

**Project Description
of
Marine Seismic Profiling on EL 1102 and in Adjacent
Areas**

Submitted to:
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Submitted by:
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1.0 INTRODUCTION

Deer Lake Oil & Gas, Inc. (DLO&G) and BG Oil & Gas Ltd. (BGO&G) together hold a 100% Working Interest in Exploration Licence EL1102 (**DLO&G 25%; BGO&G 75%**) located in the southern part of St. George's Bay, offshore western Newfoundland (FIGURE 1).

This exploration licence was issued by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) on January 15, 2007 to B.G. Capital Ltd. and covers an area of 124,320 hectares (307,201 acres).

DLO&G and BGO&G are in the process of forming a new exploration Group to explore for oil and gas in onshore and offshore areas of western Newfoundland.

The seismic survey described in this Project Description will be the first project to be undertaken by the new Group. The new Group will include PGS, a well known international seismic contractor. The new Group has tasked the MV Nordic Explorer with the execution of the survey using its proprietary dual sensor Geo-Streamer acquisition technology.

The Geo-Streamer acquisition system is particularly suited for the imaging of the salt related (including sub-salt) structures and drill targets that are the main focus of our exploration activities on EL1102 and in adjacent areas.

DLO&G has been designated as the lead partner for this project and proposes to undertake seismic profiling activities on EL1102 and in adjacent waters as shown on FIGURE 2 (the Site), commencing on or near September 21, 2009 and ending by or near December 11, 2009.

The Environmental Assessment (EA) will address seismic profiling, an activity related to oil & gas exploration.

The Project requires approval through the C-NLOPB. This document is a Project Description, which is required to initiate the Federal Coordination Regulations process under the *Canadian Environmental Assessment Act (CEAA)* to which this Project is subject.

The CEAA identifies a marine seismic survey with an output level of greater than 275.79 kPa at a distance of one metre from the seismic energy sources (*i.e.* 228.69 dB re 1 μ Pa@1m) as a trigger for an environmental screening level of assessment. This project is not supported by federal funding. Federal lands are involved and administered by the C-NLOPB.

The purpose of the project description, as required under the *C-NLOPB Geophysical, Geological, Environmental and Geotechnical Program Guidelines (May 2008)*, is to identify the basic features of the Project to be assessed under the CEAA, as well as identify the location and timing for the Project. This project description is provided to federal departments with potential decision-making responsibility under the CEAA Responsible Authorities (RAs) or expert knowledge relevant to the evaluation of potential project impacts. The project description is also a component of the environmental assessment that will be conducted by DLO&G after the RAs determine the scope of the project and factors to be assessed under the CEAA.

It has been prepared by AMEC Earth & Environmental on behalf of DLO&G. A screening level environmental assessment (EA) will be prepared from the C-NLOPB scoping document. Every

effort will be made to submit the EA to C-NLOPB at least 90 days prior to the planned commencement of activities.

1.1 PROJECT CONTACT INFORMATION

Proponent Information:

Deer Lake Oil & Gas Inc. Head Office
35 York Street
St. John's, NL, A1C 1K6
www.deerlakeoilandgas.com

Deer Lake Oil & Gas, Inc. is a St. John's, Newfoundland-based oil and gas exploration company active in western Newfoundland. DLO&G is incorporated under the Newfoundland and Labrador Corporations Act. The Corporation is focused on the exploration and development of the onshore and offshore oil and gas potential of western Newfoundland.

Project Contacts:

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Consultant Information:

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1.2 REGULATORY CONTEXT

In accordance with its mandate under the *Atlantic Accord Implementation Acts*, the C-NLOPB may issue an Authorization to Conduct a Geophysical Program to allow DLO&G to carry out the seismic survey program described herein. Offshore geophysical surveys on federal lands are subject to a screening under the *Canadian Environmental Assessment Act (CEAA)*. In addition, Section 19.1 (a) of *CEAA's Inclusion List Regulations* identifies those projects relating to seismic surveys for which a screening level of assessment is required. Under Part II - Oil and Gas Projects, physical activities that require an authorization referred to in paragraph 138(1)(b) of the *Canada-Newfoundland Atlantic Accord Implementation Act* or paragraph 142(1)(b) of the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* and relate to a marine or freshwater seismic survey during which the air pressure measured at a distance of one metre from the seismic energy source is greater than 275.79 kPa (40 psi) requires completion of an environmental assessment.

The C-NLOPB is the designated federal representative mandated under the *Atlantic Accord Implementation Acts* as well as the *CEAA*. The C-NLOPB acts as the federal environmental assessment coordinator in this context. Because seismic survey activities have the potential to affect seabirds, marine mammals, and fish and fisheries, both Fisheries and Oceans and Environment Canada are the primary federal agencies with interests and expertise in the environmental aspects of the proposed program. Relevant government legislation and guidelines to be reviewed during the issues scoping process will include:

- *Canada-Newfoundland Atlantic Accord Implementation Acts*;
- *Canadian Environmental Assessment Act*;
- *Fisheries Act*;
- *Oceans Act*;
- *Migratory Birds Convention Act*;
- *Canadian Environmental Protection Act*;
- *Species at Risk Act*;
- *Navigable Waters Protection Act*;
- *Canada Shipping Act*;
- Offshore Waste Treatment Guidelines (NEB *et al.* 2002); and
- Geophysical, Geological, Environmental and Geotechnical Program Guidelines, (C-NLOPB 2008).

Per the C-NLOPB Geophysical, Geological, Environmental and Geotechnical Program Guidelines (May 2008), an authorization to conduct the planned survey is required from the C-NLOPB.

1.3 STAKEHOLDER CONSULTATION

It is DLO&G's goal to plan and execute the seismic survey with minimal effects on other users and the environment of the study area.

DLO&G recognizes the importance of maintaining a strong communications link with interested parties who may be affected by the proposed activities or who would have a governance

responsibility. These parties would include those with fisheries or environmental interests and/or concerns.

DLO&G presently recognizes the following parties who will be approached for consultation and discussion in the planning stages of the seismic program:

- Department of Fisheries and Oceans
- NL Department of Fisheries and Aquaculture
- Fish, Food and Allied Workers Union
- Association of Seafood Producers
- One Ocean
- Environment Canada (Canadian Wildlife service and Environmental Protection Operations Directorate)
- NL Department of Environment and Conservation

DLO&G will be guided by C-NLOPB and the parties engaged in reviewing the Project Description and advising on the EA Scoping Document. Other interested groups or agencies identified during this process will be considered for consultations as well.

2.0 PROJECT DESCRIPTION

2.1 PROJECT NAME

The Project name is Marine Seismic Profiling on EL 1102 and in Adjacent Areas.

2.2 PROJECT ACTIVITY AREA

The Project Activity Area encompasses the geographic area within which DLO&G expects to undertake seismic survey and associated activities.

EL 1102 is located in the Western Newfoundland Offshore Region of the Newfoundland Offshore Area. It is contained within the southern half of the mouth and bay of St. George's Bay.

The seismic track area will include the navigable portions of EL 1102 and westward to include the area between EL 1102 and the eastern portion of EL 1105. The seismic track area will also potentially include portions of EL 1116, a parcel of land in the northern half of St. George's Bay and to the west of the Port au Port Peninsula. The entire area of seismic shooting will be contained in the Newfoundland Offshore Area. Figure 1 shows the Western Newfoundland and Labrador Offshore Region licence information.

Figure 2 provides an approximate layout of the seismic profile area.

The general coordinates of the application area are:

Northern Boundary
Lat 48.80

Southern Boundary
Lat 47.92

Western Boundary
Long -60.40 (Staying within C-NLOPB jurisdiction)

Eastern Boundary
Near the shoreline of St. George's Bay and subject to water depth, safe vessel operating practices, other use conflicts and environmental sensitivities.

2.3 PROJECT OVERVIEW

The proposed Project is a ship borne seismic program with a 2D survey to begin as early as September 21, 2009 and continue until as late as December 11, 2009. A factor in determining the actual area to be surveyed and the duration of the Project will be the availability dates of the MV Nordic Explorer and weather conditions.

The area to be surveyed will include all or most of EL 1102, an area between EL 1102 and EL 1105 (including some or most of EL 1105) and, subject to vessel availability, parts of EL 1116. Some of the survey area will constitute re-surveys and will complement previous geophysical surveys. The proximity of the seismic runs to the shoreline of St. George's Bay will be determined by safe vessel operating practices, other use conflicts and environmental sensitivities.

The 2-D seismic survey ship will tow a sound source (airgun array) and streamer(s) composed of receiving hydrophones. The actual survey lines have not been designed at this time

Details of the seismic survey equipment parameters are provided in Appendix 1.

Although the environmental assessment has not been completed, it is anticipated that mitigation procedures will include a dedicated Marine Mammal Observer (MMO), "soft starts " or "ramp-ups" of the 2-D array in order to avoid disturbance to marine life, particularly marine mammals and species at risk, a Fisheries Liaison Officer (FLO) and a communications strategy and procedures to avoid conflicts with fishery and other uses.

DLO&G will be using the approach to environmental planning, mitigation and reporting measures for marine seismic surveys as described in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines (May 2008)* issued by C-NLOPB. This includes compliance with:

- the *Statement of Canadian Practice with Respect to the Mitigation of Sound in the Marine Environment*;
- recommended practices for interaction with other ocean users, particularly fisheries interests; and

- seabird and marine mammal observation program using the protocols outlined in ESRF Report #156 – *Recommended Seabird and Marine Mammal Observation Protocols for Atlantic Canada (2004)*.

2.4 SURVEY VESSEL

The survey vessel selected for this project is the MV Nordic Explorer owned by PGS, a member of the Exploration Group.

The MV Nordic Explorer is a state-of-the-art seismic research vessel, with a crew of 30 to 50 people. On this survey, the vessel will employ Geo-Streamer dual sensor acquisition technology to acquire closely spaced 2D seismic data.

The MV Nordic Explorer has a cruising speed of 10 knots while in transit (with gear onboard) and a vessel speed of approximately 4.5 knots when the survey gear is deployed.

It is estimated that the survey vessel will require a turning radius of 2.5 to 3 kilometres outside the identified survey area. Seismic operations will generally continue up to a Sea State of 5 or wave heights of about 3 m.

Specifications on the MV Nordic Explorer are provided in Appendix 1.

2.5 LOGISTICS & SUPPORT

Logistical operations to support the geophysical program will largely be based in St. John's and Stephenville, NL or other western Newfoundland port.

Helicopters

Helicopters may or may not be utilized depending on type of helicopter available and the final program design.

Shore Base

A shore base and supply area will be established in the Port of Stephenville or other western Newfoundland port.

Support Vessels

Supply vessels may be utilized for crew changes and supply of materials and consumables. Also, it is possible the seismic vessel may interrupt its geophysical program for logistical requirements.

The MV Nordic Explorer will be accompanied by a chase boat that scouts for other vessels or fishing gear that may interact with the survey while underway. The bridge crew on the seismic

vessel will maintain close surveillance of approaching vessels. Radar reflectors are attached to the streamers for detection by other vessels.

2.6 ROUTINE DISCHARGES

Discharges and emissions from this program will be similar to those of any standard marine vessel. They will be minor and could include the following:

- **Atmospheric Emissions** - emissions from ship engines and onboard equipment will comply with the Air Quality Management (Newfoundland and Labrador Environmental Protection Act) and the Ambient Air Quality Objectives (Canadian Environmental Protection Act).
- **Ballast Water** - ballast water is stored in dedicated ballast tanks to improve vessel stability. No oil will be present in these tanks or in any discharged ballast/preload water. If oil is suspected to be in the water, it will be tested and, if necessary, treated to ensure that oil concentrations in the discharge do not exceed 15 mg/L as required by the MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships, 1973, and the Protocol of 1978 related thereto), International Maritime Organisation (IMO) and the Offshore Waste Treatment Guidelines (OWTG) (NEB et al. 2002).
- **Bilge Water** - Bilge water often contains oil and grease that originate in the engine room and machinery spaces. Before discharge, bilge water is treated in accordance with MARPOL 73/78, IMO and OWTG, using an oil/water separator. The extracted water is tested to ensure that the discharges contain no more than 15 mg/L of oil.
- **Grey and Black Water** - It is anticipated that the survey ship will carry a crew of 30 to 50 people. For accommodating about 100 people, Mobil (1983) estimated that grey water discharge (showers, dishwashing, deck drains, etc.) would be 40 m³/d and that black water discharge would be 19 m³/d. The survey vessel should produce less than half of this volume. Sanitary and food wastes will be macerated to a particle size of 6 mm or less and then discharged as per the OWTG.
- **Solid Waste** - All solid waste will be transferred to shore and disposed of at an approved on-shore-based facility. Any hazardous materials (e.g., oily rags) will be handled separately in hazardous materials containers.

2.7 ACCIDENTAL EVENTS

There will be limited amounts of marine fuel and lube oil on board that could potentially be spilled to the ocean.

The MV Nordic Explorer will utilise a solid-streamer technology, as this type of streamer is not reliant on floatation fluid to achieve a neutral ballast state. This will minimize risks of accidental spills or incidents.

Accidental spills will be reported to the C-NLOPB and the Canadian Coast Guard as soon as operational conditions allow.

Other accidental events could include damage or loss of seismic gear, entanglement of seismic gear with fishing gear, and vessel collisions. Best management practices will be used on the

seismic vessel to avoid gear loss or damage. Gear will be retrieved from the water if wave heights reach or exceed unacceptable limits. In case of severe weather, the vessel may return to shore until conditions improve.

A trained Fisheries Liaison Officer will be on board during the seismic program to liaise with fishers who may have gear deployed in the Project Activity Area, in order to ensure effective and ongoing communication and avoid unnecessary gear conflicts and possible vessel collisions.

Entanglement of marine mammals in seismic gear is not likely since streamers have no tangle gear and marine mammals are expected to avoid the vessel during operations. The onboard Marine Mammal Observer will be trained to keep watch for marine mammals during the program.

2.8 HEALTH & SAFETY

DLO&G will submit a Safety Plan to the C-NLOPB outlining the company's commitment and philosophy toward ensuring personnel's health and safety are first and foremost in all DLO&G operations.

3.0 SETTING OF ENVIRONMENTAL COMPONENTS

A number of studies have already been performed in the area which will be key references to the environmental assessment (EA) that DLO&G will be preparing. These are:

- Western Newfoundland and Labrador Offshore Area Strategic Environmental Assessment and associated amendment (C-NLOPB 2005 and 2007);
- PDIP's Port-au-Port Bay Exploration Drilling Program Environmental Assessment and the associated addendum (LGL 2007);
- Tekoil's Port-au-Port Seismic Program Screening Report (Jacques Whitford 2007); and
- NWest Energy's Environmental Assessment of Geophysical Surveys for Exploration Licence's 1097, 1098, 1103 and 1104 Western Newfoundland (Conestoga-Rovers and Associates 2008).

The Western Newfoundland and Labrador SEA Report concluded that petroleum exploration activity generally can proceed in the Western Newfoundland and Labrador Offshore Area with the application of standard mitigation measures currently applied to offshore exploratory activities elsewhere in the NL offshore.

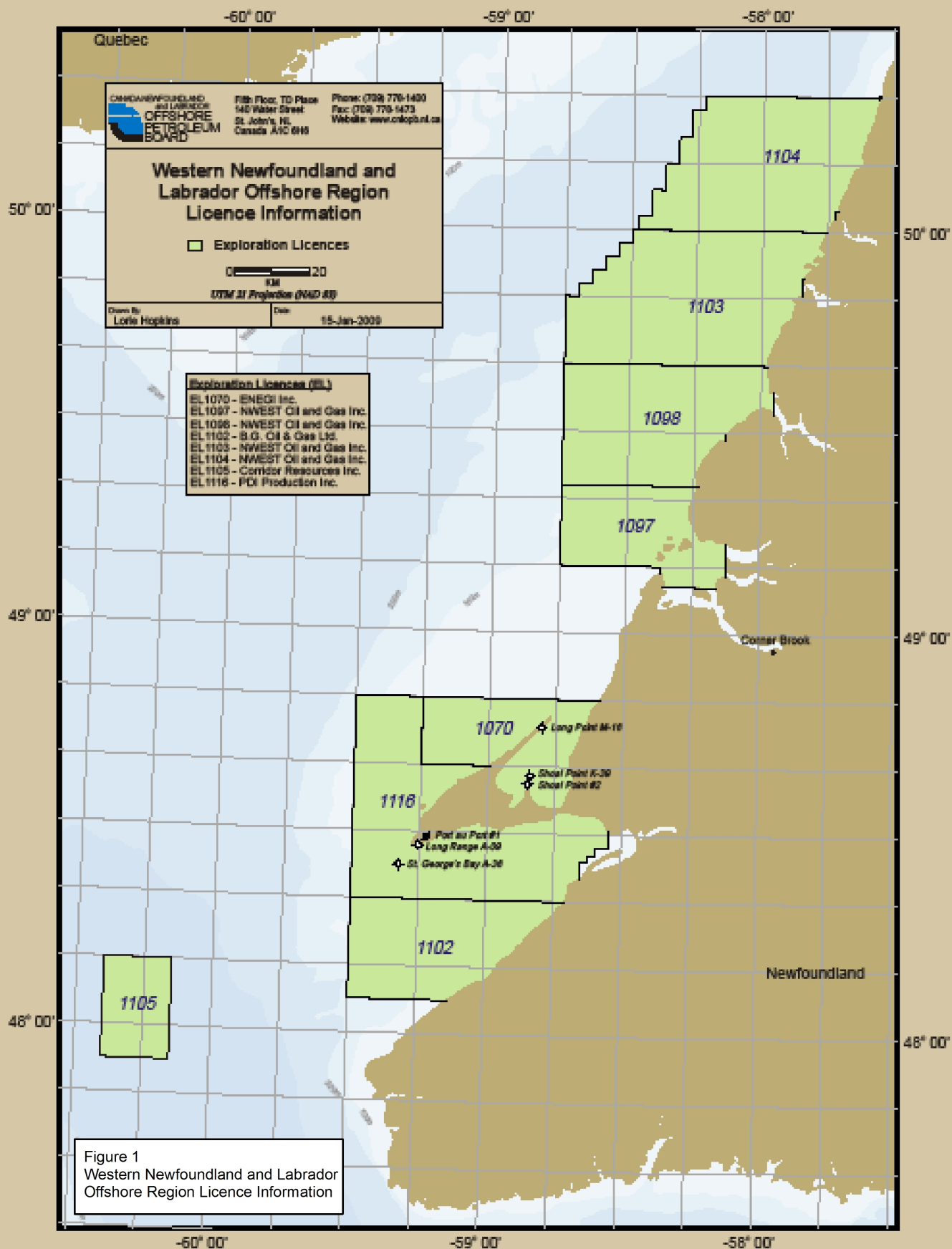
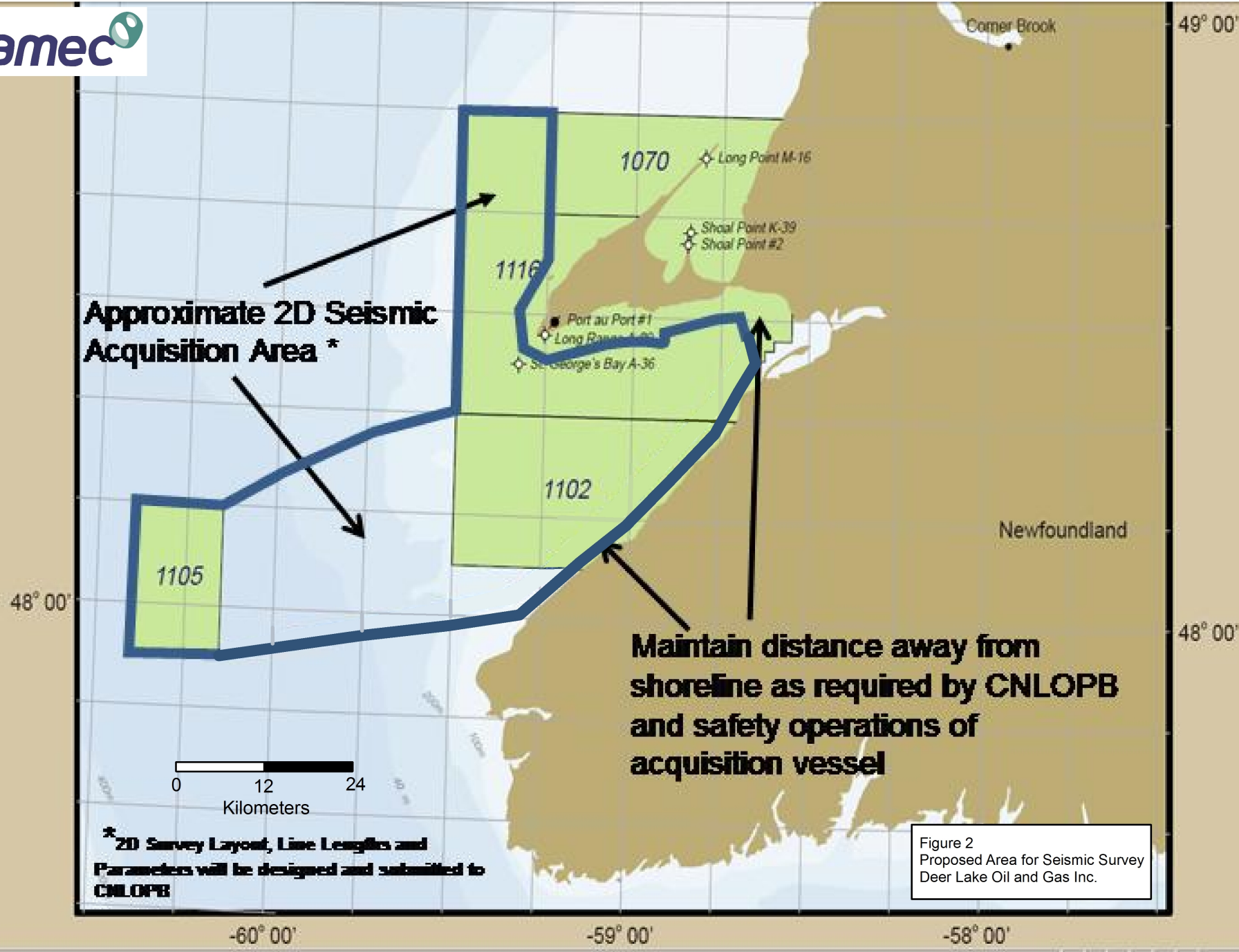


Figure 1
Western Newfoundland and Labrador
Offshore Region Licence Information



APPENDIX 1

NORDIC EXPLORER MARITIME AND SEISMIC SPECIFICATION



Nordic Explorer Maritime and Seismic Specification



Maritime Specification Summary

Name	: Nordic Explorer
Operator	: PGS
Maritime operator	: PGS Geophysical AS
Flag	: Bahamas
Port of registry	: Nassau
Builder and date built	: Langsten 1993 (86)
Vessel classification society and notations to class	: DNV +1A1, E0, HELDK, ICE 1A
Call sign	: C6TU3
IMO number	: 8517449

Vessel Dimensions

Length	: 81.1 m
Breadth	: 16.5 m
Draft	: 8.0 m (Aft loaded to summer)



Vessel Tonnage

Gross (IMO-69)	: 3861 tonnes
Net	: 1159 tonnes

Vessel Capacities

Fuel	: 1050 cu.m
Maximum endurance (shooting)	: ~ 35 days
Vessel speed (cruising)	: 11 knots (max 12 knots)
Main propulsion systems	: Wichman 12V28B, 3960kW
Auxilliary thrusters	: Bow - Brunvoll 360 kW : Stern - Brunvoll 590 kW : Azimuth 1 - Brunvoll 850 kW : Azimuth 2 - Brunvoll 850Kw

Fresh water maker capacity	: 12 m3/day
Reverst Osmosis plant	: 15 m3/day
Accommodation	: 56
Helideck	: Diameter 19m (Super Puma 332/Bell 212ST)

Communication Systems

Satellite Inmarsat C Bridge	: Tlx 4311 77810
Satellite Inmarsat B Bridge	: Tel. 00873 331177810 / Fax 00873 331177812
NorsatB Bridge	: Tel. +47 67 51 50 61

Navigational Aids

Radio direction finder	: Taiyo ADDF TDL1100
Helicopter directional beacon	: Skanti TU 8250
Radar	: 1 x Furuno FR 2110, 1 x Furuno FR 2835
Auto pilot	: Robertson AP 9 MK III, Robtrack & RPM system
Heading sensor	: SG Brown 1000S, Seapath 200, SG Brown 1000B

Vessel Fire Fighting Equipment

Fire detection system	: Servoteknikk MFT- 802
Pumps	: 3 engine room (bridge / local control)
Hydrants and hoses	: 25 x hydrants 25 x 25 meter hoses
Inert gas fixed systems	: CO2 engineroom, cable repair, incinerator room, compressor room
Foam deluge system	: Streamerdeck
Portable fire extinguishers	: 51 x powder, 10 x water, 17 x CO2, 7 x foam



Vessel Safety and Survival

Fireman's outfits	: 12
Breathing apparatus	: 8
Lifeboats	: 0, certificate of exemption, extra liferafts instead.
Life rafts	: 11 x 20 people, 2 x 12 people
MOB craft	: 1 x 6 people
Life jackets	: 114
Survival suits	: 56
Life buoys	: 13

HSE

Full compliance with SOLAS, Marpol 73/78 and other relevant maritime and industrial standards, E&P Forum and IAGC requirements. Further documentation and certification available on request.

Seismic Specifications

Streamer System

Manufacture and type	: PGS RDH Solid Digital
Skin material	: Polyurethane
Outside diameter	: 62 mm
Length of each group	: 12.5 m
Streamer set-up	: Typical 6 x 6000m
Manufacture and type of hydrophones	: Teledyne T2 BX
Type of array (e.g. linear, binomial)	: Linear
Number of hydrophones per group/ distance apart	: 16 per 12.5 m
Coupling between phones and pre-amp	: Capacitive
Sensitivity of near group at 1/P to recorder	: 20 V/Bar
Sensitivity of far group at 1/P to recorder	: 20 V/Bar
Bandwidth over which above sensitivities apply	: Specified at 100 Hz
Availability of shoreside spares if required	: Pool system
Manufacturer and type of depth controller	: Digicourse 5011
Manufacturer and type of compass	: Digicourse 5011

Recording System

Manufacturer, type	: Hydrosience, SeaTRACK 24 bit
Number of seismic and auxiliary channels	: Typical 6 x 480 + 48
Format(s) available	: SEG-D
Tape drives	: IBM 3590
Samples rates	: 0.5ms, 1 ms, 2 ms, 4 ms
High cut filters available	: 824Hz, 412Hz, 206Hz, 103Hz,
Low cut filters available	: 4.6Hz at 6dB per octave
Auxiliary channels allocation	: Typically recorded as separate streamer



Telemetry systems pre-amp gain	: 12 dB
Telemetry systems array forming capabilities	: Optional

Energy Source

Manufacturer and type	: Soder G-gun
Effective volume of standard array(s)	: up to 2 x 3090 cu.in
Maximum number of sub-arrays	: 6
Standard array depth(s)	: 5 - 7.5 m
Position of depth transducers	: Front and tail of subarray
Working pressure (maximum)	: 2000 psi
Type of firing sensors	: Moving coil
Position of firing sensors	: Each gun
Type of firing synchroniser unit	: Syntron GCS-90
Timing resolution	: 0.1 ms
Timing accuracy	: +/- 0.1 ms
Position of near/far field phones	: At each gun or cluster
Air compressors capacity	: 3x1483cfm
Number of air compressors	: 3

Navigation and Positioning Systems

Standard system	: Skyfix XP and Starfix Plus
Subcontractor	: Fugro Survey AS
Processing software	: Multifix and Starfix Suite

Relative GPS

Standard system	: Seatrack 220 and 320
Processing software	: Starfix Suite

Vessel Heading Sensors

GPS heading reference	: Seatex Seapath 200
Survey gyrocompasses, manufacturer/model	: 1 x SG Brown 1000B, 1 x SG Brown 1000S

Acoustic Ranging System

Manufacturer/model	: Sonardyne SIPS II
Frequency	: 55 - 110 kHz
Type of units	: XSRS, HGPS

Echosounder

Manufacturer/model	: Simrad EA 500
Frequencies	: 200 + 38 kHz
Maximum sounding depth	: 2200 m



Integrated Navigation Computer System

Type : SPECTRA
Supplier : Concept Systems Ltd
Hardware description : Linux Based PC's
Tape drives : IBM 3590

Binning System

Type : CENSUS
Supplier : Input/Output Inc.
Hardware description : Unix Based IBM RISC 6000 machines

Onboard Seismic Data Processing

Standard hardware configuration : IBM Bladecenter 14 blades – 28 cpus
Standard hardware capacity : 90 GFLOPs

SURVEY PROGRAMME – West Newfoundland	
Approximate Full Fold Line Km	2,000 to 5,000 km
Approximate Line Direction	Variable
Acquisition Start Date	Late Sept to mid October 2009
Anticipated End Date	Mid November to early December 2009

CONFIGURATION

Streamer Active length (m)	7050
Type	Solid Geostreamer Dual Hydrophone & Geophone Sensors
Number of hydrophone groups	564
Number of geophone groups	564
Hydrophone and Velocity sensor Group spacing (m)	12.5
Hydrophone Group length (m)	12.5
Streamer depth (m)	20
Nominal source/near trace offset (m) To be a multiple of the group interval as far as is reasonably practical	<150



RECORDING SYSTEM

Type	Hydrosience 24 bit
Number of seismic channels	Min 564
Number of auxiliary channels	48
Recording filters (2 ms sampling) Pressure Lo (Hz/db/Oct) Velocity Lo (Hz/db/Oct) Pressure Hi (Hz/db/Oct) Velocity Hi (Hz/db/Oct)	4.4Hz @ 12db/Oct 27.4Hz @ 12db/Oct 214Hz @ 341db/Oct 214Hz @ 341db/Oct
Sample rate (ms) (pressure and velocity data)	2
Record length (sec)	8
Format	SEG D 8036 3592 tapes
Hydrophone pre-amp gain	0 db
Geosensor pre-amp gain	12 db

SOURCES

Type	Bolt Airgun
Shot point interval (m)	25
Volume (in. ³)	4135
Operating pressure (psi)	≥2000
Peak/peak output (3-128 Hz) bar-m.	115.17
Primary-Bubble ratio (3-128 Hz)	11.35
No. of strings per array	3
Separation between strings (m)	8.4
Array geometry Depth (m)	9
Length (m)	14
Width (m)	16.8