

**Jeanne d'Arc Basin**

**Seismic Program 2012-2015**

**Project Description**

Prepared by



for



25 November 2011  
Project No. SA1150



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**Prepared by**

**LGL Limited, environmental research associates**  
P.O. Box 13248, Stn. A  
St. John's, NL A1B 4A5  
Tel: 709-754-1992  
rbuchanan@lgl.com

**for**

**WesternGeco Canada**  
**a division of Schlumberger Canada**  
2300, 645 7<sup>th</sup> Avenue SW  
Calgary, AB T2P 4G8

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## 1.0 INTRODUCTION

WesternGeco Canada (WesternGeco), a division of Schlumberger Canada Limited, is proposing to conduct 2D and/or 3D seismic surveys offshore Newfoundland in the region known as Jeanne d'Arc Basin (Figure 1). WesternGeco may conduct 2D or 3D seismic surveys in one or more years within the 2012-2015 timeframe.

This document is a Project Description (PD) and is intended to allow the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) to fulfill its responsibilities under the Federal Coordination Regulations pursuant to the *Canadian Environmental Assessment Act (CEAA)*. This PD combined with the technical and scoping advice received from the C-NLOPB, other federal agencies, and stakeholders consulted by WesternGeco will guide the preparation of a screening level Environmental Assessment (EA).

### 1.1 Relevant Legislation and Regulatory Approvals

An Authorization to Conduct a Geophysical Program will be required from the C-NLOPB. The C-NLOPB is mandated in this matter by the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* and the *Canada-Newfoundland Atlantic Accord Implementation Act*. In addition, offshore geophysical surveys on federal lands are subject to screening under CEAA. The C-NLOPB will act as the Responsible Authority (RA) under the CEAA and take the lead as the Federal Environmental Assessment Coordinator (FEAC). Because seismic survey activities have the potential to affect biota such as seabirds, marine mammals, and fish, as well as commercial fisheries, Fisheries and Oceans Canada (DFO) and Environment Canada are the federal agencies primarily interested and involved as Federal Authorities under CEAA.

Legislation that is relevant to the environmental aspects of this project includes:

- *Canada-Newfoundland Atlantic Accord Implementation Act*
- *Canadian Environmental Assessment Act (CEAA)*
- *Oceans Act*
- *Fisheries Act*
- *Navigable Waters Act*
- *Canada Shipping Act*
- *Migratory Bird Convention Act*; and
- *Species at Risk Act (SARA)*

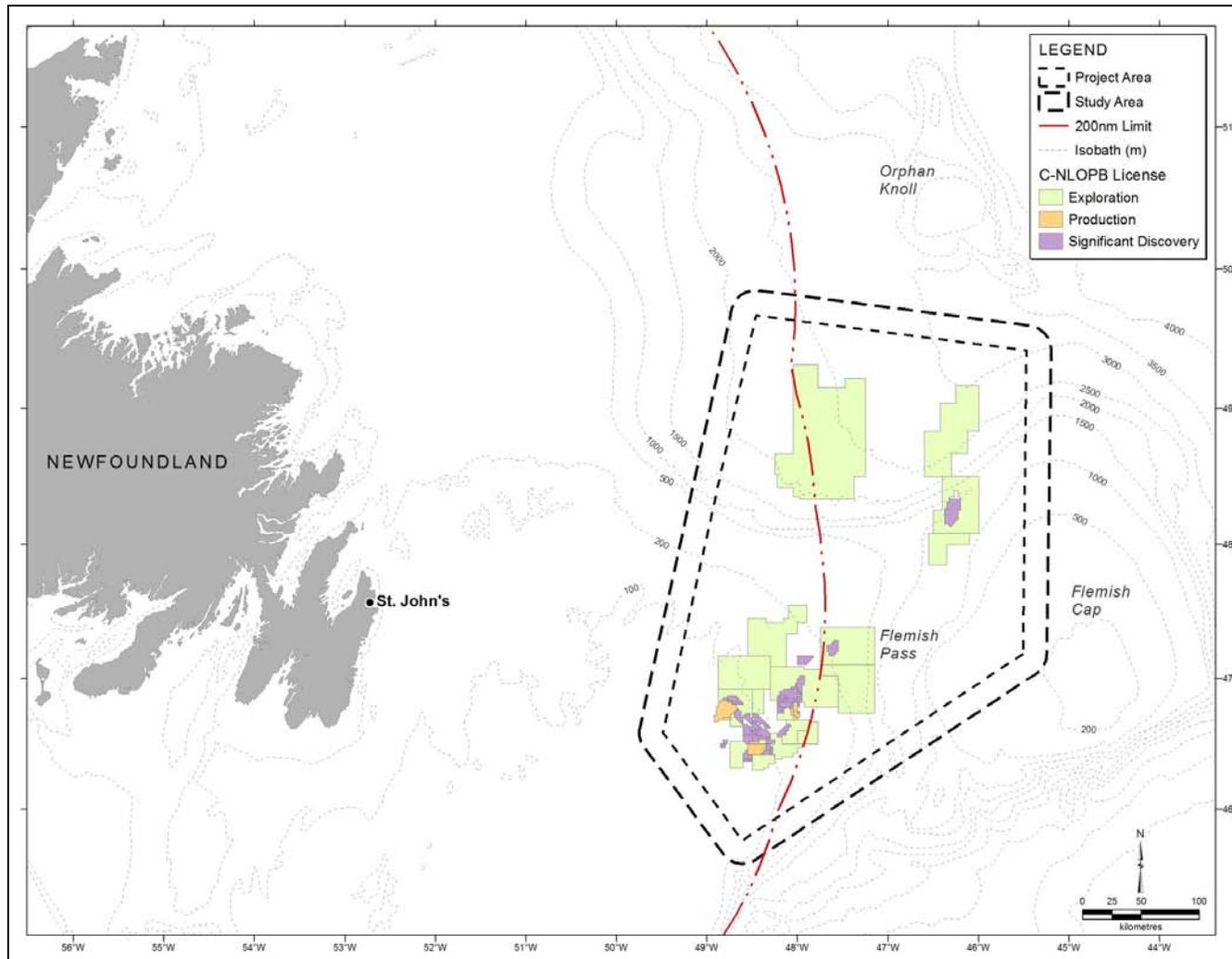


Figure 1. Project and Study Areas Offshore Newfoundland.

One of the specific guidelines issued by the C-NLOPB, the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (February 2011), is directly relevant to this undertaking.

Authorizations for the kinds of activities described in this PD will be issued under the *Atlantic Accord Implementation Act* at the discretion of the C-NLOPB.

## 1.2 The Operator

The Operator, WesternGeco Canada, a division of Schlumberger Canada Limited, is headquartered in Calgary, Alberta, and is a multi-national seismic company actively engaged in exploration worldwide.

WesternGeco is a wholly owned subsidiary of Schlumberger Canada Limited and is one of the world's leading seismic companies.

## 1.3 Canada-Newfoundland and Labrador Benefits

In full participation of the requirements of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland Labrador Act* and the *Canada-Newfoundland Atlantic Accord Implementation Act*, WesternGeco is committed to providing maximum benefits associated with East Coast operations to Canadians and in particular Newfoundland and Labrador individuals and companies where they are commercially achievable in accordance with WesternGeco's operating philosophies and requirements.

WesternGeco will manage its East Coast operations from St. John's, Newfoundland and Labrador. WesternGeco provides full and fair opportunity to Canadian individuals and organizations, in particular those from Newfoundland and Labrador, to participate in its activities in Newfoundland and Labrador. WesternGeco supports the principle that first consideration be given to personnel, support and other services that can be provided within Newfoundland and Labrador, and to goods manufactured in Newfoundland and Labrador, where such goods and services can be delivered at a high standard of Health, Safety and Environmental competency, be of high quality and are competitive in terms of fair market price. Contractors and subcontractors working for WesternGeco in Newfoundland and Labrador must also apply these principles in their operations.

## 1.4 Contacts

### 1.4.1 Executive Contact

Derek Unger  
GeoSolutions Manager Canada  
WesternGeco Canada  
2300, 645 7th Ave. SW  
Calgary, AB T2P 4G8  
Tel. 1-403-509-4000  
E-mail: unger2@slb.com

### 1.4.2 Health, Environment and Safety Contact

Mike Crane  
Quality, Health, Safety & Environmental Manager North America  
WesternGeco LLC  
10001 Richmond Ave.  
Houston, TX  
77042  
Tel. 1-713-689-5607  
E-mail: PCrane@slb.com

### 1.4.3 Geophysical Operations Contact

Andy McGowan  
Operations Manager  
WesternGeco LLC  
10001 Richmond Ave.  
Houston, TX 77042  
Tel. 1-713-689-5609  
E-mail: rmcgowan1@slb.com

Or

Gregory Rogers  
Project Manager, Asset Development  
WesternGeco LLC  
10001 Richmond Ave.  
Houston, TX 77042  
Tel. 1-713-689-2324  
E-mail: grogers5@slb.com

## 2.0 PROJECT DESCRIPTION

The official name of the Project is the Jeanne d'Arc Basin Seismic Program 2012 – 2015. The operator is proposing to conduct one or more seismic programs between 2012 and 2015, starting as early as May 2012, anywhere within its proposed Project Area (Figure 1). The timing of the surveys is subject to the Proponent's priorities and circumstances, weather and ice conditions, contractor availability and regulatory approvals. Other seismic surveys, both 2D and 3D, may also be carried out during this period depending on the results of the initial survey in 2012 and/or the availability of seismic vessels.

### 2.1 Spatial and Temporal Boundaries

The Study Area includes the Project Area plus a 20 km buffer around the Project Area to accommodate the ships' turning radii and to account for the propagation of seismic survey sound that could potentially affect marine biota (see Figure 1). The coordinates of the extents of the Study Area are as follow:

- North: 49.850°N;
- East: 45.196°W;
- South: 45.579°N; and
- West: 49.748°W

The areas of the Study Area and Project Area are 117,899 km<sup>2</sup> and 92,268 km<sup>2</sup>, respectively. The exact dimensions of the proposed 2012 seismic survey area will be determined in early 2012 as a function of vessel availability and cost.

The temporal boundaries of the proposed Project Area are between May 1 and November 30, from 2012-2015. The duration of a seismic survey is estimated at 40 to >150 days in a given year. In 2012, the seismic survey is anticipated to require at least 60-150 days.

### 2.2 Project Overview

The proposed Project is a ship-borne geophysical program consisting of approximately 2,000 to 3,500 km<sup>2</sup> of 3D survey (with potential 2D) in 2012 (or as soon thereafter as possible) and as yet to be determined areas of 2D and/or 3D surveys in the 2013 to 2015 period. Area adjacent to the exploration licenses is also included as part of the proposed Project Area to account for ship turning, holding and streamer deployment areas.

The seismic survey vessel(s) used during the program will be approved for operation in Canadian waters and will be typical of the worldwide fleet. Specific vessels have not yet been selected. The 3D seismic survey ship will tow a dual sound source (airgun array) and a multi-streamer composed of receiving hydrophones. The streamers will be up to several kilometers in length.

The C-NLOPB's *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2011) will be used as the basis for the marine mammal monitoring and mitigation program for the seismic surveys. Dedicated marine mammal observers (MMOs) will monitor for marine mammals (and sea turtles if present) and implement mitigation measures as appropriate. The airgun array will be ramped up, and ramp ups will be delayed if a marine mammal is detected within the appropriate safety zone (minimum of 500 m as noted in Fisheries and Oceans Canada *Statement of Canadian Practice*). The airgun array will be shut down any time an Endangered or Threatened (as listed on Schedule 1 of *SARA*) marine mammal (or sea turtle) is detected within the safety zone. These measures are designed to minimize disturbance to marine life, particularly marine mammals and species considered at risk under the *SARA*. In addition, the MMOs will conduct a monitoring and release program for seabirds which may strand on board the seismic vessel. As required, a fisheries liaison officer (FLO) will be on board to ensure implementation of communication procedures intended to minimize conflict with the commercial fishery.

### **2.2.1 Objectives and Rationale**

The primary objective of the Project is to determine the presence and likely locations of geological structures that might contain hydrocarbon deposits. Existing 2D and 3D seismic data in the area are of insufficient quality to serve the needs of the energy companies in their exploration, development and production activities. Acquisition of new 3D seismic data is required to provide images of higher resolution and quality.

### **2.2.2 Alternatives to the Project and Within the Project**

The alternative to the Project would be to forgo exploration for oil and gas in offshore Newfoundland and pursue opportunities elsewhere in the world in order to assist in meeting market demand for seismic data and petroleum products.

### **2.2.3 Project Phases**

The Project may have two phases. The actual timing of these activities within the temporal scope will be dependent on economic feasibility, vessel availability and results of data interpretation of survey work from preceding phases.

1. Phase 1 will include a 3D survey in 2012 in the area defined in Figure 1; and
2. Phase 2 will include 2D and/or 3D surveys of any areas that may be identified through analyses of existing and acquired data.

#### **2.2.4 Project Scheduling**

The surveys may occur between May 1 and November 30 of any given year from 2012 to 2015. The estimated duration of the proposed 2012 survey is 60-150 days.

#### **2.2.5 Site Plans**

The survey line orientations for the proposed 2D and 3D seismic surveys have not yet been determined. The Project Area proposed for the 2012-2015 seismic program is shown in Figure 1. Water depths in the Project Area range from <100 m to >3,000 m.

#### **2.2.6 Personnel**

A typical seismic vessel can accommodate approximately 50-100 personnel. Personnel on a seismic vessel include ship's officers and marine crew as well as technical and scientific personnel. The seismic vessel will also have a Fisheries Liaison Officer (FLO) and MMO(s) on board. All project personnel will have all of the required certifications as specified by the relevant Canadian legislation and the C-NLOPB.

#### **2.2.7 Seismic Vessel**

Vessel specifics will be provided in subsequent document submissions once the vessel has been identified. The selected ship will be a fully equipped, vessel suited to the environment and task with diesel-electric propulsion systems (main and thrusters) and will operate on marine diesel.

#### **2.2.8 Seismic Energy Source Parameters**

The proposed 2D or 3D survey sound source will consist of one or two airgun arrays, 3000 to 6000 in<sup>3</sup> in total volume, which will operate at towed depths between 6 m and 15 m. The airguns will be operated with compressed air at pressures of 2000-2500 psi, and produce approximate peak-to-peak pressures of 100 to 150 bar-m.

Detailed specifications of the airgun array will be provided once the project design is completed and parameters are selected.

### **2.2.9 Seismic Streamers**

The 2D and 3D seismic surveys will use towed streamers with an approximate length of 8000 m and deployed at depths ranging from 5 to 25 m.

Streamer equipment specifications will be provided when program design is complete.

### **2.2.10 Logistics/Support**

#### **Vessels**

Primary support and supply will be provided by a WesternGeco Canada chartered vessel.

In order to mitigate any potentially adverse effects on marine animals, the commercial fisheries, and other vessel traffic, a mitigation plan will be developed as part of the Project. A standby or picket vessel may be required as a mitigation measure. This vessel would be used as an additional method to obtain information on commercial fishing activity in the area and to warn other vessels in order to avoid gear losses for all parties involved. It would also be used to scout ahead of the seismic vessel for hazards such as ice and floating debris.

#### **Helicopters**

The seismic vessel will be equipped with a helicopter deck and helicopters are often used for crew changes and light re-supply. It is not known at this time whether helicopters will be used for crew changes during the proposed seismic program(s). Once the final extents of the 2D and 3D programs are determined, the necessity for and feasibility of helicopter support for crew changes will be determined.

#### **Shore Base, Support and Staging**

The Operator will maintain operational offices and use existing shore facilities in St. John's. No new shore base facilities will be established as part of the Project.

### **2.2.11 Waste Management**

Waste management will be consistent with industry best practices in offshore Newfoundland and Labrador.

### **2.2.12 Air Emissions**

Air emissions will be those associated with standard operations for marine vessels, including the seismic vessel and any potential picket and/or supply vessel. There are no anticipated implications for the health and safety of workers on these vessels.

### **2.2.13 Accidental Events**

In the unlikely event of the accidental release of hydrocarbons during the Project, the Operator will implement the measures outlined in its oil spill response plan which will be filed with the C-NLOPB. In addition, the Operator has emergency response plans in place.

## **2.3 Mitigations**

Project mitigations will be detailed in the EA and will follow the guidelines outlined in the *Statement of Canadian Practice*. Mitigation procedures will include ramp-ups, implementation of ramp up delays and airgun array shutdowns for designated marine mammal and sea turtle species, use of dedicated MMOs and a FLO, and a fisheries compensation program. The Operator recognizes that the fisheries have a long tradition off Newfoundland and Labrador and that both industries are legitimate users of the sea and seabed.

## **2.4 Project Site Information**

Project location is in the offshore Newfoundland area (see Figure 1).

### **2.4.1 Environmental Features**

The physical and biological environments of the general area have been described in recent EAs for the northern Grand Banks and Flemish Pass (LGL 2011a,b). A summary of the physical and biological environments, based on the previous EAs plus any new information, will be provided in the EA for this Project.

### **2.4.2 Physical Environment and Effects on the Project**

A description of the general physical environment of the area is contained in recent EAs for the northern Grand Banks and Flemish Pass (e.g., LGL 2011a,b) and is briefly summarized here. The survey will be conducted in water depths ranging from < 100 m to > 3000 m. The northern Grand Banks are influenced by the Labrador Current and Gulf Stream, and physical conditions (e.g., weather and ice conditions) from an operating perspective are not unlike those that would

be encountered in Orphan Basin. Extreme wind, wave and ice conditions can slow or even halt survey operations, and accidents (e.g., accidental releases of flotation fluids, if they are used) are more likely to occur than during calm conditions. The Project scheduling, during a period (May to November) when Northwest Atlantic operating conditions are typically relatively good compared to the late fall/winter/early spring period, should lessen any effects of the environment on the Project.

A summary of expected effects of the physical environment on the Project, based on information in the SEA for Orphan Basin (LGL 2003) and previous EAs, as well as any new information, will be provided in the EA for this Project.

### **2.4.3 Fish and Fish Habitat**

Fish and fish habitat, including marine invertebrates and physical attributes, have been discussed in previous EAs for the Jeanne d'Arc Basin and the Flemish Pass. These components of the ecosystem will be summarized in the EA for this Project, based on these EAs and other relevant documents and any new information.

### **2.4.4 Species at Risk**

The Project Area is not known to contain any sensitive areas or critical habitats for species listed on Schedule 1 of the SARA but this potential issue will be examined in the EA. Several species listed on Schedule 1, including the blue whale, fin whale, North Atlantic right whale, leatherback sea turtle, Ivory Gull, the white shark and three wolfish species may occur in the Project Area. In addition, the potential environmental effects on species currently listed as threatened or endangered by the Committee on the Status of Endangered Species in Canada (COSEWIC) that occur within the Study Area will be included in the EA.

## **2.5 Other Users**

### **2.5.1 Commercial Fisheries**

The Project Area supports a variety of commercial fisheries that will be described in the EA based on latest available DFO catch landings data. Some of the most important fisheries in and adjacent to the Project Area include those for northern shrimp, snow crab, and Greenland halibut.

Plans will be developed to avoid or lessen any potential effects on the commercial fisheries. These plans will include mitigations such as good communications (e.g., fishery broadcast notifications), the presence of a dedicated FLO on the vessel, avoidance of areas during times of heavy fixed gear use, and a fishing gear damage compensation program. Consultations with the

fishing industry will be undertaken through the established ONE OCEAN mechanism and the Fish, Food and Allied Workers (FFAW), and directly with relevant fishing interests as necessary.

### **2.5.2 Navigable Waters**

In addition to fishery vessels, potential users of the navigable waters in the offshore North Grand Banks regional area may include cargo and passenger vessels, other oil industry-related vessels, transport and military vessels, or other commercial work.

### **2.5.3 Consultations**

During the course of the assessment, WesternGeco will consult with stakeholders with an interest in the Project. Those consulted and the results of those consultations will be compiled in the EA.

In order to assist in scoping the effects assessment and mitigation plan, and to aid in addressing any issues of concern, WesternGeco will undertake a consultation program with the interested parties, which may include, but are not limited to:

- Fisheries and Oceans Canada (DFO);
- Environment Canada;
- ONE OCEAN;
- FFAW;
- Study Area fishers;
- Nature Newfoundland and Labrador (formerly the Natural History Society);
- Various fish processors; and
- Other Newfoundland and Labrador fisheries industry stakeholders as identified.

## **2.6 Effects of the Project on the Environment**

The proposed Project will be well within the range of other programs routinely conducted offshore Newfoundland and elsewhere in eastern Canada, and is not expected to produce any adverse significant environmental effects on the marine environment in or adjacent to the Project Area. Nonetheless, potential environmental effects will be examined in detail with focus on the commercial fishery, SARA species, marine mammals, and cumulative environmental effects with other users of the area, particularly any other potential seismic programs.

### **2.6.1 Spatial Boundaries**

The regional scale study area boundaries will be addressed in the EA and will take into consideration the information compiled in recent seismic EAs and the SEA.

### **2.6.2 Temporal Boundaries**

The temporal boundaries for the proposed project are 2012 to 2015 inclusive, with the timing of 2-D/3-D seismic survey activities between May 1 and November 30 within any particular year.

### **2.6.3 Valued Ecosystem Components**

The valued ecosystem components (VECs) will encompass, but may not be limited to fish and fish habitat, commercial fishery, marine birds, marine mammals, sea turtles, Species at Risk and sensitive areas.

Accidental events (such as an unplanned hydrocarbon release) associated with Project activities will also be assessed in the EA. It will also include an analysis of cumulative environmental effects.

### **2.6.4 Environmental Monitoring**

As noted previously, MMO(s) will be on board the vessel(s) to provide proper identification of marine mammals and species at risk for mitigation purposes, and to collect opportunistic data on marine mammal behaviour and distribution both during and outside of airgun operations. Information on marine bird occurrence and distribution will also be collected during the seismic surveys.

### 3.0 REFERENCES

- C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2011. Geophysical, Geological, Environmental and Geotechnical Program Guidelines February 2011. 49 p.
- LGL Limited. 2003. Orphan Basin Strategic Environmental Assessment. LGL Rep. SA767. Rep. by LGL Limited for the Canada-Newfoundland Offshore Petroleum Board, St. John's, NL. 229 p.
- LGL Limited. 2011a. Environmental assessment of Chevron's North Grand Banks regional seismic program, 2011-2017. LGL Rep. SA1119. Rep. by LGL Limited in association with Canning and Pitt Associates Inc., St. John's, NL, and Oceans Ltd., St. John's, NL for Chevron Canada Limited, Calgary, AB. 226 p. + appendices.
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