1 Purpose

This document provides scoping information for the Environmental Assessment (EA) of the proposed Vertical Seismic Profiling (VSP) activities (the Project) in the Terra Nova Development in the Jeanne d'Arc Basin. Petro-Canada, the Proponent, is proposing to conduct VSP activities within the Terra Nova Development area about 350 km east-southeast of St. John's (see Figures 1 and 2 in the 2006 Project Description) and as described in the Project description "*Project Description of Vertical Seismic Profiling at the Terra Nova Development*" (LGL 2006). The VSP program will be conducted, as required, in support of ongoing delineation and production drilling at the Terra Nova Development. The purpose of the VSP activities is to tie in or ground-truth the geological data with geophysical data. VSP surveys typically occur during the summer season (although they could occur at any time throughout the year) and will continue on an as-needed basis for the life of the Terra Nova Development project.

Included in this document is a description of the scope of the Project that will be assessed, the factors to be considered in the assessment, and the scope of those factors.

2 Regulatory Considerations

The Project will require authorizations pursuant to Section 138 (1)(b) of the *Canada-Newfoundland Atlantic Accord Implementation Act* and Section 134(1)(a) of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act.*

The Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) has determined, in accordance with paragraph 3(1)(a) of the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements* (FCR), that an EA of the project under section 5 of the CEA Act is required.

Pursuant to Section 12.2(2) of CEA Act, the C-NLOPB is assuming the role of the Federal Environmental Assessment Coordinator (FEAC) for this screening and in this role will be responsible for coordinating the review activities of the expert government departments and agencies that participate in the review.

> ***The C-NLOPB intends the environmental assessment submitted with any supporting documents, as may be necessary, will fulfill the requirements for a Screening. The C-NLOPB, therefore, pursuant to Section 17 (1) of the CEAA, formally delegate the responsibility for preparation of an acceptable Screening environmental assessment to Petro-Canada, the Project proponent. The C-NLOPB will prepare the Screening Report, which will include the determination of significanc*e.**

3 Scope of the Project

Vertical seismic profiling consists of an airgun array sound source, typically less powerful than those used during routine seismic surveys, deployed at locations near the rig with receivers placed in the well. The sound source to be used at Terra Nova will include a four sleeve-gun tuned array comprised of 2x100 in^3 and 2x150 in^3 guns for a total volume of 500 in^3. The guns will be charged with nitrogen or compressed air, suspended at a constant depth of four to seven metres, depending on sea-state, and operated at 2,000 psi pressure. The 0-to-peak source level is 8.45 Bar-m, which converts to 238.5 dB re 1 µPa 0-P @ 1m; maximum output occurs between 20 and 140 Hz.

The Terra Nova VSP surveys may range from a zero-offset VSP (i.e., fixed distance from the wellhead) with the source deployed from the rig to a walkaway VSP (uniform intervals up to 5.0 km from the rig). Petro-Canada's preference is to use the Baker Atlas Multi-Level Receiver (MLR) tool as a receiver. The MLR tool is generally deployed with five receivers at a spacing of 15 metres between tools but can also be deployed with up to thirteen receivers, if required. The MLR tool can be used in both open hole and cased hole environments. Alternatively, a Slim-Hole Receiver tool is available if borehole conditions warrant its use. A normal job using the standard MLR configuration would result in the acquisition of up to 400 levels.

The VSP surveys will be conducted from the drill rig with the assistance of a typical standby supply vessel.

At each well, the survey would be a one-time event potentially occurring as early as July 2006 (and occurring over the life of the Project) and extend for eight to 36 hours per survey.

4 Factors to be Considered

The EA shall include a consideration of the following factors in accordance with Section 16 of CEA Act:

4.1 The purpose of the Project;

4.2 The environmental effects[1] of the Project, including those due to malfunctions or accidents that may occur in connection with the Project and any change to the Project that may be caused by the environment;

4.3 Cumulative environmental effects of the Project that are likely to result from the Project in combination with other projects or activities that has been or will be carried out.

4.4 The significance of the environmental effects described in 4.2 and 4.3;

4.5 Measures, including contingency and compensation measures as appropriate, that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;

[1] The term "environmental effects" is defined in Section 2 of the CEAA and Section 137 of the *Species at Risk Act*.

4.6 The significance of adverse environmental effects following the employment of mitigative measures, including the feasibility of additional or augmented mitigative measures;

4.7 The need for, and the requirements of, any follow-up programs in respect of the Project consistent with the requirements of the CEA Act and the SARA. (Refer to the Canadian Environmental Assessment Agency's 2002 "*Operational Policy Statement*" regarding Follow-up Programs[2]); and

4.8 Report on consultations undertaken by Petro-Canada with interested parties who may be affected by program activities and/or the general public respecting any of the matters described above that are received.

5 Scope of the Factors to be Considered

Petro-Canada will prepare and submit to the C-NLOPB an EA for the above-described physical activity, and as described in the Project description "*Project Description of Vertical Seismic Profiling at the Terra Nova Development*" (LGL 2006). The EA will address the factors listed above; the issues identified in Section 5.3, and document any issues and concerns that may be identified by the proponent through regulatory, stakeholder, and public consultation.

This survey is proposed for the Jeanne d'Arc Basin, which has been studied extensively in a number of recent EAs. The Terra Nova development underwent a joint Accord Act-CEA Act Panel review. In addition, over the last few years, Petro-Canada completed EAs for wellsite/geohazard surveys and VSP programs all within the Jeanne d'Arc Basin area. For the purposes of this assessment, the information provided in the EAs completed by Petro-Canada[3] can be used in support of the EA for the proposed seismic survey.

If the "Valued Ecosystem Component" (VEC) approach to focus its analysis is used in the EA, a definition of each VEC (including components or subsets thereof) identified for the purposes of environmental assessment, and the rationale for its selection, shall be provided.

The assessment of cumulative environmental effects should be consistent with the principles described in the February 1999 CEAA "*Cumulative Effects Assessment Practitioners Guide"* and in the March 1999 CEAA operational policy statement "*Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act"*. It will include a consideration of environmental effects that are likely to result from the proposed Project in combination with other projects or activities that have been or will be carried out. These include, but are not limited to:

- other seismic activities;

[2] CEA Agency Guidance documents and Operational Policy Statements are available on its web site: http://www.ceaa-acee.gc.ca/012/newguidance_e.htm#6.

[3] EA reports and addenda completed include: "Wellsite Geohazard Survey 2005, Environmental Assessment Terra Nova Development" (LGL 2005); "Wellsite Geohazard Survey Environmental Assessment Terra Nova Development (LGL 2004); "Vertical Seismic Profiling Environmental Assessment Terra Nova Development" (LGL 2004) "Terra Nova Environmental Impact Statement" (Petro-Canada 1996);

- fishing activities (including Aboriginal fisheries);
- other oil and gas activities; and
- marine transportation.

The scope of the factors to be considered in the EA will include, the components identified in Section 5.3 - Summary of Potential Issues, setting out the specific matters to be considered in assessing the environmental effects of the Project and in developing environmental plans for the Project, and the "Spatial Boundaries" identified below. Considerations relating to definition of "significance" of environmental effects are provided in the following sections.

Discussion of the biological and physiological environments should consider the data available for the Project and study area. Where data gaps exist, the EA should clearly identify the lack of data available.

5.1. Boundaries

The EA will consider the potential effects of the proposed physical activity within spatial and temporal boundaries that encompass the periods and areas during and within which the Project may potentially interact with, and have an effect on, one or more VECs. These boundaries may vary with each VEC and the factors considered, and should reflect a consideration of:

- the proposed schedule/timing of the seismic program;
- the natural variation of a VEC or subset thereof;
- the timing of sensitive life cycle phases in relation to the scheduling of seismic activities;
- interrelationships/interactions between and within VECs;
- the time required for recovery from an effect and/or return to a pre-effect condition, including the estimated proportion, level, or amount of recovery; and
- the area within which a VEC functions and within which a Project effect may be felt.

The proponent shall clearly define, and provide the rationale for, the spatial and temporal boundaries that are used in its EA. A 'Study Area' shall be clearly described in the EA report. Boundaries should be flexible and adaptive to enable adjustment or alteration based on field data. The Study Area will be described based on consideration of potential areas of effects as determined by the scientific literature, and project-environment interactions. A suggested categorization of spatial boundaries follows.

5.1.1 Spatial Boundaries

<u>Project Area</u>

The area in which seismic activities are to occur, and include the area of the buffer zone normally defined for line changes.

<u>Affected Area</u>

The area, which could potentially be affected by Project activities beyond the "Project Area".

Regional Area
The area extending beyond the "Affected Area" boundary. The "Regional Area" boundary will also vary with the component being considered (e.g., boundaries suggested by bathymetric and/or oceanographic considerations).

5.1.2. Temporal Boundaries

The temporal scope should describe the timing of Project activities for the life of the Terra Nova project, and an assessment of effects throughout this timeframe. Scheduling of Project activities should consider the timing of sensitive life cycle phases of the VECs in relation to physical activities.

5.2 Significance of Adverse Environmental Effects

The Proponent shall clearly describe the criteria by which it proposes to define the "significance" of any residual adverse effects that are predicted by the EA. This definition should be consistent with the November 1994 CEAA " *Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects"*, and be relevant to consideration of each VEC (including components or subsets thereof) that is identified. The effects assessment methodology should clearly describe how data gaps are considered in the determination of significance of effects.

5.3 Summary of Potential Issues

The EA will contain descriptions of the physical and biological environments and contain descriptions and definitions of EA methodologies. Where information is summarized from existing EA reports, the sections referenced should be clearly indicated. Effects of relevant Project activities on those VECs most likely to be in the Study Area will be assessed. Discussion of cumulative effects within the Project and with other relevant marine projects will be included. Issues to be considered in the EA will include, but not be limited to the following.

General

5.3.1 The methodology that the Proponent uses to assess environmental effects.

5.3.2 Identification, where possible, of testable hypotheses associated with the results of the assessment.

Air Quality

5.3.3 Air emissions associated with Project activities and any implications for health and safety of workers that may be exposed to them.

Physical Environment

5.3.4 Where appropriate, provide an update of meteorological and oceanographic characteristics of the Study Area, including extreme conditions, and any change to the Project that may be caused by the environment.

Marine Resources

5.3.5 Marine and/or Migratory Birds
Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- Spatial and temporal species distributions (observations from prior programs should be included);
- Species habitat, feeding, breeding, and migratory characteristics of relevance to the EA;
- Effects of petroleum spills from accidental events, including fluid loss from streamers;
- Attraction of birds to vessel lighting and the potential effects and mitigations;
- Procedures for handling birds that may become stranded on drill rigs or support vessels;
- Means by which bird mortalities associated with the Project operations may be documented and assessed;
- Means by which potentially significant effects upon birds may be mitigated through design, scheduling, and/or operational procedures; and
- Environmental effects due to the Project, including cumulative effects.

5.3.6 Marine Fish and Shellfish
Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- Characterization of the existing environment in the Study Area;
- Distribution and abundance of species utilizing the Study Area with consideration of critical life stages (e.g., spawning areas, overwintering, juvenile distribution, migration);
- Description, to the extent possible, of location, type, diversity and areal extent of marine fish habitat in the Study Area. In particular, those indirectly or directly supporting traditional, historical, present or potential fishing activity, and including any essential (e.g. spawning, feeding, overwintering) habitats;
- The means by which potentially significant effects upon fish and commercial fisheries may be mitigated through design, scheduling, and/or operational procedures; and
- Environmental effects due to the Project, including cumulative effects.

5.3.7 Marine Mammals and Sea Turtles
Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- Spatial and temporal distribution (observation and monitoring data collected during previous surveys should be discussed);
- Description of marine mammal lifestyles/life histories relevant to the Study Area;
- Distribution to/displacement of marine mammals and sea turtles due to noise and the possibility of ship strikes;
- Means by which potentially significant effects upon marine mammals/sea turtles (including critical life stages) may be mitigated through design, scheduling, and/or operational procedures; and
- Environmental effects due to the Project, including cumulative effects.

5.3.8 Species at Risk (SAR):
Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- A description, to the extent possible, of SAR as listed in Schedule 1 of the *Species at Risk Act (SARA)*, and those under consideration by COSEWIC in the Study Area, including fish, marine mammals, sea turtles, and seabird species;
- A description of critical habitat (as defined under SARA), if applicable, to the Study Area;
- Monitoring and mitigation, consistent with recovery strategies/action plans (endangered/threatened) and management plans (special concern);
- A summary statement stating whether Project effects are expected to contravene the prohibitions of SARA (Sections 32 (1), 33, 58(1)).
- Means by which adverse effects upon SAR and their critical habitat may be mitigated through design, scheduling, and/or operational procedures; and
- Assessment of effects (adverse and significant) on SAR and critical habitat, including cumulative effects.

5.3.9 "Sensitive" Areas
Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- A description, to the extent possible, of any "sensitive areas" in the Study Area, such as important or essential habitat to support any of the marine resources identified;
- Environmental effects due to the Project, including cumulative effects, on those "sensitive areas" identified; and
- Means by which adverse effects upon "sensitive areas" may be mitigated through design, scheduling, and/or operational procedures.

Marine Use

5.3.10 Noise/Acoustic Environment
Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- Disturbance/displacement of VECs and SAR associated with seismic activities;

- Means by which potentially significant effects may be mitigated through design, scheduling and/or operational procedures; and
- Effects of seismic activities (direct and indirect), including cumulative effects, on the VECs and SAR identified within the EA. Critical life stages should be included.

5.3.11 Presence of Seismic Vessel(s)

Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- Description of project-related traffic, including routings, volumes, scheduling and vessel types;
- Effects upon access to fishing grounds;
- Effects upon general marine traffic/navigation, including fisheries research surveys, and mitigations to avoid research surveys; and
- Environmental effects assessment, including cumulative effects.

5.3.12 Fisheries

Provide an update to the information presented in the environmental assessment reports and addenda completed by Petro-Canada for the Jeanne d'Arc Basin area. The information should include:

- A description of fishery activities (including traditional, existing and potential commercial, recreational and aboriginal/subsistence and foreign fisheries) in the Project and affected areas, where practical;
- Consideration of underutilized species and species under moratoria that may be found in the Study Area as determined by analyses of past DFO research surveys and Industry GEAC survey data, with emphasis on those species being considered for future potential fishers, and species under moratoria;
- Traditional historical fishing activity, including abundance data for certain species in this area, prior to the severe decline of many fish species (e.g., an overview of survey results and fishing patterns in the survey areas for the last 20 years);
- An analysis of the effects of Project operations and accidental events upon the foregoing. The analysis should include consideration of recent scientific literature on effcts of sesimic activity on invertebrate species, including identified data gaps;
- Fisheries liaison/interaction policies and procedures;
- Program(s) for compensation of affected parties, including fisheries interests, for accidental damage resulting from Project activities;
- Means by which adverse effects upon commercial fisheries may be mitigated through design, scheduling, and/or operational procedures; and
- Environmental effects due to the Project, including cumulative effects.

5.3.13 Accidental Events

- Discussion on the potential for spill events related to the use and maintenance of streamers.

- Environmental effects of any accidental events arising from streamers or accidental releases from the seismic and/or support vessels (e.g., loss of product from streamers). Cumulative effects in consideration of other oil pollution events (e.g., illegal bilge disposal) should be included.
- Mitigations to reduce or prevent such events from occurring.
- Contingency plans to be implemented in the event of an accidental release.

Environmental Management

5.3.14 Petro-Canada's environmental management system and its components, including, but not limited to:

- Pollution prevention policies and procedures;
- Fisheries liaison/interaction policies and procedures;
- Program(s) for compensation of affected parties, including fisheries interests, for accidental damage resulting from Project activities; and
- Emergency response plan(s).

Biological and Follow-up Monitoring

5.3.15 Discuss the need for and requirements of a follow-up program (as defined in Section 2 of CEA Act) and pursuant to the SARA. The discussion should also include any requirement for compensation monitoring (compensation is considered mitigation).

Details regarding monitoring and observation procedures to be implemented regarding marine mammals and seabirds (observation protocols should be consistent with the C-NLOPB Geophysical, Geological, Environmental and Geotechnical Program Guidelines (April 2004) respecting VSP programs.