

Project Description

Seitel's East Coast Offshore Seismic Program, 2016-2025

Prepared by



Prepared for



**3 November 2015
LGL Project No. FA0071**

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1.0 INTRODUCTION

Seitel Canada Ltd. (Seitel) is proposing to conduct two dimensional (2D), three dimensional (3D), and/or four dimensional (4D) seismic surveys in the Newfoundland and Labrador offshore (the Project). The Project Area identified in Figure 1 includes Northern and Southern Grand Banks, the Flemish Cap and the shelf region off NE Newfoundland and Labrador, as well as offshore slope and deep water regions associated with the shelf (e.g., Flemish Pass, Orphan Basin, parts of the Labrador and Newfoundland basins). Seitel is proposing to conduct seismic surveys in one or more years within the 2016-2025 timeframe.

This document is the Project Description (PD); 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 Seitel, 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 the Canadian Environmental Assessment Agency (CEAA).

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

- *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* (C-NLOPB 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.

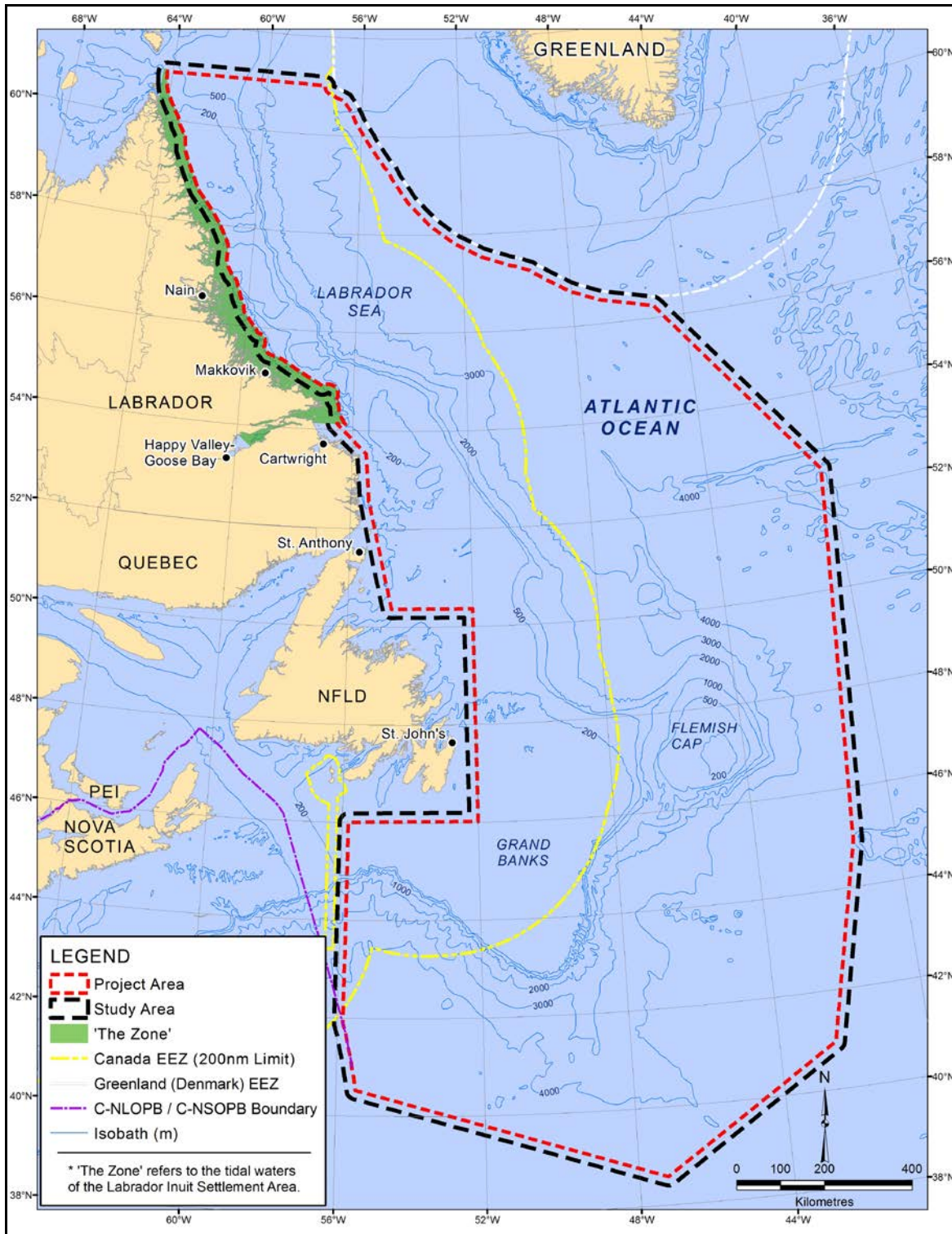


Figure 1. Locations of Project Area and Study Area for Seitel's Proposed East Coast Offshore Seismic Program, 2016-2025.

1.2 The Operator

Seitel Canada Ltd. is a leading provider of seismic data and related geophysical services to the oil and gas industry in North America. Seismic data are a crucial tool in mapping the earth's subsurface and revealing the potential for hydrocarbon accumulations. Seitel's products and services are used by oil and gas companies to assist in the exploration for and development and management of oil and gas reserves. Seitel Canada Ltd. is based in Calgary, AB.

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*, Seitel is 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 Seitel's requirements.

Seitel will manage the seismic operations from St. John's, Newfoundland and Labrador. Seitel agrees that first consideration will be given to personnel, support and other services that can be provided from within Newfoundland and Labrador, and to goods manufactured in Newfoundland and Labrador as long as the goods and services can be delivered at a high standard of Health, Safety and Environmental competency, are of high quality, and are competitive in terms of fair market price. All contractors and subcontractors working for Seitel in Newfoundland and Labrador must also apply these principles in their operations.

1.4 Contacts

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2.0 PROJECT DESCRIPTION

The official name of the Project is Seitel's East Coast Offshore Seismic Program, 2016-2025. Seitel is proposing to conduct one or more 2D, 3D and/or 4D seismic surveys within its proposed Project Area (see Figure 1) between 2016 and 2025, starting as early as May 2016. There is the possibility that Seitel will concurrently conduct two surveys in any given year. The possible combinations of concurrent seismic survey types in any given year are 2D and 2D, and 2D and 3D. The timing of the surveys is subject to Seitel priorities and circumstances, weather conditions, contractor availability, and regulatory approvals.

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 proposed Project Area includes space to account for ship turning and streamer deployment. The areal extent of the Project Area is 2,116,780 km². As indicated in Figure 1, a larger proportion of the Project Area lies outside of Canada's Exclusive Economic Zone (EEZ) (~62%) than inside the EEZ (~38%). Water depths within the Project Area range from <100 m to > 4,000 m (see Figure 1).

The coordinates that delineate the Project Area (decimal degrees, WGS84 Datum) are as follow:

- 60.957°N, 64.222°W (western extreme);
- 61.008°N, 57.586°W (northern extreme);
- 60.701°N, 56.742°W;
- 57.818°N, 52.301°W;
- 56.249°N, 45.067°W;
- 52.437°N, 40.213°W (eastern extreme);
- 44.940°N, 41.220°W;
- 40.962°N, 42.495°W;
- 38.579°N, 47.250°W (southern extreme);
- 40.526°N, 55.474°W;
- 41.895°N, 55.850°W;
- 46.004°N, 55.814°W;
- 46.017°N, 52.000°W;
- 50.365°N, 52.004°W;
- 50.367°N, 54.601°W;
- 52.563°N, 55.389°W;
- 53.535°N, 55.517°W;
- 55.608°N, 59.275°W;

- 57.254°N, 60.938°W; and
- 59.434°N, 63.044°W.

The coordinates that delineate the Study Area (decimal degrees, WGS84 Datum) are as follow:

- 66.082°N, 64.484°W (western extreme);
- 61.131°N, 57.316°W (northern extreme);
- 60.838°N, 56.506°W;
- 57.970°N, 52.121°W;
- 56.402°N, 44.900°W;
- 52.480°N, 39.929°W (eastern extreme);
- 44.918°N, 40.970°W;
- 40.857°N, 42.303°W;
- 38.400°N, 47.230°W (southern extreme);
- 40.410°N, 55.653°W;
- 41.873°N, 56.089°W;
- 46.123°N, 56.008°W;
- 46.201°N, 52.259°W;
- 50.188°N, 52.284°W;
- 50.227°N, 54.775°W;
- 52.540°N, 55.682°W;
- 53.454°N, 55.808°W;
- 55.581°N, 59.592°W;
- 57.217°N, 61.261°W; and
- 59.365°N, 63.374°W.

The temporal boundaries of the Project are 1 May to 30 November during 2016-2025. The duration of a seismic survey in any given year may range from 60-210 days.

2.2 Project Overview

The proposed Project is a ship-borne geophysical program that may include ~10,000 km of 2D seismic survey lines in 2016. Specific data acquisition plans for 2D, 3D and/or 4D surveys during 2017-2025 are not yet determined.

For the potential 2D survey in 2016, the seismic survey vessel would be either the *MV Aquila Explorer* (see Section 2.2.5 for more details) or a similar vessel. The seismic survey vessel(s) used during subsequent 2D/3D/4D surveys are currently unknown 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 in Sections 2.2.6 and 2.2.7, respectively.

For some of the survey operations, Seitel proposes to use Ocean Bottom Nodes (OBNs) instead of towed streamers to acquire imaging data. More details on OBNs are provided in Section 2.2.8.

Gravity and magnetic surveys will also be conducted. These passive surveys will be conducted either from the seismic vessel or a fixed-wing aircraft.

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 Union (FFAW) will be on board the seismic vessel 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 seismic data in the area do not provide sufficient quality or coverage to serve the needs of the energy companies in their exploration, development and production activities. Acquisition of more 2D, 3D and/or 4D 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 Scheduling

As already indicated in Section 2.1, the seismic surveys will be conducted between 1 May and 30 November of any given year from 2016-2025. The approximate duration of the 2016 2D seismic survey, should it proceed, is 60-90 days.

2.2.3 Site Plans

In 2016, it is possible that ~10,000 km of survey line will be surveyed. The 2D seismic survey lines will be primarily orientated ESE-WNW or SSW-NNE with an approximate 10-50 km

separation between adjacent lines. The survey line lengths are estimated to vary between 100-1000 km.

2.2.4 Personnel

A typical seismic vessel can accommodate ~55-60 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 the required certifications as specified by the relevant Canadian legislation and the C-NLOPB.

2.2.5 Seismic Vessel

In 2016, Seitel will use either the *MV Aquila Explorer* or a similar vessel. The *MV Aquila Explorer* was built in 1981 and subsequently converted in Singapore in 2006/2007. It is under Panamanian flag. The vessel is 71 m long, 17.5 m wide, and has a maximum draft of 5.45 m. The vessel is equipped with two MAK 6M 453 AK 1770 Kw engines and has a maximum cruising speed of 11 knots (20.4 km/h). Typical seismic surveying speed is 4.5-5 knots (8.3-9.3 km/h). For seismic surveys during 2017-2025, vessel specifics will be provided once the vessel has been identified.

2.2.6 Seismic Energy Source Parameters

The sound sources of the proposed 2D/3D/4D survey program will consist of either one or two airgun arrays. If the latter, the airgun arrays will operate in a flip-flop arrangement. The total volume of an airgun array will range from 3,000-6,000 in³. The airgun array(s) will be deployed at depths ranging from 6-15 m. The airguns will be operated with compressed air at pressures ranging from of 2,000-2,500 psi. The peak-to-peak sound source level will be ~100-200 bar-m (~260-266 dB re 1 μ Pa \cdot m_{pp}). Detailed specifications of the airgun array will be provided once the 2016 project design is completed and parameters are selected.

2.2.7 Seismic Streamers

If seismic surveying is conducted in 2016, the survey vessel will tow as many as 16 solid streamers, each ranging in length from 6-12 km long at depths ranging from 9-25 m.

2.2.8 Ocean Bottom Nodes

As already indicated above, Seitel proposes to use cableless Ocean Bottom Nodes (OBNs) in conjunction with towed streamers for some of its seismic surveys during 2017-2025. The OBNs contain a single hydrophone and 3 geophones configured for multi-component acquisition and are not linked to one another via a cabled system. Each wireless (cableless) OBN will have a footprint ranging between 0.20-0.25 m², and as many as 10,000 could be deployed in a 2D project or 3D grid configuration on the sea bottom at any one time. The OBNs can be deployed

and retrieved by ROV or lowered by rope. These units are completely autonomous to operate on the seabed until retrieved and can be left unattended for up to 100 days. The supply vessel will also serve as the platform for ROV operations.

2.2.9 Logistics/Support

2.2.9.1 Vessels

Seitel prefers that primary support and supply be provided by a local vessel but vessel plans are undetermined at this stage. As a minimum, it is anticipated that one local vessel will accompany the seismic vessel in the picket vessel role. The picket vessel will be used to scout ahead of the seismic vessel for fishing vessels and gear, as well as for hazards such as ice and floating debris.

2.2.9.2 Helicopters

The *MV Aquila Explorer* is equipped with a helicopter deck suitable for helicopters like the Sikorsky S-92. Crew changes will be either by helicopter, ship-to-ship transfer, or ship-to-shore transfer.

2.2.9.3 Shore Base, Support and Staging

Seitel will have a shore representative based in St. John's for the duration of each seismic program. 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. Seitel follows MARPOL 73/78 Annex IV: Pollution by Sewage from Ships, and Annex V: Pollution by Garbage from Ships.

2.2.11 Air Emissions

Air emissions will be those associated with standard operations for marine vessels, including the seismic vessel, the support vessel and the picket vessel. Seitel follows MARPOL 73/78 Annex VI: Regulations for the Prevention of Air Pollution from Ships.

2.2.12 Accidental Events

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

2.3 Mitigation and Monitoring

Project mitigation measures will be detailed in the EA, some of which 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 and release program for seabirds which may strand on Project vessels. Seabird monitoring will include systematic counts based on protocols issued by the Canadian Wildlife Service.

3.0 ENVIRONMENTAL ASSESSMENT

The EA will closely follow previous assessments of seismic programs in the Newfoundland and Labrador offshore. The primary issues of concern are the effects of exposure to underwater airgun sound on marine fauna and fisheries, as well as the potential effects of equipment deployed on the sea bottom (i.e., OBNs) on fisheries.

3.1 Physical and Biological Environment

The Eastern Newfoundland Strategic Environmental Assessment (SEA; C-NLOPB 2014), Southern Newfoundland SEA (C-NLOPB 2010), and Labrador Shelf SEA (C-NLOPB 2008) provide descriptions of the physical and biological environments in much of the Study Area. A description of the physical and biological environments will be provided in the EA for this Project. Background information will be provided for the anticipated Valued Environmental 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 discussion of expected effects of the physical environment on the Project, based partially on information in the relevant SEAs (C-NLOPB 2008, 2010, 2014), will be included in the EA.

3.3 Effects of the Project on VECs

The effects of Project activities on VECs, most notably the underwater sound from airgun arrays, will be assessed in detail. Information on the known effects of Project activities on the VECs, with emphasis on the effects of underwater sound on marine fauna, will be reviewed and used to predict residual effects on VECs. Input received during consultations will be considered when determining the mitigation and monitoring procedures that will be included in the EA.

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

3.4 Consultations

As part of the EA process, Seitel will consult with stakeholders who have an interest in the Project. This will assist in scoping the effects assessment and mitigation plan. The results of the consultations (i.e., issues of concern) will be presented and addressed in the EA.

Seitel will undertake a consultation program with various consultees including:

- Fisheries and Oceans Canada (DFO);
- Environment Canada (EC);
- One Ocean;
- FFAW/Unifor;
- Study Area fishers;
- Nunatsiavut Government;
- Other aboriginal groups;
- Nature Newfoundland and Labrador (formerly the Natural History Society);
- Various fish processors; and
- Other identified Newfoundland and Labrador fisheries industry stakeholders.

Note that consultations will be held in St. John's and at various locations in Labrador.

4.0 REFERENCES

- C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2014. Eastern Newfoundland Strategic Environmental Assessment. Report by AMEC Environment & Infrastructure, St. John's, NL for the C-NLOPB, St. John's, NL. 527 p. + appendices.
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