

**Project Description - Western  
Newfoundland CSEM Survey  
2017**



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### 1.0 INTRODUCTION

#### 1.1 BACKGROUND

Electromagnetic Geoservices Canada, Inc. (EMGS) is proposing to conduct a controlled source electromagnetic (CSEM) survey (Western Newfoundland CSEM Survey 2017; the Project) in Western Newfoundland offshore waters. The Project is proposed for the western offshore waters of Newfoundland, with a tentative start of 2017, pending regulatory approvals. CSEM survey data is often used supplemental to seismic data to discriminate petroleum from water, thereby increasing the drilling success rates and reducing the environmental footprint of exploratory programs.

In accordance with the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*, marine CSEM surveys require a Geophysical Program Authorization (Electromagnetic Program Authorization) from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB).

The application for this authorization requires, among other things, an environmental assessment (EA) of the proposed program. Marine CSEM surveys are not included on the "Regulations Designating Physical Activities" list under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). As a result, it does not require an EA under CEAA 2012. The EA process is therefore conducted as part of the Geophysical Program Authorization led by the C-NLOPB.

This document serves as the Project Description to initiate the C-NLOPB's EA process and will be used, along with the technical and scoping advice received from the C-NLOPB, federal agencies, and stakeholders to guide the preparation of an EA.

#### 1.2 THE OPERATOR

EMGS is the global market leader in the CSEM industry with more than 700 surveys conducted in frontier and mature basins across the world, from the Arctic to Australia, in water depths ranging from 30 to 3500 m. The company's primary business is focused towards the use of resistivity data as a direct hydrocarbon indicator.

EMGS currently operates a fleet of two dedicated 3D electromagnetic survey vessels: the M/V *Atlantic Guardian* and S/V *BOA Thalassa*, with extensive experience across the world's mature and frontier offshore basins. EMGS vessels have operated in Newfoundland waters on numerous projects in the past with the latest conducted in 2014.

EMGS is cognizant of the requirements of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland Labrador Act* and the *Canada-Newfoundland Atlantic*



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*Accord Implementation Act.* EMGS 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 competitive in accordance with EMGS' requirements.

EMGS 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 level of health, safety, and environmental performance, and be competitive in terms of quality and cost. Contractors and subcontractors working for EMGS in Newfoundland and Labrador must also apply these principles in their operations.

A Canadian Benefit Plan will be submitted in accordance with the C-NLOPB Guidelines.

### 1.3 PROPONENT CONTACT

For the purpose of this application, the EMGS Contact is as follows:

#### Operations Manager EMGS ASA

Atle Johan Bull Lund  
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Email: al@emgs.com

### 1.4 RELEVANT LEGISLATION AND REGULATORY APPROVALS

As indicated above, marine CSEM surveys are subject to authorization by the C-NLOPB in accordance with the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*. The *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012) provide information on the application and approval process for a Geophysical Program Authorization.

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

- *Species at Risk Act (SARA)*
- *Oceans Act*
- *Fisheries Act*
- *Navigable Waters Protection Act*



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- *Canadian Shipping Act*
- *Migratory Birds Convention Act.*

## 2.0 PROJECT DESCRIPTION

EMGS is proposing to conduct a 5 to 10 day CSEM program, starting as early as 2017, within the proposed Survey Area of Interest (Project Area) (refer to Figure 1). The timing of the surveys is subject to EMGS's client priorities and circumstances, weather conditions, contractor availability and regulatory approvals.

### 2.1 SPATIAL AND TEMPORAL BOUNDARIES

The Project Area is 5140 km<sup>2</sup> located off of the western coast of Newfoundland. The area takes into account an approximate 20 km turning radius for vessel activities. The actual survey area will likely be smaller than the Project Area shown on Figure 1. The "corner" coordinates (Decimal degrees, WGS84 projection) of the Project Area are shown in Table 1 below and presented on Figure 1:

**Table 1 Project Area Corner Coordinates**

ID	NAD 1983 CSRS UTM Zone 21N		WGS 1984 (Decimal Degrees)		WGS 1984 (Degrees Minutes Seconds)	
	X	Y	Latitude	Longitude	Latitude	Longitude
1	248855.28	5377489.75	48.5003	-60.4000	48° 30' 1.012" N	60° 23' 59.971" W
2	312296.14	5374907.42	48.4992	-59.5410	48° 29' 57.237" N	59° 32' 27.591" W
3	311026.14	5334606.00	48.1366	-59.5401	48° 8' 11.875" N	59° 32' 24.414" W
4	271402.06	5274136.95	47.5803	-60.0401	47° 34' 49.241" N	60° 2' 24.187" W
5	244901.34	5295218.99	47.7598	-60.4042	47° 45' 35.376" N	60° 24' 15.038" W

The temporal boundaries of the proposed Project are to occur in 2017. The duration of the survey is estimated to last from 5 to 10 days.

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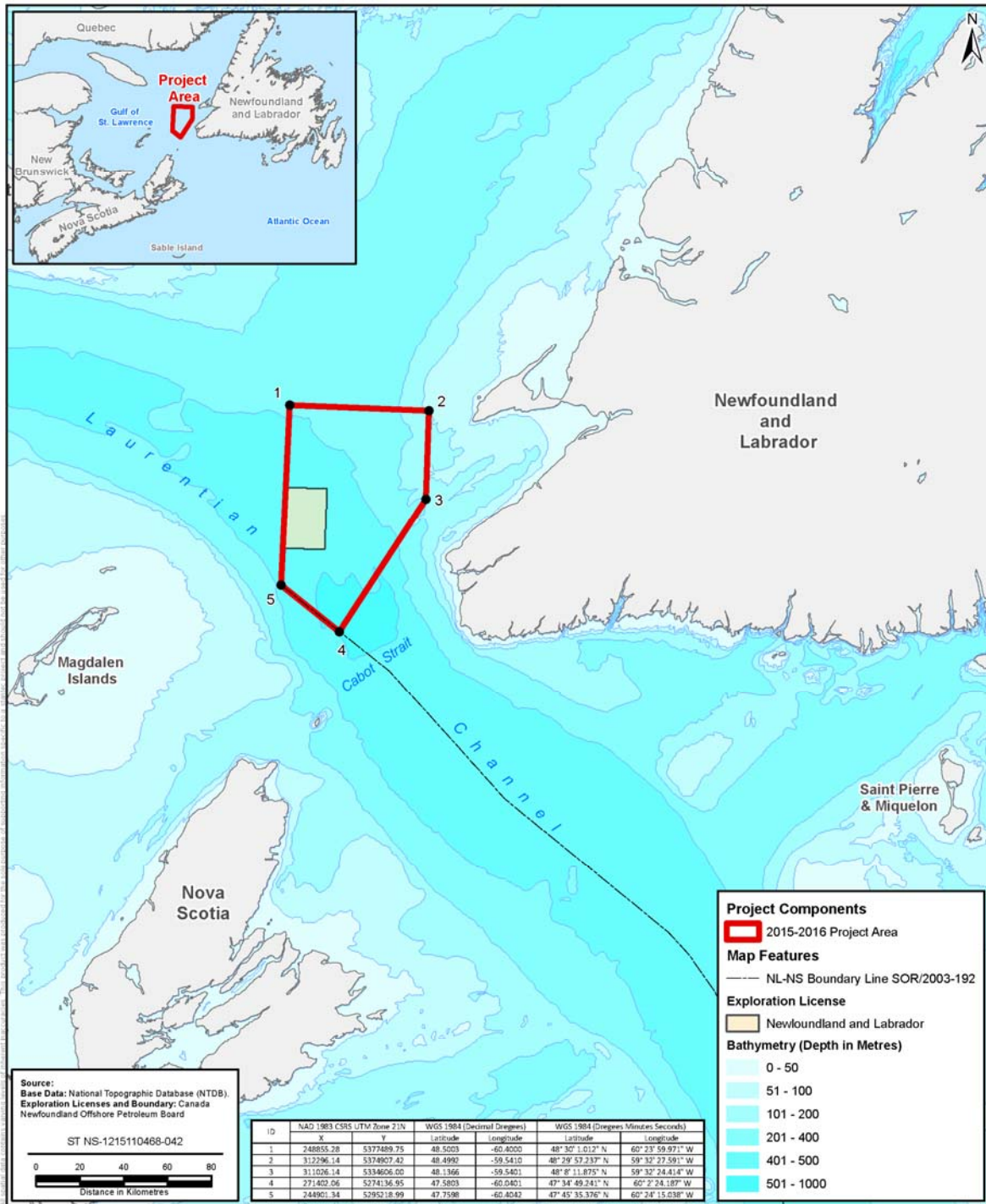


Figure 1 Western Newfoundland CSEM Survey – Project Location



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### 2.2 PROJECT OVERVIEW

The CSEM survey will be conducted by deploying a grid of receivers 2 km apart on the seabed. The survey vessel will then tow an electromagnetic source (Figure 2) 30 m above the seabed over the receivers. The electromagnetic source will propagate a signal through the seabed subsurface which will be recorded by the receivers in the survey area. The data from the receivers will then be modeled, integrated and interpreted to determine potential hydrocarbon sources.

During the survey there will be the potential need for a marine mammal monitoring and/or mitigation program. If such a program is required, the C-NLOPB's *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012) will be used as the basis. There may also be the requirement for a marine bird monitoring and release program during the survey. A Fisheries Liaison Officer (FLO) provided by the Fish, Food and Allied Workers (FFAW) will be on board the survey vessel to ensure implementation of communication procedures intended to minimize conflict with the commercial fishery.

#### 2.2.1 Objectives and Rationale

CSEM methods produce valuable resistivity information used to assess the type of fluids in a reservoir. The existence of a subsurface resistor co-located with a prospective structure identified on a seismic image can significantly increase the probability of success when the prospect is drilled. Quantitative interpretation of resistivity data can further reduce commercial risk for the oil company by assessing the scale (and thus commerciality) of the oil and gas reserves in place.

#### 2.2.2 Project Scheduling

The CSEM survey is expected to occur in 2017. The estimated duration of the proposed survey is 5 to 10 days.

#### 2.2.3 Site Plans

Survey design planning is still in progress; as a result detailed survey plans are not yet available. These details will be submitted to the C-NLOPB four to six weeks in advance of the survey. The survey site will be located within the 5140 km<sup>2</sup> block (refer to Figure 1). Survey line length and orientation is to be determined, although it is anticipated that the orientation will be North-South. Grid and survey line spacing will range from approximately 1 to 3 km. Water depth in the Project Area ranges from 100 m to 500 m (Figure 1).

#### 2.2.4 Survey Vessel and Crew

The survey will be conducted using one of EMGS' two exploration vessels which can hold up to 200 receivers. These vessels are not significantly different than offshore supply vessels used on the east coast of Newfoundland in the Orphan Basin. The vessel will have an onboard technical



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crew from EMGS in addition to a crew employed by the ship owner. The total crew is expected to consist of 35-50 persons on five week rotations.

Personnel on a survey vessel include ship's officers and marine crew as well as technical and scientific personnel. The survey vessel may also have a FLO and MMOs onboard. All Project personnel will have all of the required certification as specified by the relevant Canadian legislation and the C-NLOPB.

### 2.2.5 CSEM Sources

The source system is designed to meet CSEM requirements with respect to performance, physical dimensions and safety when handling the system. The CSEM source consists of a power supply and control unit at the topside transmitter mounted on towed subsea-frame (tow fish) with a horizontal electric dipole connected to the tow fish.

The topside unit controls the power to generate the predefined EM signal at the electric dipole. The power is transformed to high voltage/low current and transferred via umbilical to the subsea system. At the subsea system the power is transformed back to low voltage/high current. A trailing electric dipole (antenna) is connected to the subsea signal source. This antenna is fed with a periodic current. The waveform and periodic time can be defined and changed at the topside operator station. A separate power supply feeds the instrumentation on the tow fish.

Figure 2 depicts the general subsea configuration of the CSEM Source. The electrical dipole (antenna) is neutrally balanced for in-line towing operations. A tail fish is designed to stretch the antenna system. Both the towfish and tailfish carry additional survey and navigational equipment.

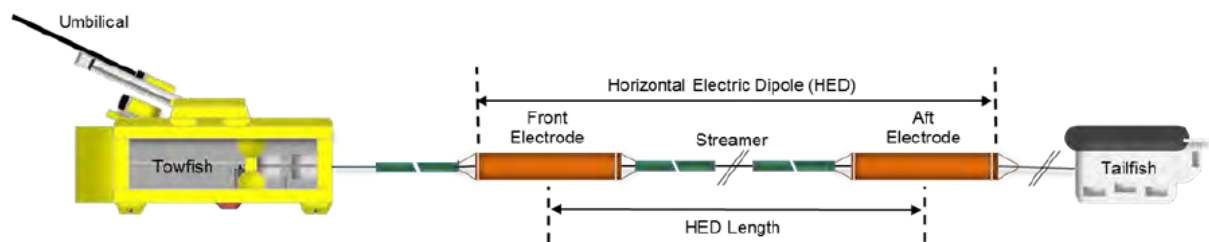


Figure 2 Schematic Drawing of the CSEM Source

### 2.2.6 CSEM Receivers

During the survey, CSEM seabed nodes are deployed on the seabed in a grid layout. The general composition of the node consists of a data acquisition unit, electrical and magnetic sensors, and a positioning transponder, all attached to compacted sand anchor to provide negative buoyancy (Refer to Figure 3). The positioning transponders, also known as



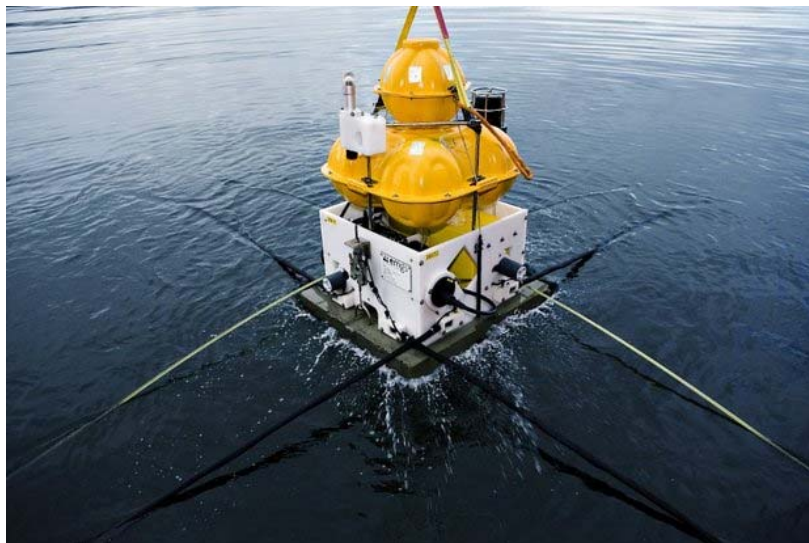


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Programmable Generic Transponder (PGT) are manufactured for EMGS by Sonardyne Intl. and are used on both the towed source and receivers to position them in the water column. The PGT attached to the receiver also has a mechanical release function built into it. This is the primary method of release used to detach the receiver from the compacted sand anchor. By sending an acoustic command from the vessel, a mechanical thread is activated on the PGT which unwinds and releases the anchor wire attached to the receiver. Once fully detached, the positive buoyancy provided by the receiver floats lift the unit upward and it ascends to the surface. . The PGT is also equipped with a secondary release system in the form of a burn wire. In the unlikely situation that the primary release fails, the burn wire release will be activated and effectively severs the anchor wire via electric current. Again allowing the receiver to ascend to the surface once fully detached.

The PGT's also provide real time positioning info from the two vessel mounted USBL (Ultra Short Base Line) systems. EMGS vessels use two independent USBL systems for redundancy. These are the Sonardyne and Kongsberg USBL systems. Acoustic signals are sent to the PGT from the vessel which in turn sends a reply signal enabling its position to be calculated. In this manner, the receiver can be tracked during its descent, its final seabed position and also throughout its ascent back to the surface.



**Figure 3      The CSEM Receiver Package**

Each receiver is mounted with a compacted sand anchor (920 mm x 810 mm x 102 mm) in order to provide negative buoyancy during deployment, and stability whilst on the seafloor.

The compacted sand anchors contain no ingredients harmful to the marine environment it is meant to serve in. All ingredients are found in natural gravel, limestone and/or seawater and do not contain any organic admixtures.

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### 2.2.7 Logistics/Support

#### 2.2.7.1 Support Vessels

Depending on the final logistics plan, a supply vessel may be required for re-supply. Due to the short survey length it is not likely that support vessels will be used for crew changes.

#### 2.2.7.2 Helicopters

The survey vessel will be equipped with a helicopter deck although it is not intended that helicopters will be utilized for this project.

#### 2.2.7.3 Shore Base, Support, and Staging

Logistics such as re-supply and crew changes will be coordinated in St. John's. No new shore base facilities will be established as part of the Project.

### 2.2.8 Waste Management

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

### 2.2.9 Air Emissions

Air emissions will be those associated with standard operations for marine vessels, including the CSEM vessel and any potential picket and/or supply vessel.

### 2.2.10 Accidental Events

In the unlikely event of an accidental release from Project vessels (*e.g.*, fuel spill,) the measures outlined in EMGS' Oil Spill Response Plan (OSRP) will be implemented. The OSRP will be filed with the C-NLOPB. EMGS will also have an emergency response plan in place.

## 2.3 MITIGATION AND MONITORING

Mitigation and monitoring requirements will be detailed in the EA and will be based on C-NLOPB guidelines and any other appropriate regulatory guidelines. At a minimum, this will include:

- Adherence to the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012)
- Implementation of a marine mammal monitoring and mitigation program
- Implementation of monitoring and release program for seabirds which may strand on board Project vessels



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- Use of a FLO to ensure implementation of communication procedures intended to minimize conflict with the commercial fishery.

Additional mitigation and monitoring programs may be recommended during the EA process.

### 3.0 ENVIRONMENTAL ASSESSMENT

The EA document will be prepared to meet the requirements of the Scoping Document prepared by the C-NLOPB. The focus of the EA will be on assessing potential effects of electromagnetic signals and towed gear on marine fauna and fisheries.

#### 3.1 PHYSICAL AND BIOLOGICAL ENVIRONMENT

Portions of the physical and biological environments in and immediately adjacent to the Project Area have been described in a number of recently approved and ongoing EAs. These have included seismic and drilling EAs and Strategic Environmental Assessments (SEAs) (*e.g.*, Western Newfoundland and Labrador Offshore Strategic Environmental Assessment). A description of the physical and biological environments will be provided in the EA for the Project. Background information will be provided for anticipated Valued Environmental Components (VECs) which are anticipated to be Fish and Fish Habitat, Commercial Fisheries, Marine Mammals and Sea Turtles, Marine Birds, Species at Risk and Special Areas.

#### 3.2 EFFECTS OF THE PROJECT ON VECs

The effects of Project activities, most notably the electromagnetic signals from the CSEM source, on VECs will be assessed in detail. Information on the known effects of electromagnetic emissions and other Project activities, on marine fauna and habitat, will be reviewed and used to predict residual and cumulative effects on VECs. Mitigation and monitoring procedures will be included in the EA and will consider input received by stakeholders during consultation. Accidental events associated with Project activities will also be assessed in the EA.

#### 3.3 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

A discussion of expected effects of the physical environment on the Project, based partially on information from previous EAs and new desktop research will be provided in the EA for the Project.

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## 4.0 CONSULTATION AND ENGAGEMENT

In order to assist in scoping the effects assessment and developing an appropriate mitigation plan to address any issues of concern, EMGS will undertake a consultation program with applicable stakeholders. This may include, but not be limited to:

- C-NLOPB
- Fisheries and Oceans Canada (DFO)
- Environment Canada
- One Ocean
- FFAW
- Project Area Fishers
- Fish Processors
- Other Newfoundland and Labrador fisheries industry stakeholders as identified.
- Aboriginal and Sustenance Fishers

The EA will include details on the consultation and engagement process, including methods of engagement, parties consulted, issues and concerns raised, and how these issues have been addressed.

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### 5.0 REFERENCES

C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2012. Geophysical, Geological, Environmental and Geotechnical Program Guidelines, January 2012. 51 pp.