Hebron Field

2010 Geohazard Survey Program

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1 Introduction

ExxonMobil Canada Properties (the Operator), on behalf of the Hebron Project Proponents: ExxonMobil Canada Properties, Chevron Canada Limited, Petro-Canada Hebron Partnership, StatoilHydro Canada Ltd, and Nalcor Energy - Oil and Gas Inc, is proposing to undertake a wellsite geohazard survey and sediment sampling over the Hebron Unit (see figure 1-1). The wellsite survey is to identify any potential shallow gas hazards in the location of the proposed Hebron production facility.

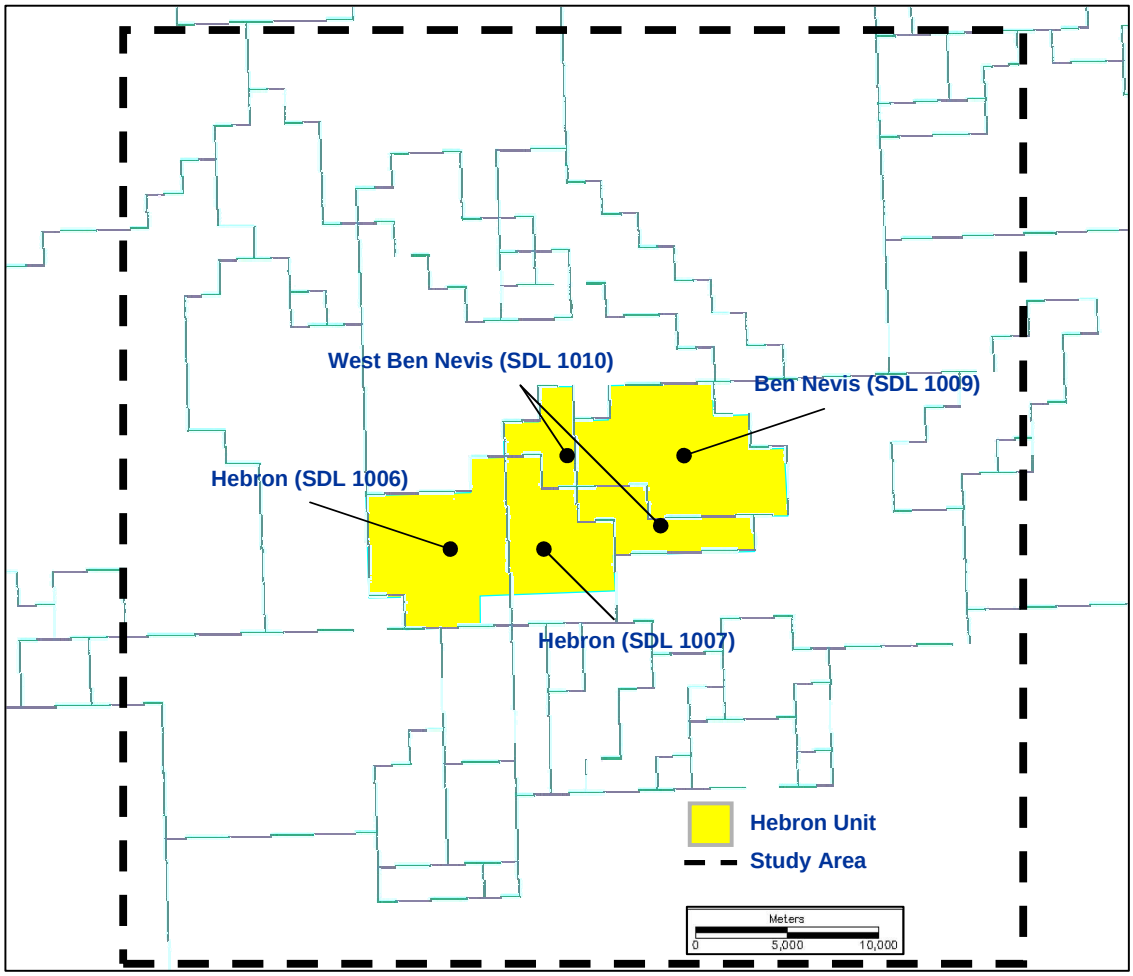

Figure 1-1 Hebron Geohazard Study Area

This document provides an overview of the Hebron geohazard project to assist the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) fulfill its requirements under the *Canada-Newfoundland Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Implementation Newfoundland and Labrador Act* (the "Accord Acts") and the *Canadian Environmental Assessment Act* ("CEAA") for the issuance of a geophysical authorization. This project description will assist the C-NLOPB and Federal Authorities in determining

the nature of their participation in an environmental assessment of the Hebron Geohazard Program.

1.1 Project Proponents

The Hebron Project proponents have varying participating interests in the four SDLs comprising the Hebron Unit, but share the cost of project activities as follows:

Table 1-1 Owners' Participating Interest

Owners	Share (%)
ExxonMobil Canada Properties	36.0
Chevron Canada Limited	26.7
Petro-Canada Hebron Partnership	22.7
StatoilHydro Canada Limited	9.7
Nalcor Energy - Oil and Gas Inc.	4.9

ExxonMobil Canada Properties is the Operator of the Hebron Project, and is Operator for the proposed geohazard program.

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2 Regulatory Framework

Offshore oil and gas exploration and development activities in the Newfoundland and Labrador offshore area are regulated under the Accord Acts.

An Authorization to Conduct a Geophysical Program will be required from the C-NLOPB. Pursuant to the CEAA, the C-NLOPB is required to conduct an environmental assessment of a proposed project before it can issue the requisite authorization. The Project is listed on the *Inclusion List Regulations* under the CEAA, and therefore a screening level of environmental assessment is required.

The C-NLOPB, as the Responsible Authority under CEAA, will coordinate the federal EA review process. Seismic surveys have the potential to interact with seabirds, marine mammals, and other commercial users (fisheries), therefore, it is likely that Environment Canada and the Department of Fisheries and Oceans will be Federal Authorities in the environmental assessment.

Other legislation that may be relevant to the environmental aspects of this Project include:

- *Oceans Act*
- *Fisheries Act*
- *Navigable Waters Act*
- *Canada Shipping Act*
- *Migratory Bird Act*
- *Species at Risk Act (SARA)*

3 Proposed Project

The Hebron Geohazard Survey will be carried out in the Hebron Unit area located in the Jeanne d'Arc Basin (centered at approximately 46º33'N, 48º30'W), approximately 340 km offshore of St. John's, Newfoundland and Labrador (see Figure 1-1). The water depth in this area ranges from 88 to 102 m. The Hebron Unit contains three discovered fields: the Hebron Field; the West Ben Nevis Field; and the Ben Nevis Field.

ExxonMobil Canada Properties, as operator of the Hebron Project, requires site-specific information at the proposed location of the Hebron GBS, the offshore loading system (OLS) flow-line route, and other areas within the Hebron Unit. The proposed geohazard survey will collect site specific information to identify potential drilling hazards such as pockets of shallow gas and steep or unstable substrates, potential construction hazards.

The study area, as shown in Figure 1-1, includes the Hebron Unit (SDLs 1006, 1007, 1009 and 1010) and encompasses additional areas surrounding the Hebron Unit to accommodate the turning radius required by a geophysical survey vessel.

The site survey data will be collected at one or more survey areas within the study area and may include the following activities:

- Side scan sonar
- Mutlibeam echosounder
- 2D High resolution seismic
- Sub-bottom profiler
- Magnetometer
- Seabed video
- Sediment grab samples

Surficial data, up to 100 m deep into the substrate, will be collected using a broad band (e.g., 500-Hz to 6-kHz) sparker or boomer as a sound source. A multi-beam echosounder will be employed to collect bathymetric data, seabed imagery will be collected using a dual frequency side scan sonar system. Seabed video and/or grab samples may be acquired to provide information on the character of the seabed and sediments.

Sediment samples, either taken by a grab sampler, a gravity corer or a box corer, may be collected at one or more locations in the Project Area. The number of core samples will be determined as project plans are finalized.

The geohazard survey will be undertaken by a contracted vessel, similar to other vessels used in the NL offshore for such surveys.

Mitigation procedures, consistent with those outlined in the C-NLOPB's "Geophysical, Geological, Environmental and Geotechnical Guidelines" (CNLOPB 2008) for geohazard programs will be implemented.

3.1 Project Scheduling

Survey activities will likely commence in May 2010. For each survey area (minimum of two, with possibility of additional areas), a typical geohazard program requires up to 7 days to complete. This Project will include the potential for survey activities to be carried out from May to December 2010, to allow for any scheduling delays that may occur.

3.2 Logistics and Support

Survey Vessel

The procurement of a contracted survey vessel is currently in progress. As of the date of this Project Description, ExxonMobil has sent out and is reviewing expressions of interests from national and international contractors capable of supplying these services. The vessel will likely be typical of vessels previously used to carry out geohazard surveys on the Grand Banks. A standby or picket vessel may also be required depending on program needs and/or mitigations to be employed.

Shore-based facilities

ExxonMobil maintains offices in St. John's. Existing shore-base facilities will be utilized where required. No new shore base facilities are required.

4 Environmental Overview

The physical and biological environment of the Northeast Grand Banks have been extensively described in numerous environmental assessments (e.g., "Hibernia Drill Centres Construction and Operations Program Hibernia Management and Development Company (HMDC)," JWL 2009; "Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008-2017 Environmental Assessment," LGL 2007; "Environmental Assessment of Petro-Canada Jeanne d'Arc Basin Exploration Drilling Program, 2009-2017," LGL 2009).

4.1 Physical Environmental Setting

The climate of the Grand Banks is dynamic and influenced by maritime, arctic and tropical air masses. The area typically has cold and dry winters (with respect to humidity) and cool and moist summers. Weather systems are often intense, and include a wide range of precipitation types, particularly in fall and winter. In winter, spring and fall, the dominant winds in the area are westerly and in summer, southwesterly.

Air temperatures in the vicinity of the Hebron Project Area are generally lower in summer and higher in winter compared to St. John's because of the oceanic environment. February is the coldest month and August is the warmest month both onshore and offshore.

The Grand Banks region is the wettest in eastern Canada, with over 1,000 mm of precipitation per year. The occurrence of precipitation is highest in January and lowest in July. Rainfall is most likely in autumn, with moderate to heavy rainfall occurring most frequently from September to January. Snow is most likely to occur in January through March. Moderate to heavy snowfall is most likely to occur in January and February. Fog frequently occurs in the Hebron Unit Area, with the foggiest period occurring between May and July. In July, the foggiest month, visibility is often reduced to less than 1 km.

Water depth in the area is in the range of 88 to 102 m. The highest waves occur from December to February.

Further discussion of the physical environment, and how the environment may affect project activities (i.e., effects from wind, waves, etc.) will be included in the environmental assessment.

4.2 Biological Environmental Setting

The substrate within the Hebron Unit is approximately 95% sand with a varying amount of gravel, silt and clay. Gravel content is lower in the southern half of the Hebron Unit Area (1.4 % gravel) than in the northern portion (6.2 % gravel).

The benthic community in the Hebron Unit area is dominated by polychaetes, bivalves, amphipods, echinoderms (sand dollars and starfish), and Tunaidacea.

The dominant commercial fish in the area include American Plaice, shrimp, snow crab, Iceland scallop. Other species occurring in the area include: sand lance capelin, mailed sculpin, sea urchin, sand dollar, soft-shelled clams, toad crab, and sea stars. Historically, the most abundant species in the vicinity of the Hebron Project were American Plaice and cod, but these species are also widely distributed throughout the Grand Banks.

4.2.1 Species At Risk.

Table 4-1 lists the species at risk, as identified on the SAR Schedule 1 that may occur in the project area.

Table 4-1: Species at Risk likely to occur in Project Area

Species Common Name	Species Scientific Name	SARA Status	COSEWIC Status
Fish			
Atlantic Cod (NL Pop)	*Gadus morhua*	No Status	Endangered
American Plaice	*Hippoglossoides platessoides*	No Status	Threatened
Atlantic Wolffish	*Anarhichas lupus*	Schedule 1 – Special Concern	Special Concern
Northern Wolffish	*Anarhichas denticulatus*	Schedule 1 - Threatened	Threatened
Spotted Wolffish	*Anarhichas minor*	Schedule 1 – Threatened	Threatened
Cusk	*Brosme brosme*	No Status	Threatened
Porbeagle Shark	*Lamna nasus*	No Status	Endangered
Blue Shark	*Prionace glauca*	No Status	Special Concern
Shortfin Mako	*Isurus oxyrinchus*	No Status	Threatened
White Shark	*Carcharodon carcharias*	No Status	Endangered
Marine Mammals			
Blue Whale	*Balaenoptera musculus*	Schedule 1 - Endangered	Endangered
Fin Whale	*Balaenoptera physalus*	Schedule 1 – Special Concern	Special Concern
Sowerby's Beaked Whale	*Mesoplodon bidens*	Schedule 3 – Special Concern	Special Concern
Killer Whale	*Orcinus orca*	No Status	Special Concern
Harbour Porpoise	*Phocoena phocoena*	Schedule 2 - Threatened	Special Concern
Birds			
Ivory Gull	*Pagophila eburnea*	Schedule 1 - Endangered	Endangered
Reptiles			
Leatherback Sea Turtle	*Dermochelys coriacea*	Schedule 1 - Endangered	Endangered

4.2.2 Marine Birds

The Grand Banks provides important habitat for millions of marine birds. Over 60 species have been reported. Approximately 19 of these species are pelagic and could occur in the Hebron Project Area. In the spring and summer, the most common species include the northern fulmar (*Fulmarus glacialis*), shearwaters (*Puffinus sp.*), storm-petrels (*Oceanites oceanicus*), jaegers (*Stercorarius sp.*), black-legged kittiwake (*Rissa tridactyla*), gulls (*Larus spp.*), skuas (*Catharacta skua*), and dovekies (*Alle alle*). The only marine bird species at risk likely to occur near the Hebron Project is the Ivory Gull (*Pagophila eburnea*).

4.2.3 Marine Mammals

Several species of whales may be found on the Grand Banks including humpback (*Megaptera novaeanliae*), minke (*Balaenoptera acutorostrata*), blue (*B. musculus*), fin (*B. physalus*), sei (*B. borealis*), Atlantic pilot, sperm (*Physeter catadon*), killer (*Orcinus orca*), and northern bottlenose (*Hyperoodon ampullatus*) (Petro-Canada 1995; Wiese and Montevecchi 1999). Many species are mostly summer residents, transients, or both. There are only a few permanent residents, including the Atlantic pilot whale (*Globicephala melaena*) (Nelson and Lien 1996; Waring et al. 2004). Seals occur year-round in waters off Newfoundland and Labrador, including populations of grey (*Halichoerus grypus*), harp (*Phoca groenlandica*) and hooded (*Cystophora cristata*) seals.

4.2.4 Sea Turtles

There are three species of sea turtles known to occur near the Hebron Geohazard Project Area: leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and Kemp's ridley (*Lepidochelys kempii*).

4.3 Commercial Fisheries

The northeastern Grand Banks supports a variety of commercial fisheries. Plans will be developed to avoid or lessen any potential effects on the commercial fishery. These plans may include elements such as effective communications, avoidance of areas during times of heavy fixed gear use, and a fishing gear damage compensation program.

5 Public Consultation

In support of project activities and the environmental assessment process, the Operator will engage with the C-NLOPB and federal regulatory authorities. The operator will proactively engage offshore fishers and the Fish Food and Allied Workers Union to inform them of project activities and solicit any concerns or comments on project activities. Other consultations will likely include members of the local environmental non-governmental organizations community, One Ocean, the Seafood Producers Association, and other parties that express an interest in the environmental aspects of the Project.

6 References

C-NLOPB. 2008 Geophysical, Geological, Environmental and Geotechnical Guidelines.

Jacques Whitford Limited. 2009. Hibernia Drill Centres Construction and Operations Program Hibernia Management and Development Company (HMDC).

LGL. 2007. Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008-2017, Environmental Assessment.

LGL. 2008. Environmental Assessment of Petro-Canada Jeanne d'Arc Basin Exploration Drilling Program, 2009-2017.