PROJECT DESCRIPTION

Marine 2D/3D/4D Seismic 2016-2022 Survey

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Polarcus

Prepared by:

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1 Introduction

Polarcus UK Ltd. is proposing to conduct two dimensional (2D), three dimensional (3D) and /or four dimensional (4D) seismic surveys in the Newfoundland Offshore (the project). The Project Area identified in Figure 1 is in Eastern Newfoundland. Polarcus is proposing to conduct seismic surveys in one or more years within the 2016 – 2022 timeframe.

This document is the Project Description; the first step in the Canada-Newfoundland and Labrador Offshore Petroleum Boards (C-NLOPB) environmental assessment (EA) process. This Project Description combined with the Scoping Document provided by the C-NLOPB, other Federal Agencies, and Stakeholders consulted by Polarcus, will guide the preparation of the EA.

1.1 Regulatory Context and Relevant Legislation

Polarcus requires a Geophysical Program Authorization to conduct the program. 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 (CEA, 2012) Came into force on July 6, 2012. Marine seismic surveys 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

The Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2012) are directly relevant to the proposed undertaking.

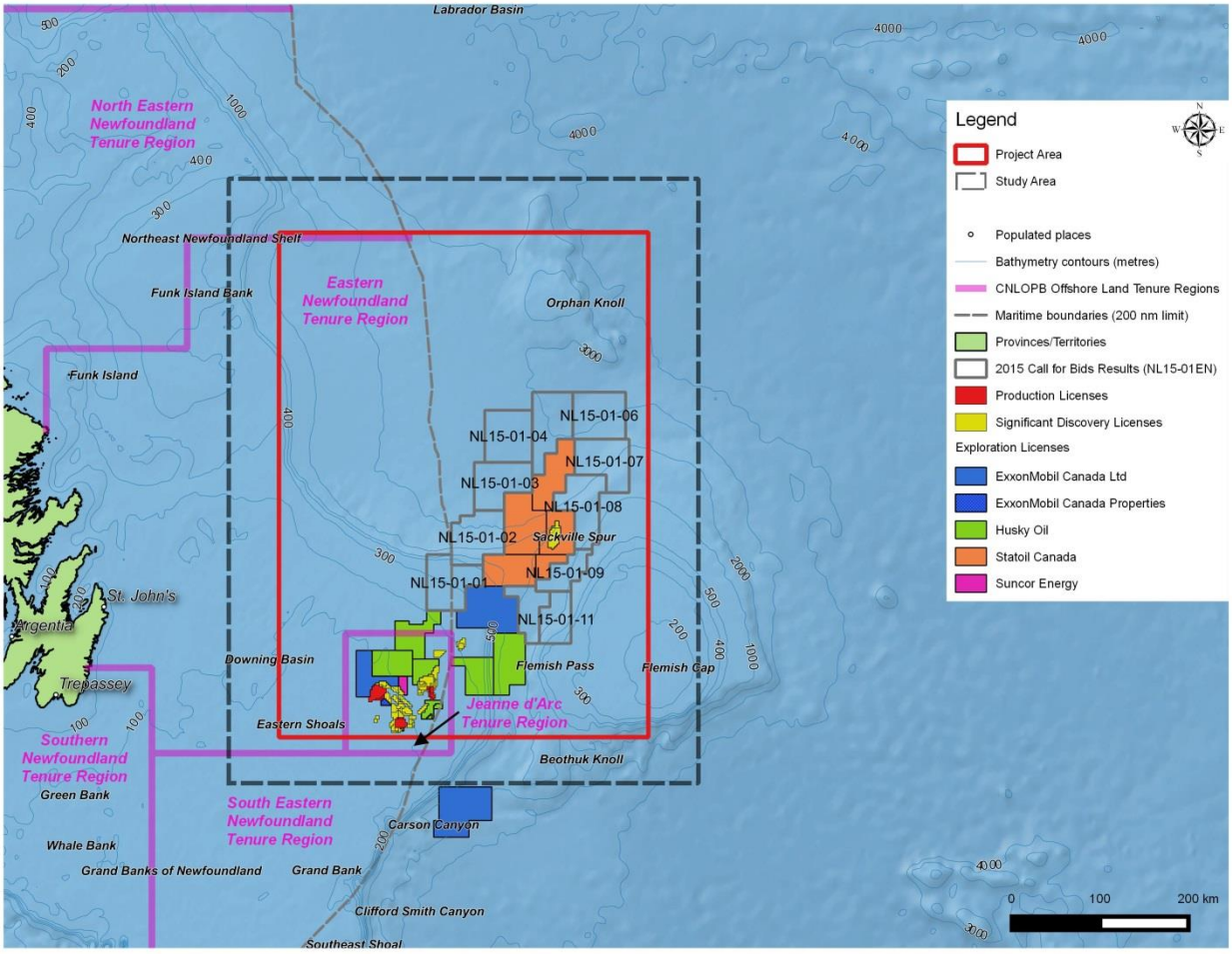

Figure 1 - Eastern Newfoundland Study/Project Area (2016-2022)

1.2 The Operator

Polarcus UK Ltd. (Polarcus) is an offshore geophysical company operating a fleet of seismic research vessels worldwide. The company has a strong environmental focus that aims to decrease emissions to both sea and air. In support of its Commitment to the Environment, all Polarcus vessels are certified to the highest rating of the DNV GL Triple-E standard reflective of leading maritime energy efficiency and environmental performance.

Polarcus provides worldwide seismic data acquisition services and Multi-Client library data as well as seismic data imaging to help energy companies find oil and gas reserves offshore.

The company was founded in 2008 in Dubai, UAE. Polarcus is registered in Canada.

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, Polarcus is committed to providing maximum benefits associated with East Coast operations to Canadians, and in particular, to Newfoundland and Labrador residents and companies where they are commercially competitive in accordance with Polarcus procurement needs.

Polarcus is aware and understands section 45 of the Act,

- Polarcus will have a shore manager stationed in St. John's, Newfoundland for the duration of the program where appropriate levels of decision-making are to take place;
- be consistent with the Canadian Charter of Rights and Freedoms, employment of Canadians and residents of the Province, giving first consideration to residents of the Province of Newfoundland and Labrador for employment and training during the project;
- use Canadian manufacturers, consultants, contractors and service companies and, in particular, give first consideration to services provided from within the Province and to goods manufactured in the Province, where those services and goods are competitive in terms of fair market price, quality and delivery;
- that expenditures for Research and Development are to be carried out in the Province and Education and Training to be provided in the Province;
- that provisions to ensure that disadvantaged individuals or groups have access to employment and business opportunities generated by the project; and,
- Provisions to ensure manufacturers, consultants, contractors and service companies in the Province and other parts of Canada are given a full and fair opportunity to participate on a competitive basis in the supply of goods and services used in any proposed work or activity.

1.4 Contacts

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2 Project Description

Polarcus is proposing to conduct one or more 2D, 3D and/or 4D seismic surveys within its proposed Project Area (Figure 1), between 2016 and 2022. This survey could start as early as 1 May 2016. There is the possibility that Polarcus could conduct more than one survey in any given year. The timing of the surveys will be decided by circumstances and priorities assigned by Polarcus, weather conditions, contractor availability and regulatory approvals.

2.1 Spatial and Temporal Boundaries

The Study Area includes the Project Area plus a 50 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 Study Area is 308,384 km2 and the Project Area is 202,785 km2. Just over half of the Project Area (57%) is located outside of Canada's Exclusive Economic Zone (EEZ; 200 nm limit). Water depth within the Project Area ranges from <100 m to > 4,000 m (see Figure 1). All project activities will take place within the Project Area.

The corner coordinates (decimal degrees, WGS84) of the extents of the Project Area are as follows:

- Northwest: 51.04506° N, 50.19496° W
- Northeast: 51.0478° N, 44.95272° W
- Southeast: 46.32257° N, 44.95159° W
- Southwest: 46.32127° N, 50.1959° W

The "corner" coordinates (decimal degrees, WGS84) of the extents of the Study Area are as follows:

Northwest: 51.52525° N, 50.9079° W

- Northeast: 51.52525° N, 44.23973° W
- Southeast: 45.87144° N, 44.23973° W
- Southwest: 45.87144° N, 50.9079° W

The temporal boundaries of the Project are 1 May-30 November 2016-2022. The typical duration of a seismic survey in any given year is 90-120 days.

2.2 Project Overview

The proposed Project is a marine geophysical program that will include not more than 10,000 Km2 of 3D seismic survey lines in 2016. Specific data acquisition plans for 2D, 3D and/or 4D surveys is subsequent years are not yet determined. The proponent may also collect Gravity Magnetic data in any given year.

For the proposed 3D survey in 2016, the seismic survey vessel will be Polarcus Amani or a similar vessel. The seismic survey vessel(s) used during subsequent 2D/3D/4D surveys are currently unknown; however they will be approved for operations in Canadian waters, and will be typical of the Polarcus fleet.

The C-NLOPB's Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB, 2012) will be used as the basis for the marine mammal seabird monitoring and mitigation program for seismic surveys. Dedicated Marine Mammal Seabird Observers (MMSOs) 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 500m as noted in Fisheries and Oceans Canada Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (Fisheries and Oceans Canada, 2007). The airgun array will 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 disturbances to marine life, particularly marine mammals and species considered at risk under the SARA. In addition, the MMSOs will conduct a monitoring and release program for seabirds which may become stranded on board the vessel. A Fisheries Liaison Officer (FLO) provided by the Fish, Food and Allied Workers Union (FFAW) will be onboard the seismic vessel and/or the supply vessel to ensure implementation of communication procedures intended to minimize conflict with the commercial fishery.

2.2.1 Rationale and Objectives

The objective of the Project is to determine the presence and likely locations of geological structures that might contain hydrocarbon deposits. Existing data in the area does not provide sufficient quality or coverage to serve 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

Seismic surveys will be conducted between 1 May and 30 November of any given year from 2016- 2022. The approximate duration of the proposed 2016 survey is 90-120 days.

2.2.3 Site Plan

The 2016 specific plan for acquisition has not been finalized, however no more than 10,000 km2 of 3D seismic data will be acquired. The average survey line length is estimated to be approximately 100km. The Operator also intends to collect gravity data.

2.2.4 Personnel

Personnel onboard the seismic vessel will include technical crew and maritime crew. The typical Polarcus fleet of vessels accompanies approximately 60 personnel. All crew will have the required certifications for offshore Newfoundland and Labrador for working under the C-NLOPB's jurisdiction. There will be MMOs and FLO's onboard for the duration of the program.

2.2.5 Seismic Vessel

In 2016, Polarcus will use either the Polarcus Amani or similar vessel from the Polarcus Fleet. Delivered in 2012, Polarcus Amani is an ultra-modern, super high ice class, 14 streamer 3D/4D seismic vessel. Built to the ULSTEIN SX134 design and incorporating the innovative ULSTEIN X-BOW® hull, the vessel combines the latest developments in maritime systems with the most advanced seismic technology commercially available. The vessel is also amongst the most environmentally sound seismic vessels in the market with diesel-electric propulsion, high specification catalytic convertors to reduce harmful exhaust emissions, double hull and regulatory-exceeding advanced ballast water treatment / bilge water cleaning systems. The vessel complies with the stringent DNV CLEAN DESIGN notation.

The Amani is 92 m long, 21m wide, and has a maximum draft of 7.5m. The vessel has accommodations for 60 crew with a maximum cruising speed of 17 knots. Typical seismic surveying speed is 4.5-5 knots. For future surveys during 2017-2022, vessel specifics will be provided once the vessel has been identified.

2.2.6 Seismic Source Parameters

In 2016, the proposed 2D/3D/4D survey sound source will consist of one or more airgun arrays, 4,240 cubic inch total volume, which will operate at towed depths between 6 and 9 m. The airguns will be operated with compressed air at pressures of 2000 psi, and produce approximate peak-to-peak pressures of 120bar-m.

2.2.7 Seismic Streamers

In 2016, the 3D seismic survey vessel will tow multiple solid streamers that are 8,000-10,000 m in length at a depth of 9-25 m. In subsequent 2D, 3D and/or 4D seismic surveys (2017-2022), streamer equipment specifications will be provided when program design is complete. The solid streamers will be deployed at depths ranging from 9 to 25 m. As many as 14 streamers may be towed during a 3D or 4D seismic survey.

2.2.8 Logistics

Vessels

Support/Supply vessels will be secured through the Expression of Interest process in Canada with first consideration given to Newfoundland companies. The support 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. The supply vessel will be utilized to supply the seismic vessel when necessary.

Helicopters

The Polarcus Fleet of vessels is equipped with a helicopter deck suitable for helicopters like the Sikorsky S-92. Crew changes will be by helicopter or ship to ship.

Shore Base

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

2.2.9 Waste Management

Waste management will be consistent with industry best practices in Offshore Newfoundland and Labrador. Polarcus follows MARPOL 73/78 Annex IV: Pollution by Sewage from Ships, and Annex V: Pollution by Garbage from Ships. Polarcus procedures and practices related to recycling and/or repurposing of waste streams will be in effect.

2.2.10 Air Emissions

Air Emissions will be those associated with standard operations for marine vessels, including the seismic vessel, the support/supply vessel. Polarcus follows MARPOL 73/78 Annex VI: Regulations for the Prevention of Air Pollution from Ships. Air emissions reporting will be performed using a Polarcus developed, DNV GL certified emissions tracking tool. Certified emissions statistics will be made available following any project.

2.2.11 Accidental Events

In the unlikely event of an accidental spill during the project, the measures outlined in Polarcus Oil Spill Response Plan will be implemented. The oil spill response plan will be provided to the Board. Polarcus will be registered with Eastern Canadian Response Corporation for the duration of the program in Canada. Polarcus will have an Emergency Response Plan in place.

2.2.12 Mitigation and Monitoring

All Project mitigations will be outlined in the EA, some of which will follow 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 and the use of dedicated MMOs and FLOs onboard the vessel. Polarcus will obtain a "Bird Handling Permit" for the vessel from the Canadian Wildlife Society and MMOs will conduct a monitoring and release program for seabirds which may strand on the Project vessels. On a daily basis, the vessel environmental performance will be monitored using a DNV GL certified tool and when feasible to do so, operational adjustments will be made to minimize airborne emissions impact and improve overall environmental performance. Full disclosure of certified project emissions will be made available.