

**Project Description**  
**Labrador Sea Seismic Program 2014-2018**

Prepared for

**Multi Klient Invest AS**

(A Wholly Owned Subsidiary of  
Petroleum Geo-Services ASA)

and

**TGS–NOPEC Geophysical Company ASA**

by



31 October 2013  
Project No. SA1245



# **Project Description**

## **Labrador Sea Seismic Program 2014-2018**

**Prepared for**

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## 1.0 INTRODUCTION

Multi Klient Invest AS (MKI), a wholly owned subsidiary of Petroleum Geo-Services ASA (PGS) and TGS-NOPEC Geophysical Company ASA (TGS) have entered into a cooperation agreement and are proposing to conduct two dimensional (2D) and/or three dimensional (3D) seismic surveys offshore Newfoundland and Labrador in the Labrador Sea (Figure 1). MKI will be the operator and may conduct 2D or 3D seismic surveys in one or more years within the 2014-2018 timeframe.

This document is a Project Description (PD) and is the first step in the Canada-Newfoundland and Labrador Offshore Petroleum Board's (C-NLOPB) environmental assessment (EA) process. This PD combined with the technical and scoping advice received from the C-NLOPB, other federal agencies, and stakeholders consulted by MKI and TGS will guide the preparation of an EA.

### 1.1 Relevant Legislation and Regulatory Approvals

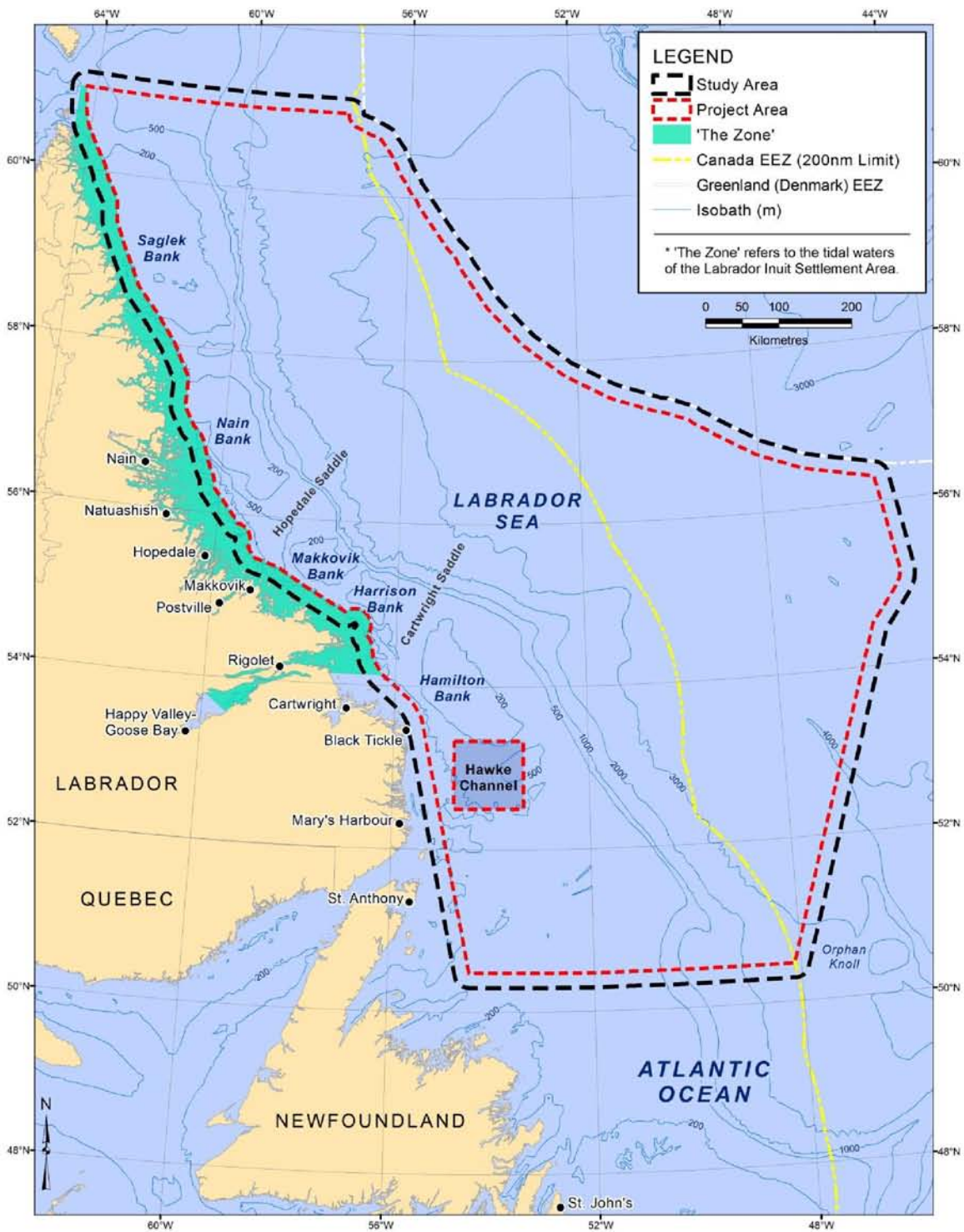
An Authorization to Conduct a Geophysical Program will be required from the C-NLOPB. The C-NLOPB is mandated in this matter by the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* and the *Canada-Newfoundland Atlantic Accord Implementation Act*. The *Canadian Environmental Assessment Act, 2012* (CEAA 2012) came into force on 6 July 2012. The "Regulations Designating Physical Activities" lists physical activities which fall under the new Act. Marine seismic surveys are not included on the list and therefore do not require an EA under CEAA 2012.

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

- *Species at Risk Act (SARA)*
- *Oceans Act*
- *Fisheries Act*
- *Navigable Waters Protection Act*
- *Canada Shipping Act*
- *Migratory Birds Convention Act*

One of the specific guidelines issued by the C-NLOPB, the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (January 2012), is directly relevant to the proposed 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.



**Figure 1. Project and Study Areas in the Labrador Sea.**



## 1.2 The Operator

The Operator, Multi Klient Invest AS (MKI), is a wholly owned subsidiary of Petroleum Geo-Services ASA (PGS). MKI has entered into a cooperation agreement with TGS-NOPEC Geophysical Company ASA, to conduct this work.

## 1.3 Canada-Newfoundland and Labrador Benefits

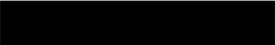
In full appreciation of the requirements of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland Labrador Act* and the *Canada-Newfoundland Atlantic Accord Implementation Act*, MKI and TGS are committed to providing maximum benefits associated with East Coast operations to Canadians, and in particular, to Newfoundland and Labrador individuals and companies where they are commercially competitive in accordance with MKI's requirements.

MKI will manage its East Coast operations from St. John's, Newfoundland and Labrador. MKI 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 MKI in Newfoundland and Labrador must also apply these principles in their operations.

## 1.4 Contacts

### Multi Klient Invest AS

#### Executive Contacts

  
Vice-President, North America MultiClient  
Petroleum Geo-Services

[REDACTED]  
Business Manager, North America MultiClient  
Petroleum Geo-Services

**Health, Environment and Safety Contact**

[REDACTED]  
HSEQ Manager  
Petroleum Geo-Services

**Geophysical Operations Contact**

[REDACTED]  
Senior Project Manager  
Petroleum Geo-Services

**TGS-NOPEC Geophysical Company ASA**

**Executive Contact**

[REDACTED]  
Project Development Manager, Offshore North America Arctic  
TGS-NOPEC Geophysical Company ASA

## Regulatory Contact

[REDACTED]  
Senior Regulatory and Compliance Specialist  
TGS-NOPEC Geophysical Company ASA

## 2.0 PROJECT DESCRIPTION

The official name of the Project is the Labrador Sea 2014-2018 Seismic Program. MKI and TGS are proposing to conduct one or more seismic programs between 2014 and 2018, starting as early as May 2014, anywhere within its proposed Project Area (Figure 1). The timing of the surveys is subject to MKI and TGS priorities and circumstances, weather and ice conditions, vessel 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 2014 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 account for the propagation of seismic survey sound that could potentially affect marine biota (see Figure 1). The areas of the Study Area and Project Area are 766,631 km<sup>2</sup> and 679,758 km<sup>2</sup>, respectively. The Project Area does not enter the Nunatsiavut Zone.

The “corner” coordinates (decimal degrees, WGS84 projection) of the extents of the Project Area are as follow:

- Northwest: 61.000°N, 64.253°W;
- Northeast: 61.000°N, 57.587°W;
- Southwest: 50.481°N, 54.424°W;
- Southeast: 50.463°N, 48.130°W
- Eastern extent: 55.144°N, 45.187°W

The temporal boundaries of the proposed Project Area are between 1 May and 30 November, from 2014-2018. The duration of a seismic survey is estimated at 60 to <120 days in a given year. In 2014, the seismic survey is anticipated to require at least 90 days.

## 2.2 Project Overview

The proposed Project is a ship-borne geophysical program that includes approximately 10,000 km of 2D seismic survey lines planned for 2014. Data acquisition plans for 2D and 3D surveys during 2015-2018 are not yet determined. The proposed Project Area includes space to account for ship turning and streamer deployment areas.

For the proposed 2D survey in 2014, the seismic survey vessel will be the M/V *Sanco Spirit* (see Section 2.2.6 for more details). The seismic survey vessel(s) used during subsequent 2D or 3D surveys are unknown at present but will be approved for operation in Canadian waters and will be typical of the worldwide fleet. Details on airgun arrays and streamers are provided below.

The C-NLOPB's *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012) 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 and implement mitigation measures as appropriate. The airgun array will be ramped up, and ramp ups will be delayed if a marine mammal or sea turtle is detected within the appropriate safety zone (minimum of 500 m as noted in Fisheries and Oceans Canada *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*). 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 Project vessels.

A fisheries liaison officer (FLO) provided by the Fish, Food and Allied Workers (FFAW) will be on board the seismic vessel to ensure implementation of communication procedures intended to minimize conflict with the commercial fishery. A FLO representing Inuit/Nunatsiavut interests will be onboard the picket vessel and an individual representing Inuit/Nunatsiavut interests will also be onboard the seismic vessel to assist with marine mammal observations.

### 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 do not provide sufficient coverage to serve the needs of the energy companies in their exploration, development and production activities. Acquisition of new 2D/3D seismic data is required to provide images of higher resolution and quality that will reduce the possibility of unnecessary drilling activity.

### **2.2.2 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 2D survey in 2014 in the Project Area shown in Figure 1; and
2. Phase 2 will include 2D and/or 3D surveys in the Project Area that may be identified through analyses of existing and acquired data.

During Phase 2, it is anticipated that there will be one seismic survey a year but there is a possibility of 2D and 3D seismic surveys occurring in the same year, i.e., two seismic vessels operating in same season.

### **2.2.3 Project Scheduling**

The seismic surveys may occur between 1 May and 30 November of any given year from 2014 to 2018. The estimated duration of the proposed 2014 survey is approximately 90 days.

### **2.2.4 Site Plans**

In 2014, it is planned that 10,000 km of 2D seismic data will be acquired. Most 2D seismic survey lines will be orientated ESE/WNW or SSW/NNE. Survey line lengths are anticipated to range in length from 20-600 km. Water depths in the Project Area range from about 100 m to 4,200 m (Figure 1).

The Labrador Sea seismic program will occur within and beyond Canada's Exclusive Economic Zone (EEZ) but does not enter the waters of Canada's Territorial Sea (i.e., 0–12 n.mi. offshore) and does not include the Hawke Channel (area closed to mobile fishing gear). There will be no acquisition within the Nunatsiavut Zone, and seismic survey lines will end 20 km short of the Zone boundary to ensure that line turns can be made without entering the Zone.

### **2.2.5 Personnel**

A typical seismic vessel can accommodate approximately 35-60 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 FLO and MMOs on board. All project personnel will have all of the required certifications as specified by the relevant Canadian legislation and the C-NLOPB.

### **2.2.6 Seismic Vessel**

In 2014, MKI will use the MV *Sanco Spirit* as the seismic vessel. This Norwegian built (in 2009) and registered vessel is 86 m long and 16 m wide. It has a draft (loaded) of 5.8 m, travels at a cruising speed of 13 knots, and is equipped with a helideck. The *Sanco Spirit* has diesel-electric propulsion systems (main and thrusters) and operates on marine diesel. For seismic surveys in 2015-2018, vessel specifics will be provided once the vessel has been identified.

### **2.2.7 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 200 bar-m.

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

### **2.2.8 Seismic Streamers**

In 2014, the 2D seismic survey will tow a single solid streamer (PGS GeoStreamer<sup>®</sup>) that is 8000-10,000 m in length at a depth 15-25 m. In subsequent 2D and 3D seismic surveys (2015-2018), streamer equipment specifications will be provided when program design is complete. Streamers will be solid with an approximate length of 8000 m and deployed at depths ranging from 5 to 25 m. As many as 16 streamers may be towed during a 3D seismic survey.

### **2.2.9 Logistics/Support**

#### **Vessels**

Primary support and supply will be provided by a MKI chartered vessel. During the 2014 2D seismic survey, the *Blain M.* will serve as the picket vessel. The *Blain M.* was built in Nova Scotia in 1981 and is registered in Ottawa. The vessel is 47.1 m long and about 11 m wide, with a draft of 2.5 m, and a cruising speed of 9 knots. The picket 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. In 2014, crew changes will occur via port calls. It is not known at this time whether helicopters or vessel-to-vessel transfers will be used for crew changes during seismic program(s) in 2015-2018.

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

MKI will have a shore representative based in St. John's for the duration of seismic programs. No new shore base facilities will be established as part of the Project.

### **2.2.10 Waste Management**

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

### **2.2.11 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.

### **2.2.12 Accidental Events**

In the unlikely event of the accidental release of hydrocarbons during the Project, the measures outlined in MKI's oil spill response plan will be implemented. The oil spill response plan will be filed with the C-NLOPB. In addition, MKI will have an emergency response plan in place.

## **2.3 Mitigation and Monitoring**

Project mitigations will be detailed in the EA and will follow the guidelines outlined in the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*. 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 FLOs, and a fisheries compensation program. In addition, the MMOs will conduct a monitoring (systematic seabird counts based on protocols issued by the Canadian Wildlife Service) and release program for seabirds which may strand on board Project vessels.

### **3.0 ENVIRONMENTAL ASSESSMENT**

The environmental assessment will closely follow previous assessments of seismic programs offshore Newfoundland and Labrador. The primary issues of concern are the effects of underwater sound from the airgun arrays on marine fauna and fisheries.

#### **3.1 Physical and Biological Environment**

The physical and biological environments of the general area have been described in recent EAs for the Labrador Sea (Sikumiut 2008; LGL 2010; LGL and GXT 2013). 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. Background information will be provided for anticipated Valued Ecosystem Components (VECs)—fish and fish habitat, fisheries, marine birds, marine mammals, sea turtles, Species at Risk and sensitive areas.

#### **3.2 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 Labrador Sea (Sikumiut 2008) and previous EAs, as well as any new information, will be provided in the EA for this Project.

#### **3.3 Effects of the Project on VECs**

The effects of Project activities, most notably the underwater sound from airgun arrays, on VECs will be assessed in detail. Information on the known effects of underwater sound on marine fauna, as well as other Project activities, will be reviewed, and used to predict residual effects on VECs. Mitigation and monitoring procedures will be included in the EA and will consider input received by stakeholders during consultations.

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.

#### **3.4 Consultations**

During the course of the assessment, MKI 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, MKI 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.

#### **4.0 REFERENCES**

C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2012. Geophysical, Geological, Environmental and Geotechnical Program Guidelines, January 2012. Canada-Newfoundland and Labrador Offshore Petroleum Board. 53 p.

LGL Limited. 2010. Environmental assessment of Chevron's offshore Labrador seismic program, 2010-2017. LGL Rep. SA1031. Rep. by LGL Limited in association with Oceans Ltd., St. John's, NL, for Chevron Canada Resources, Calgary, AB. 248 p. + appendix.

LGL Limited and GX Technology Canada Ltd. 2013. Environmental assessment of GXT's LabradorSPAN 2-D Seismic, Gravity and Magnetic Survey, 2013-2015. LGL Rep. SA1199. Rep. by LGL Limited, St. John's, NL, and GX Technology, Calgary, AB. 286 p. + App.

Sikumiut (Sikumiut Environmental Management Ltd.). 2008. Strategic Environmental Assessment Labrador Shelf Offshore Area. Final Report for the Canada – Newfoundland and Labrador Offshore Petroleum Board. 519 pp. + appendices.