

3-D Marine Seismic Program in and near EL 1092

Project Description

Prepared by



Prepared for



January 2006
Project No. SA882

3-D Marine Seismic Program in and near EL 1092 Project Description

Prepared by

**LGL Limited
environmental research associates
388 Kenmount Road
St. John's, NL
A1B 4A5
709 754-1992 (p)
709 754-7718 (f)
rbuchanan@lgl.com
www.lgl.com**

Prepared for

**Petro-Canada
235 Water Street
St. John's, NL
A1C 1B6**

**January 2006
Project No. SA882**

Table of Contents

	Page
Table of Contents.....	ii
List of Figures.....	ii
1.0 Introduction.....	1
2.0 Relevant Legislation and Regulatory Approvals.....	1
2.1. Canada Newfoundland Benefits.....	3
2.2. Contacts.....	3
2.2.1. Executive Contact Information.....	3
2.2.2. Geophysical Contact.....	3
2.2.3. Environmental Contact.....	4
3.0 Proposed Project.....	4
3.1. Name and Location.....	4
3.1.1. The Operator.....	4
3.2. Project Overview.....	5
3.2.1. Alternatives to Project, Alternatives within Project.....	5
3.2.2. Project Scheduling.....	6
3.2.3. Site Plans.....	6
3.2.4. Seismic Vessels.....	6
3.2.5. 3-D Seismic Survey.....	6
3.2.6. Logistics/Support.....	7
3.2.7. Waste Management.....	7
3.3. Project Site Information.....	7
3.3.1. Environmental Features.....	8
3.3.2. Physical Environment and Effects on the Project.....	8
3.3.3. Fish and Fish Habitat.....	8
3.3.4. Species at Risk.....	8
3.4. Other Users.....	9
3.4.1. Fisheries.....	9
3.4.2. Navigable Waters.....	9
3.4.3. Consultations.....	9
3.5. Effects of the Project on the Environment.....	10
3.5.1. Spatial Boundaries.....	10
3.5.2. Temporal Boundaries.....	10
3.5.3. Valued Ecosystem Components.....	10
3.5.4. Environmental Monitoring.....	10
3.6. References Cited.....	11

List of Figures

Figure 1. Location of proposed 3-D seismic program for Petro-Canada.....	2
--	---

1.0 Introduction

Petro-Canada proposes to undertake a 3-D seismic survey in the Jeanne d'Arc Basin primarily in and near Exploration License (EL) 1092 (see Figure 1). Petro-Canada anticipates that the 3-D seismic survey may begin as early as May 2006 but depending on the availability of a seismic ship the survey may not be initiated until 2007, 2008, or 2009.

This document provides a Project Description to allow the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) to fulfill its responsibilities under the *Canadian Environmental Assessment Act Federal Coordination Regulations*. This Project Description together with the technical and scope advice received from the C-NLOPB and other Federal Agencies through the *Federal Coordination Regulations* and from other stakeholders consulted by Petro-Canada will guide the preparation of a Screening Level Environmental Assessment.

2.0 Relevant Legislation and Regulatory Approvals

An *Authorization to Conduct a Geophysical Program* will be required from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB or "Board"). The C-NLOPB is mandated by the *Atlantic Accord Implementation Acts*. Offshore geophysical surveys (including geohazard surveys) on federal lands are subject to screening under the *Canadian Environmental Assessment Act (CEA Act)*. The Board acts as the federal environmental assessment coordinator or FEAC. Because seismic survey activities have the potential to affect seabirds, marine mammals, and fish and fisheries, the Fisheries and Oceans and Environment Canada are the primarily interested agencies. Legislation that is relevant to the environmental aspects of this Project includes:

- *Canada-Newfoundland Atlantic Accord Implementation Acts*
- *Canadian Environmental Assessment Act*
- *Oceans Act*
- *Fisheries Act*
- *Navigable Waters Act*
- *Canada Shipping Act*
- *Migratory Bird Act*
- *Species at Risk Act*

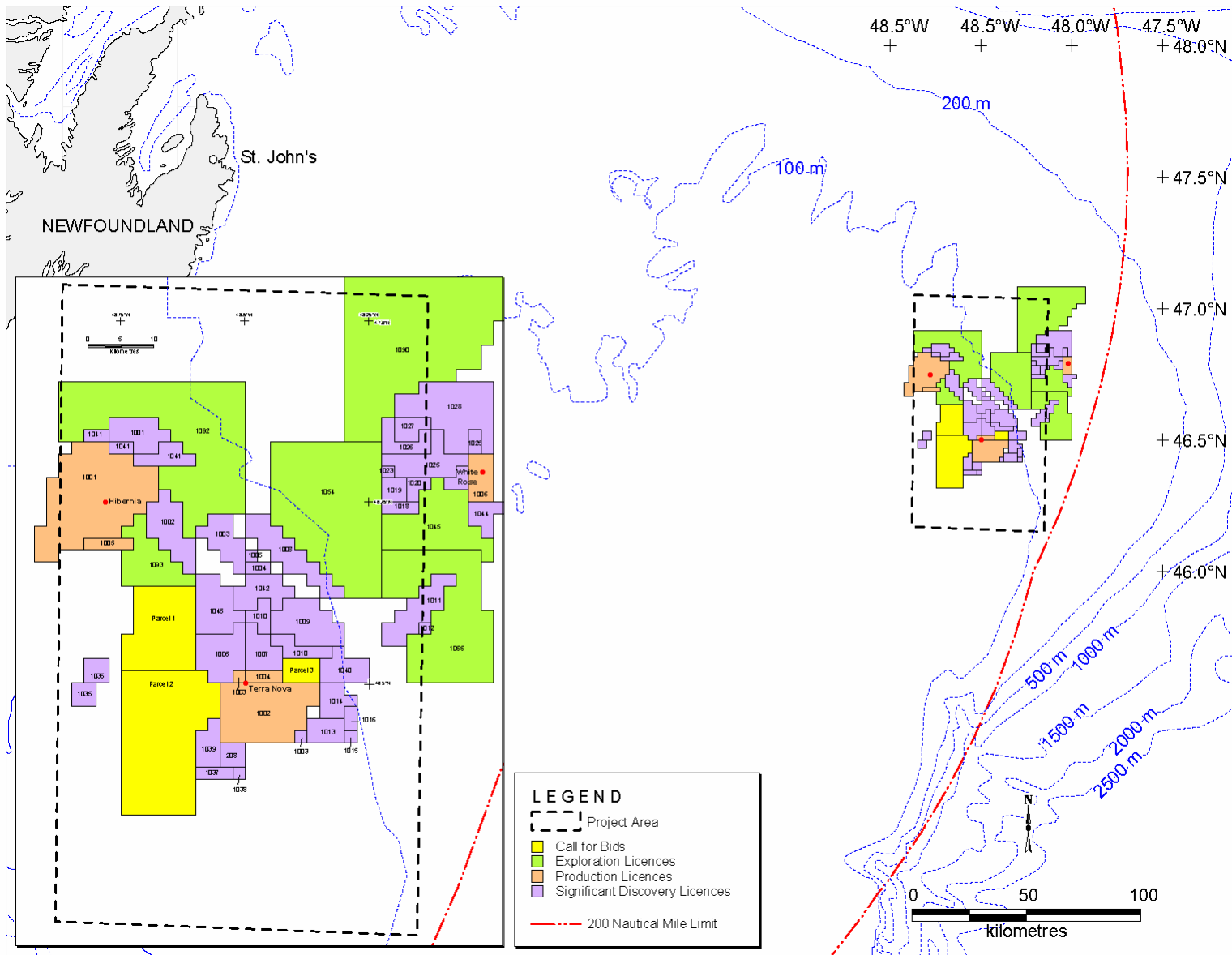


Figure 1. Location of proposed 3-D seismic program for Petro-Canada.

2.1. Canada Newfoundland Benefits

Petro-Canada is committed to bringing maximum benefits associated with East Coast operations to Canada, and in particular Newfoundland and Labrador, where commercially achievable in accordance with their operating philosophy and legislative requirements. In the spirit of the Atlantic Accord, Petro-Canada actively seeks to enhance the participation of Canadian, and Newfoundland and Labrador, individuals and organizations in offshore oil and gas activity on the East Coast. Petro-Canada's commitment to delivering benefits to the Province and to Canada is outlined in the Terra Nova Development Application Canada-Newfoundland Benefits Plan.

Petro-Canada manages East Coast operations from its St. John's office. Canadian, and in particular Newfoundland Labrador, individuals and organizations are provided with *full and fair opportunity* to participate in Petro-Canada's activities on the East Coast. Petro-Canada also supports the principle that *first consideration* be given to personnel, support and other services that can be provided by Newfoundland and Labrador, and to goods manufactured in Newfoundland and Labrador, where such goods and services are competitive in terms of fair market price, quality and delivery. Contractors and Subcontractors working for Petro-Canada on its East Coast operations must also subscribe to and apply these principles in their own operations.

2.2. Contacts

2.2.1. Executive Contact Information

Mr. Derek Evoy, Exploration Manager, Petro-Canada Frontier
Petro-Canada
2608 150-6th Ave S.W.
Calgary, Alberta
T2P 3E3
Phone: (403) 296-5490
Email: devoy@petro-canada.ca

2.2.2. Geophysical Contact

Mr. Bob Wilson
Geophysical Operations
Petro-Canada
2212 150-6th Ave S.W.
Calgary, Alberta
T2P 3E3
Phone: (403) 296-3731
Email: BWilson@petro-canada.ca

2.2.3. Environmental Contact

Ms. Francine Power-Wight
Petro-Canada
235 Water Street
St. John's, NL
A1C 1B6
Phone: (709) 778-3726
Email: fwight@petro-canada.ca

3.0 Proposed Project

3.1. Name and Location

The EL 1092 Seismic Program application covers the C-NLOPB exploration license 1092 and potentially other areas within the Project Area (see Figure 1). The x,y coordinates of the Project Area in NAD 83 Zone 22 coordinates are:

NW Corner: 47.051° N, 48.867° W
NE Corner: 47.034° N, 48.131° W
SW Corner: 46.169° N, 48.881° W
SE Corner: 46.150° N, 48.153° W

At present, the defined Project Area includes space to accommodate a seismic vessel turning radius.

3.1.1. The Operator

Petro-Canada is one of the largest integrated oil and gas companies in Canada, with significant international interests. Headquartered in Calgary, Alberta, Petro-Canada (the Operator) is a Canadian-based integrated energy company serving global customers, committed to maximizing returns to its shareholders in an ethical and socially responsible way, through the dedicated effort of its people.

The Operator is the management and operating company for the Operator's 10 Significant Discovery Licenses, three Production Licenses, and four Exploration Licenses, offshore Newfoundland. The Terra Nova field, the largest of the Operator's Significant Discovery Areas, is estimated to contain approximately 370-470 million barrels of recoverable reserves. Petro-Canada is also a major partner in the Hibernia and White Rose Developments.

3.2. Project Overview

The proposed 2006 Project is a ship-based geophysical program consisting of approximately 490 km² of 3-D survey. The survey will be within and near Petro-Canada EL 1092 (see Figure 1) and will occur either in 2006, 2007, 2008, or 2009. Some adjacent lands are also included as part of the overall Project Area in order to ensure inclusion of ship turning, and to allow for a change in size and direction of the survey if new information indicates a change is required for 2007, 2008, or 2009 (Figure 1).

The survey will most likely be conducted by a “piggy-back” charter on a seismic vessel or vessels that will be operating in Newfoundland and Labrador waters during 2006-2009. Most of these vessels have previously been assessed as part of other operators’ seismic programs and will be assessed again for the coming seasons. The vessels will be approved for operation in Canadian waters and are typical of the worldwide fleet. The specific vessel has not yet been selected through the bidding process.

The 3-D seismic survey ship will tow a sound source (airgun array) and streamer (s) composed of receiving hydrophones. Survey lines in 2006 will likely run approximately north-south and spacing between survey lines will be determined upon selection of a seismic contractor.

Proposed mitigation procedures will follow those recommended by the Board in Appendix 2 of *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (CNOBP 2004), including ramp up (i.e., soft start) of the airgun arrays, the use of dedicated Marine Mammal Observer(s) (MMOs) to monitor marine mammals and turtles and implement shut downs of the surveys when appropriate, and the use of a fisheries liaison officer (FLO) and communication procedures to avoid conflicts with the fishery.

3.2.1. Alternatives to Project, Alternatives within Project

The existing 2-D seismic indicates that at a minimum two targets, one of which is a complex stratigraphic feature and another a poorly defined structural feature, may contain significant volumes of producible hydrocarbons. There is potential for more targets. The existing seismic data does not permit the exact size and internal complexity of the targets to be identified. Acquisition of new 3-D seismic is required to determine if exploration drilling is warranted.

Petro-Canada has exploration commitments EL1092. The 3-D seismic survey is now a standard precursor to offshore exploratory drilling. It lessens the chances of expending resources “drilling dry holes” and increases safety. As such, currently, there is no alternative to the 3-D seismic program other than to incur financial penalties and explore for oil and gas elsewhere.

Viable alternatives within the Project are essentially the choices between different contractors’ ships and survey equipment which are presently being evaluated through the bid evaluation process.

3.2.2. Project Scheduling

The proposed survey may occur between 1 May and 30 November of 2006, 2007, 2008, or 2009. The duration of the survey is estimated at 22-35 days.

3.2.3. Site Plans

A site map showing the Project Area is provided in Figure 1. It is anticipated that full-fold seismic data will be acquired in a 490 km² area primarily in and near EL1092. There will be 50-60 prime sail lines (not including infill data) for the 2006 survey, if data acquisition occurs in 2007, 2008, or 2009, this number could change.

The type of seismic vessel under consideration accommodates approximately 40-60 personnel. Personnel on seismic vessels typically include individuals from the Operator (i.e., Petro-Canada), the vessel owner/operator (ship's officers and crew), and the various technical and scientific personnel from a variety of contractors and subcontractors.

3.2.4. Seismic Vessels

Vessels presently approved and operating on the East Coast on other programs will be utilized. Vessel specifics will be provided once the contractors are selected. Most, if not all likely survey vessels have diesel-electric propulsion systems (main and thrusters) and operate on marine diesel.

3.2.5. 3-D Seismic Survey

As described above, Petro-Canada will utilize a seismic vessel already operational in East Coast waters. The acoustic source will consist of two airgun arrays, each with a maximum total volume of 5800 cubic inches (in³) spaced a maximum of 50-m apart, and towed at depths about six to seven metres. The airgun arrays will operate in a 'flip-flop' arrangement with a shotpoint interval of 18.75 m or 25 m. The airguns will be operated with compressed air at pressures of 2000 to 2500 psi. There will likely be eight or 10 towed streamers (strings of hydrophone sound receivers), typically 5000 to 6000 m in length that will be towed behind the vessel at depths of 7-8 m. The maximum width of the towed streamers would be 700 m. Sail lines will likely run approximately north-south with spacing between survey lines dependent upon the number of streamers. Streamer flotation will be either solid or liquid (Isopar) depending upon availability from specific contractors.

Detailed specifications will be provided when the contractor is selected.

3.2.6. Logistics/Support

3.2.6.1. Vessels

As noted above, primary support will be provided by a chartered seismic survey vessel.

In order to mitigate any potentially adverse effects on marine animals, the fisheries, and other vessel traffic, a mitigation plan will be developed as part of the Project. A standby or picket vessel may be required as mitigation. This vessel would be used as an additional method of obtaining information on fishing activity in the area and in warning other vessels in order to avoid gear losses for all parties.

3.2.6.2. Helicopters

The larger seismic vessels are usually equipped with a helicopter platform and helicopters are often used for crew changes and light re-supply. In some cases, survey contractors may prefer to come to shore for crew changes and re-supply.

3.2.6.3. Shore Base

Petro-Canada and contractors maintain offices and shore facilities in St. John's. However, some seismic contractors may prefer to crew change or re-supply in other existing Newfoundland ports, presumably on the Avalon Peninsula because of proximity to the Project Area. No new shore base facilities will be established as part of this Project.

3.2.7. Waste Management

Waste management aboard the seismic vessel will be implemented in a manner consistent with Petro-Canada's East Coast Waste Management Plan and the contracted vessels policies and procedures that will be reviewed against the Petro-Canada Plan. Petro-Canada's East Coast Waste Management Plan is currently on file with the C-NLOPB.

3.3. Project Site Information

Project location is on the northern Grand Banks, in the Jeanne d'Arc Basin, just east of the Hibernia development, primarily in and near EL1092 (Figure 1).

3.3.1. Environmental Features

The physical and biological environment of the northeastern Grand Banks has been described in previous large scale EAs such as the Hibernia EIS (Mobil et al. 1985), Terra Nova EA (Petro-Canada 1996), the White Rose Comprehensive Study and associated documents (Husky 2000, 2001), the Jeanne d’Arc Basin Screening EA for Drilling (Husky 2002), and the Husky 3-D Seismic EA (LGL Limited 2005).

3.3.2. Physical Environment and Effects on the Project

The physical environment of the northeastern Grand Banks has been described in previous large scale EAs. The physical environmental conditions that will be encountered within the Project Area will be within the range of conditions as described in those EAs. A brief summary of expected conditions will be included in the EA to follow.

Effects of the physical environment on the Project will be described and include those caused by wind, ice, waves, and currents.

3.3.3. Fish and Fish Habitat

The fish species that inhabit the Project Area and the other species and habitats that support them are expected to be typical of the Grand Banks for equivalent depths, substrates, and physical oceanographic conditions. These components of the ecosystem have been described in the previous EAs and will be summarized in the EA to follow.

3.3.4. Species at Risk

The Project Area is not known to contain any sensitive areas for species listed on Schedule 1 of the *Species at Risk Act* (SARA) but this issue will be examined in the EA to follow. Species that are legally protected under SARA (i.e., Schedule 1 ‘threatened’ or ‘endangered’) and which may occur in the Project Area include the following:

- Blue whale (*Balaenoptera musculus*) (Atlantic population) – endangered
- North Atlantic right whale (*Eubalaena glacialis*) – endangered
- Leatherback sea turtle (*Dermochelys coriacea*) – endangered
- Northern wolffish (*Anarhichas denticulatus*) – threatened
- Spotted wolffish (*Anarhichas minor*) – threatened

3.4. Other Users

3.4.1. Fisheries

The area of the Grand Banks that contains the Project Area supports a variety of commercial fisheries to be described in the EA to follow based on latest available DFO data. The most important fisheries, in terms of landed value, in and adjacent to the Project Area, are northern shrimp (mobile trawl fishery) and snow crab (fixed gear fishery).

A mitigation plan will be developed to avoid or at least lessen any potential effects on the commercial fishery. The plan will include such elements as good communications (e.g., fishery broadcast notifications, utilization of a FLO, etc.), avoidance of areas and times of heavy fixed gear use, a fishing gear compensation program, and potentially a picket vessel (i.e., a vessel that accompanies the seismic ship and scans for fishing vessels and gear). Consultations with the fishing industry will be undertaken through the established ONE OCEAN committee and directly with relevant fishing interests as necessary.

There are no recreational or aboriginal fisheries in or adjacent to the Project Area.

3.4.2. Navigable Waters

Other users of the navigable waters on the Grand Banks in addition to fishery vessels, include other oil industry-related vessels, transport and military vessels and the occasional private yacht.

3.4.3. Consultations

During the course of the assessment, Petro-Canada will consult with stakeholders with an interest in the Project. Those consulted and the results of those consultations will be in the environmental assessment report.

In order to assist in scoping the effects assessment and mitigation plan and to aid in addressing any issues of concern, Petro-Canada and consultants will undertake a consultation program with the following interested parties:

- Fisheries and Oceans
- Environment Canada
- ONE OCEAN
- Newfoundland and Labrador Natural History Society

- Fish, Food and Allied Workers (FFAW)
- Fishery Products International (FPI)
- Other relevant parties as identified

3.5. Effects of the Project on the Environment

The proposed geophysical Project will be well within the range of other programs routinely conducted on the Grand Banks and elsewhere. The Project is not expected to produce any adverse significant effects on the marine environment in or adjacent to the Project Area. Nonetheless, potential effects will be examined in detail with focus on the fishery, *SARA* species, marine mammals, and cumulative effects with other users of the area, particularly other seismic programs.

3.5.1. Spatial Boundaries

The regional scale study area boundaries will take into consideration those established for previous project assessments e.g., Hibernia, Terra Nova and White Rose Developments. The Project Area boundary is defined in Figure 1. It is proposed that seismic data may be acquired in any part of the Project Area, but that total seismic data acquisition will occur in a smaller area of approximately 500 km².

3.5.2. Temporal Boundaries

The temporal boundaries for the Project are May 2006 to November 2009 inclusive, with timing of seismic operations between 1 May and 30 November within any particular year. The duration of the survey is estimated at a total of 22-35 days.

3.5.3. Valued Ecosystem Components

The valued ecosystem components (VECs) will encompass, but may not be limited to, Marine Birds, Fish and Fish Habitat, Commercial Fisheries, Marine Mammals and Sea Turtles. In response to recent legislative developments, identification and evaluation of “species at risk” will form part of the assessment as a valued ecosystem component.

3.5.4. Environmental Monitoring

An environmental observer (s) will be on board the vessel to properly identify marine mammal species for mitigation purposes and to collect opportunistic data on marine mammal behaviour and distribution with and without airguns operating.

3.6. References Cited

- Husky. 2000. White Rose Comprehensive Study – Part One (Environmental Impact Statement).
- Husky. 2001. White Rose oilfield comprehensive study supplemental report responses to comments from Canada-Newfoundland Offshore Petroleum Board, Department of Fisheries and Oceans, Environment Canada, Natural Resources Canada and Canadian Environmental Assessment Agency. Submitted by Husky Oil Operations Limited (Operator). 265 p. + App.
- Husky. 2002. Husky Jeanne d’Arc Basin exploration drilling program description and environmental assessment. Prepared by LGL Limited in association with Oceans Limited, PAL and S.L. Ross. LGL Limited Report No. SA725 for Husky Oil, St. John’s. 188 p.
- LGL Limited. 2005. Northern Jeanne d’Arc Basin seismic program environmental assessment. LGL Rep. SA836. Rep. by LGL Limited, St. John’s, NL for Husky Energy Inc., Calgary, AB. 241 p.
- Mobil. 1985. Hibernia Development Project, Environmental Impact Statement. Volume IIIa: Biophysical Assessment. Mobil Oil Canada, Ltd. (Operator), Gulf Canada Resources Inc., Petro-Canada Inc., Chevron Canada Resources Ltd., and Columbia Gas Development of Canada Ltd. 258 p.
- Petro-Canada. 1996. Development application Terra Nova Development environmental impact statement. Prepared by Petro-Canada on behalf of Terra Nova proponents: Petro-Canada, Mobil Oil Canada Properties, Husky Oil Operations Limited, Murphy Oil Company Ltd., and Mosbacher Operating Limited.