turtles are not likely to be adverse and therefore **not significant**.

Blue whales, 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. It is unlikely, but possible, that an individual beluga whale could stray into the Project Area at any time of the year.

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**.

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. Hazardous materials will be handled separately. 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 (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 "operational" releases. GSI has increased the thickness of the streamer skin to further reduce the possibility of a leak or spill, with a wall thickness 12% thicker than that of the original manufacturer.

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, DFO/Industry research surveys, marine transportation, 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 in the western Newfoundland and Labrador offshore area, Laurentian Sub-Basin offshore area and areas located in Nova Scotia waters. 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 to three months, thereby limiting the duration of cumulative effects associated with the Project. The increase in vessel traffic will be minor compared with existing vessel traffic in the area. 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. GSI will communicate in advance with fishers, the FFAW, and DFO on seismic survey schedules and their location relative to commercial fisheries and DFO sentinel and research vessel surveys to ensure there is no spatial overlap issues. A chase vessel will provide communications with fisher vessels during the survey and the Fisheries Liaison Officer onboard will provide communications.

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 does not require follow-up monitoring, as defined in the *CEA Act*, to be undertaken.

8. Other Considerations

The C-NLOPB is satisfied with the environmental information provided by GSI regarding the potential adverse environmental effects, which may result from the proposed 3D and 2D seismic surveys, 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 EA Addendum and those listed below are implemented, the Project is not likely to cause significant adverse environmental effects.

9. Recommended Conditions and/or Mitigations

- *GSI 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 Geophysical Surveys for Exploration Licences 1097, 1098, 1103 and 1104 Western Newfoundland” (March 2008), “Addendum to Environmental Assessment of Geophysical Surveys for Exploration Licences 1097, 1098, 1103 and 1104 Western Newfoundland” (July 2008), and “GSI Responses to C-NLOPB Inquiries” (September 2008).*
- *GSI 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 and 3D seismic programs.*
- *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.*
- *GSI shall provide a report on the October 20, 2008 fisheries consultations to the C-NLOPB no later than Oct. 27, 2008.*

The following recommendation/conditions are applicable to activities proposed for 2009 to 2015.

- *The North Head Lobster nursery area should be avoided during the sensitive time period (June-July) when larvae are most abundant in the water column. Outside the sensitive time period, the seismic sound source should be minimized when transiting this area.*
- *For project activities beyond 2008 that may occur in the nearshore shallow areas where the inshore lobster fishery occurs, additional mitigations (i.e., avoidance) may be required.*
- *GSI shall provide a consultation plan that outlines how industry and government stakeholders will be consulted prior to the start of program activities for 2009 to 2015. The consultation plan should be submitted no later than January 15, 2009.*

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 GSI, 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 Date: October 17, 2008
Kimberly A. Coady
Environmental Assessment Officer

References:

- Christian, J.R., A. Mathieu, D. H. Thomson, D. White and R.A. Buchanan. 2004. Effect of Seismic Energy on Snow Crab (*Chionoecetes opilio*) 7 November 2003. Environmental Studies Research Funds Report No. 144. Calgary. 106 p.
- Conestoga-Rovers & Associates. 2007. Western Newfoundland Geophysical Survey Project Description for Exploration Licenses 1097, 1098, 1103 and 1104. Prepared for NWest Energy Inc. 23 p.
- Conestoga-Rovers & Associates. 2008a. Environmental Assessment of Geophysical Surveys for Exploration Licenses 1097, 1098, 1103 and 1104 Western Newfoundland. Prepared for NWest Energy Inc. 221 p + App.
- Conestoga-Rovers & Associates. 2008b. Addendum to Environmental Assessment of Geophysical Surveys for Exploration Licenses 1097, 1098, 1103 and 1104 Western Newfoundland. Prepared for Geophysical Service Incorporated. 20 p + App.
- Geophysical Service Incorporated. 2008. Western Newfoundland Geophysical Survey Project Description for Exploration Licenses 1097, 1098, 1103 and 1104, GSI. 33 p.
- Payne, J.R., C.A. Andrews, L.L. Fancey, A.L. Cook, and J.R. Christian. 2007. Pilot Study on the Effects of Seismic Air Gun Noise on Lobster (*Homarus americanus*). Can. Tech. Rep. Fish. Aquat. Sci. 2712: v + 46.