

**CANADA-NEWFOUNDLAND and LABRADOR OFFSHORE
PETROLEUM BOARD
CEAA SCREENING REPORT**

Part A: General Information

Screening Date	<u>April 30, 2008</u>
EA Title	Jeanne d'Arc Basin Seismic & Geohazard Program Environmental Assessment, 2008 - 2016
Proponent	StatoilHydro Canada Ltd. Suite 600, Scotia Centre 235 Water Street St. John's NL A1C 1B6
Contact	Mr. Tor Martin Vikse Manager Health, Safety & Environment
C-NLOPB File No.	7705 N54-4
CEAR No.	07-01-32084
Referral Date	July 11, 2007
EA Start Date	July 17, 2007
Location	Jeanne d'Arc Basin Area NW Corner: 48° N, 49.5° W NE Corner: 48° N, 47° W SW Corner: 46° N, 49.5° W SE Corner: 46° N, 47° W

Part B: Project Information

In July 2007, StatoilHydro Canada Ltd. (StatoilHydro) submitted a project description "*Seismic Survey Program for Jeanne d'Arc Basin Area, 2008-2016*" (Norsk Hydro 2007) to the C-NLOPB, in support of its application to conduct a 3-D seismic and geohazard surveys program on exploration licences held by the operator in the Jeanne d'Arc Basin area. The "*Environmental Assessment of StatoilHydro's Jeanne d'Arc Basin Area Seismic and Geohazard Program, 2008-2016*" (LGL 2008), submitted on January 30, 2008, provided an environmental assessment for a nine year seismic and geohazard program on acreage held by StatoilHydro in the Jeanne d'Arc Basin.

In completing this Screening Report, information from the 2008 EA Report is summarized and included in the following sections.

1. Description of Project

In support of exploration activities on acreage held by StatoilHydro in the Jeanne d'Arc Basin area (EL 1092), StatoilHydro is proposing to conduct 3-D and potentially 4-D seismic surveys in 2008 and other surveys (2-D, 3-D, or 4-D) through 2016 in the Jeanne d'Arc Basin area. The Project Area is bounded by NW Corner: 48° N, 49.5° W; NE Corner: 48° N, 47° W; SW Corner: 46° N, 49.5° W; and SE Corner: 46° N, 47° W (NAD 83 Zone 22 coordinates). Seismic activities will be undertaken in this area as required from 2008 through to 2016. In addition, StatoilHydro proposes to undertake wellsite geohazard surveys within the Project Area from 2008 to 2016.

In 2008, up to 840 km² of seismic data may be acquired within and near ELs 1100 and 1101 (3-D survey; 500 km²) and across the Terra Nova license area (4-D survey: 340 km²). Additional seismic surveys may be conducted within the Project Area in 2009 - 2016. Seismic surveys are to be undertaken from 1 April to 31 October with the duration of the survey estimated at 40 to >100 days in a given year. In 2008, it is estimated that the survey duration will be 57 days (35 days for 3-D and 22 days for 4-D). It is estimated that at least one geohazard survey may occur in 2008 and as many as three geohazard surveys per year may occur in 2009 – 2016. A geohazard survey would typically require a total survey duration of 9 to 11 days.

The wellsite surveys include the acquisition of geotechnical and geophysical data. The seismic array size (number of airguns, total volume) and configuration will vary depending on the contractor. Typically, wellsite surveys involve two 5085 in³ arrays of 24 Bolt airguns per array. The largest airgun used will be 290 in³ and the smallest 105 in³. Each array will consist of three eight gun 1695 in³ sub-arrays. Typically 8 to 10 streamers (strings of hydrophone sound receivers), each 5 to 6 km in length, will be towed behind the seismic vessel to record the airgun pulses.

2. Description of Environment

2.1 Physical Environment

A detailed description of the physical environment for the Jeanne d'Arc Basin area can be found in the "*Environmental Assessment of StatoilHydro's Jeanne d-Arc Basin Area Seismic and Geohazard Program, 2008-2016*" (LGL 2008). Water depths range from <100 m on the shelf to approximately 1500 m (average depth is 233 m) on the continental slope in the eastern portion of the Project Area. Mean wind speeds were 10.8 m/s and 10.9 m/s respectively in January and 6.0 m/s in July. Average wind directions in the project area are from the west to northwest during the winter season. Mean maximum significant wave heights ranged from near 6 m in July to 13 to 14 m in the winter months (December to February).

2.2 Biological Environment

2.2.1 Fish and Invertebrates

There are a number of fish species in the Jeanne d'Arc Basin area, of which a large

number are fished commercially. A detailed description of these species is provided in EAs prepared for activities in the same area such as the: Husky new drill centre construction and operations program EA and addendum (LGL 2006a, 2006b, 2007); White Rose Oilfield Comprehensive Study (Husky 2000); Husky Jeanne d'Arc Basin exploration drilling EA and update (LGL 2002, 2005a, 2006a); and Husky Jeanne d'Arc Basin 3-D seismic EA and update (LGL 2005b; Moulton et al. 2006). Updated information, descriptions of fish species not discussed in recent EAs, and summaries of relevant information from these documents are presented in the 2008 EA.

Snow Crab distribution on the Grand Banks has shifted in the last few years, as determined by the Department of Fisheries and Oceans (DFO) research survey trawls. Snow crab prefer water with temperatures ranging from -1°C to 4°C. Crab generally mate in the spring, with the female carrying the fertilized eggs for 1 – 2 years prior to larval hatch. Based on recent DFO survey data, NAFO Division 3L offshore snow crab recruitment and exploitable biomass in 2006 remained low relative to levels of the late 1990s. The inshore recruitment and exploitable biomass on this Division increased in 2006. For Division 3O, survey indices for snow crab are unreliable. All of the 2006 commercial snow crab harvesting in the Project Area occurred within 50 km of the 200 m isobath inside the Canadian EEZ.

Distribution of northern shrimp occurs from Davis Strait to the Gulf of Maine; typically where bottom water temperatures range from 2° to 6°C and where the substrate is soft mud. In the Newfoundland and Labrador Offshore Area, these conditions occur in water depths ranging from 150 to 600 m. Northern shrimp spawn in the shallower inshore waters in the late summer and fall. The eggs remain attached to the females until the following spring or summer. Northern shrimp is a significant species harvested in both the Study and Project areas in terms of quantity and value of harvest. The fishery is confined to a well-defined zone in the northern part of the Study and Project areas.

2.2.2 Commercial Fisheries

The Study and Project Areas are primarily within North Atlantic Fisheries Organization (NAFO) Management Division 3L. A relatively small part of the Study Area overlaps Division 3N in the south. Most of the Project and Survey areas are within Canada's 200-mile EEZ, as is the potential 2008 survey area.

Fish species in the area include snow crab (*Chionoecetes opilio*) and northern shrimp (*Pandalus borealis*). Both of these fisheries dominated the domestic harvest in both the Study and Project areas during the 2004 to 2006 period. DFO datasets indicate, for the last three years there was no harvesting recorded within the proposed 2008 Survey Area for any time of the year. Most of the domestic fish harvesting tends to occur at depths between 100 and 200 m in the eastern Grand Bank, both inside and outside the 200-mile EEZ (almost exclusively snow crab), and to the north in depths between 200 m and 1000 m (northern shrimp). Crab is harvested with fixed gear – crab pots, whereas shrimp are harvested using mobile shrimp trawls.

2.2.3 Marine Mammals and Sea Turtles

There are 18 species of cetaceans and 3 species of seals that are known to occur in the area (LGL 2008). Baleen whales most likely found in the Study area include the blue (likely rare) (*Balaenoptera musculus*), fin (*B. physalus*), sei (*B. borealis*), humpback (*Megaptera novaeangliae*), minke (*B. acutorostrata*) and North Atlantic right whale (*Eubalaena glacialis*). Toothed whales include the sperm (*Physeter macrocephalus*), northern bottlenose (*Hyperoodon ampullatus*), Sowerby's beaked (*Mesoplodon bidens*), killer (*Orcinus orca*), and long-finned pilot whales (*Globicephala melas*), the bottlenose dolphin (*Tursiops truncatus*), short-beaked common (*Delphinus delphis*), Atlantic white-sided (*Lagenorhynchus acutus*), white-beaked (*Lagenorhynchus albirostris*), Risso's (*Grampus griseus*) and striped dolphins (*Stenella coeruleoalba*) and the harbour porpoise (*Phocoena phocoena*). Seals species likely in the area are the grey (*Halichoerus grypus*), harp (*Phoca groenlandica*) and hooded (*Cystophora cristata*) seals.

There are three species of sea turtles that may occur in the Study Area: leatherback turtle (*Dermochelys coriacea*); the loggerhead turtle (*Caretta caretta*); and the Kemp's Ridley turtle (*Lepidochelys kempi*). The leatherback turtle is listed as Endangered under the *Species at Risk Act*. The northwest Atlantic population estimates of Kemp's Ridley and loggerhead sea turtles is unknown. There are no identified sensitive areas for sea turtles in the Study Area.

Recent monitoring programs (2004 - 2007) of seismic and CSEM surveys conducted in the Jeanne d'Arc Basin and areas adjacent to the Grand Banks provide new information on marine mammal spatial and temporal distribution. Results of these monitoring reports are summarized in the 2008 EA Report. In summary, humpback whales accounted for most sightings in the Study Area followed by sperm whales, long-finned pilot whales, fin whales, and minke whales. There were relatively few sightings of dolphins and harbour porpoise recorded in the Study Area.

2.2.4 Marine Birds

The Grand Banks have supported large numbers of seabirds during all seasons (LGL 2008). Over 25 marine birds have been identified as occurring in the Study Area. These include species of *Alcidae* (Dovekie, Murres – Common and Thick-billed, Razorbill and Atlantic puffin); *Laridae* (Skuas – Great and South polar; Jaegers – Polmarine, Parasitic, and Long-tailed; Gulls – Herring, Iceland, Lesser Black-backed, Glaucous, Great Black-backed, and Ivory; Black-legged Kittiwake and Arctic Tern); *Sulidae* (Northern Gannet), *Hydrobatidae* (Wilson's and Leach's Storm Petrels); *Phalaropodinae* (Phalarope – Red and Red-necked), and *Procellariidae* (Northern Fulmar and Greater, Sooty and Manx Shearwaters). Specific information can be found in the 2008 EA Report.

The abundance and distribution of marine birds varies depending on the season. All of the nesting seabirds on the Avalon Peninsula feed on the Grand Banks during the nesting season from May to September. Many of the non-breeding sub-adult seabirds, for instance the Northern Fulmar (*Fulmaris glacialis*), are common throughout the year.

The Greater Shearwater (*Puffinus spp.*) is common from June to October, and absent from January to April. Leach's storm petrels (*Oceanites oceanicus*) are uncommon from April to October, whereas the Black-legged Kittiwake (*Rissa tridactyla*) is most abundant in the fall and winter. Dovekies (*Alle alle*) while uncommon to common in the winter are absent in the summer.

The 2008 EA provides a summary of the data from bird observations undertaken during 2005 and 2006 seismic programs.

2.2.5 Species at Risk

There are a number of Species at Risk, as defined under Schedule 1 of the *Species at Risk Act* (SARA) that are likely to be in the project area. The following table identifies the species likely to be present and their SARA and COSEWIC listing.

Species	SARA Status	COSEWIC Status (Date of most recent status report)
Blue whale (<i>Balaenoptera musculus</i>)	Schedule 1 - Endangered	Endangered (May 2002)
North Atlantic right whale (<i>Eubalaena glacialis</i>)	Schedule 1 - Endangered	Endangered (May 2003)
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	Schedule 1 - Endangered	Endangered (May 2001)
Northern wolffish (<i>Anarhichas denticulatus</i>)	Schedule 1 – Threatened	Threatened (May 2001)
Spotted wolffish (<i>Anarhichas minor</i>)	Schedule 1 - Threatened	Threatened (May 2001)
Atlantic (Striped) wolffish (<i>Anarhichas lupus</i>)	Schedule 1 – Special Concern	Special Concern (November 2000)
Fin whale (<i>Balaenoptera physalus</i>)	Schedule 1 – Special Concern	Special Concern (May 2005)
Ivory Gull (<i>Pagophila eburnea</i>)	Schedule 1 – Special Concern	Endangered (April 2006)
Porbeagle shark (<i>Lamna nasus</i>)		Endangered (May 2004)
White shark (<i>Carcharodon carcharias</i>)		Endangered (April 2006)
Shortfin Mako shark (<i>Isurus oxyrinchus</i>)		Threatened (April 2006)
Cusk (<i>Brosme brosme</i>)		Threatened (May 2003)

Species	SARA Status	COSEWIC Status (Date of most recent status report)
Sowerby's beaked whale (<i>Mesoplodon bidens</i>)		Special Concern (November 2006)
Blue shark (<i>Prionace glauca</i>)		Special Concern (April 2006)
Harbour porpoise (<i>Phocoena phocoena</i>)		Special Concern (April 2006)

There is currently no confirmed blue whale in the northwest Atlantic based on available data from DFO. It is listed as a Schedule 1 Endangered Species under the SARA, and a recovery strategy is being developed. The sighting rate of blue whales was highest in water depths ranging from 2000 to 2500 m. Blue whales were regularly sighted in offshore waters (100 to 3,000 m deep) of the Laurentian sub-basin area during a seismic monitoring program in June to September 2005. In the waters off Newfoundland, very little is known regarding their presence or distribution. It is possible that blue whales may occur in the Jeanne d'Arc Basin but numbers are expected to be low.

The North Atlantic right whale is the most endangered species in the northwest Atlantic. It is distributed only in the northwest Atlantic and numbers about 300 individuals. DFO records show that it was recorded once in the Study Area just north of the Project Area.

Adult leatherback turtles are commonly sighted in the waters off Newfoundland from June to October, with peak abundance in August. Leatherbacks equipped with satellite tags did not occur in the Project Area but some did migrate through the Grand Banks south of Newfoundland. Two leatherbacks were sighted in mid-August 2006 in the Study Area during Husky's seismic program. This was the first documented sightings in the Jeanne d'Arc Basin. A Recovery Strategy was released by DFO in June 2006 and finalized in December 2006; however, critical habitat has not yet been identified. Leatherback turtles have been caught incidentally during commercial fish harvesting in Newfoundland waters. Most of the captures occur near the 200 m isobath from June to November.

The likelihood of wolffish occurring in the Study Area is unknown, but assumed to be likely. Northern wolffish spawn in September and the fish remain near their eggs to guard them. They are known to be located at depths ranging from 150 to 600 m, but have been found in the shallower areas. Spotted wolffish occur at depths greater than 450 m and spawn during late summer and early autumn. They are more abundant along the slope area of the Study Area in the fall, than in the spring. Atlantic wolffish can be found at depths up to 350 m, but is typically found further south than the northern or striped species. Atlantic wolffish, like striped wolffish, is more abundant in the fall along the slope adjacent to the Study Area. A proposed Recovery Strategy for

northern and spotted wolffishes and a Management Plan for Atlantic wolffish were recently published.

There are no reliable estimates for the number of fin whales in the Newfoundland stock however; twenty-six fin whale sightings have been recorded within the Study Area based upon the DFO sightings database (LGL 2008). Fin whales were commonly sighted in the Study Area during Husky's seismic monitoring programs in 2005 and 2006. They were the second most abundant mysticete (humpback whales were most common) observed. It is likely that fin whales commonly occur in the Study Area at least during late spring to fall.

The Ivory Gull may appear in low numbers in the Study Area although there have been no sightings of this species in or near the Study Area during recent seismic and CSEM monitoring programs. They are typically found on the edge of pack ice on the northern Grand Banks in late winter.

2.2.5 Research Surveys, Vessel Traffic, Recreation and Tourism

Vessel traffic with respect to fishing vessels is discussed in terms of amount of commercial fishing activity. Information regarding DFO vessel research surveys is provided in the 2008 EA Report. For the 2008 survey season, there will likely be overlap between the Study and/or Project areas and DFO research surveys in NAFO 3L and/or 3N. DFO conducts a spring survey in sections of 3LNLPs (April-July), and a fall survey of 2HJ3KLMNO (September/October to December). The deeper waters of 3L (slope areas) are typically surveyed in October, and the shallower areas in November or December. StatoilHydro will be required to communicate with DFO to avoid any potential conflict with research surveys that may be operating in the area. The Fish, Food and Allied Workers (FFAW) Union crab survey is likely to occur in September and will last 24 to 48 hours. Locations have not been finalized for 2008. Surveys that occurred in 2007 outside the 200 nmi limit area are not planned for 2008.

The main North Atlantic shipping lanes between Europe and North America lie to the north of the Grand Banks into the Strait of Belle Isle in summer. In winter, traffic shifts to the main shipping lanes along the southern Grand Banks into the Gulf of St. Lawrence.

The majority of hunting of seabirds (mostly murre) in Newfoundland and Labrador waters occurs near shore from small boats. Seal hunting also occurs inshore of the Project Area.

Part C: Environmental Assessment Process

3. Procedures

On 11 July 2007, StatoilHydro submitted a project description "*Project Description Seismic Survey Program for Jeanne d'Arc Basin Area, 2008 2016*" (Norsk Hydro 2007) to the C-NLOPB, in support of its application to conduct a seismic program. Pursuant to Section 12.2(2) of the CEA Act, and the *Regulations Respecting the Coordination by*

Federal Authorities of Environmental Assessment Procedures and Requirements, the C-NLOPB assumed the role of the Federal Environmental Assessment Coordinator (FEAC) for the Screening. Input was sought from federal and provincial regulatory agencies and interested stakeholders respecting the scope of project and environmental assessment review.

A Federal Coordination Regulations (FCR) notification was sent on July 17, 2007 regarding StatoilHydro's proposed program. DFO and Environment Canada (EC) responded that they would participate as FAs in the EA review.

On August 01, 2007, the C-NLOPB notified StatoilHydro that a screening level of assessment was required and the proponent was provided with a Scoping Document.

StatoilHydro submitted the 2007 EA Report to the C-NLOPB on 30 January 2008. The C-NLOPB, as Responsibility Authority (RA), forwarded the 2008 EA on 31 January 2008 to DFO, EC, and the provincial Departments of Fisheries and Aquaculture, Natural Resources, and Environment and Conservation. The FFAW and One Ocean were provided a copy of the EA report to review. Comments were received from DFO, EC, FFAW, and by a member of the public.

It is the obligation of the C-NLOPB to consider which physical works and undertakings in relation to the proposed project fall within the scope of the Project. First, there are no physical works that should be included in the scope of the Project. Second, if the Project were to proceed, as set out in the application and supporting EA report and supporting information, it would constitute a single project for the purposes of Section 15(2) of CEAA. For the purposes of Subsection 15(3) of CEAA, the C-NLOPB's scoping exercise is complete because an assessment was conducted in respect of every construction, operation, modification, decommissioning, abandonment, or other undertaking proposed by StatoilHydro that is likely to be carried out in relation to their proposed Project.

4. Environmental Assessment Review

Comments on the EA report were received from DFO, EC, FFAW, and a member of the public.

Comments from DFO, which were submitted on 14 March 2008, focused on annual project updates, marine mammal monitoring-safety zones and editorial comments.

Environment Canada responded on 14 March 2008 and focused contingency planning in the event of leakage from streamers. *StatoilHydro has an "Oil Spill Response Plan" in effect for its operations on the east coast and this plan would be implemented in the event of a spill.*

The FFAW provided comments on 26 March 2008 that focused on the timing of the seismic program given that spring and summer months are the best time of year for various species to be harvested. They identified that the industry research programs for

2008 are expected to follow the same trends as recent years. They also stated that communication of all operations in the Study Area is imperative and that StatoilHydro may provide information on the 2008 seismic program in the May issue of the "Union Forum". *StatoilHydro stated in the EA that they would have a FLO and SPOC in place and provide information concerning the seismic program in the "Union Forum".*

Comments were provided on February 27, 2008 by a member of the public. The ratings of impacts in the EA were questioned. As well, it was stated that the area against which the area being impacted is being compared should be clearly identified in the EA. The fact that cumulative impacts were evaluated with limited knowledge of other projects that might be introduced in the future was questioned. It was pointed out that a statement made in the EA concerning research funding contribution by the oil and gas industry through the Environmental Studies Research Fund (ESRF) was out of context.

Comments were provided to StatoilHydro for consideration in future programs.

5. Scope of Project

StatoilHydro is proposing to conduct 3-D and potentially 4-D seismic surveys and wellsite geohazard surveys in an area of the Jeanne d'Arc Basin bounded by NW Corner: 48° N, 49.5° W; NE Corner: 48° N, 47° W; SW Corner: 46° N, 49.5° W; and SE Corner: 46° N, 47° W. The Project Area encompasses ELs 1100 and 1101 and the Terra Nova and White Rose fields. The Project Area includes space to accommodate a seismic vessel-turning radius. The temporal scope of the project is from 2008 through to the end of 2016.

The vessel for the 2008 seismic program has not been selected but typically, a single seismic vessel will collect data using a multiple streamer configuration with eight 5000 m streamers towed behind the vessel. Two 5085 in³ airgun arrays (3 sub-arrays each at 1695 in³) will be towed at a depth of approximately 7 m below surface. Each sub-array is composed of eight airguns with a source level of 109.9 bar-m (or approximately 255 dB re 1 µPa (0-peak)). If a 4-D seismic survey is conducted across the Terra Nova license area, an additional seismic source vessel may be used to acquire data coverage directly below the FPSO. The airgun arrays from both vessels would not be operated simultaneously. The geohazard surveys would be conducted using a smaller vessel and a combination of smaller scale seismic equipment, sonars, and a boomer.

At the time of application for seismic and wellsite surveys to be undertaken beyond 2008 in the Project Area, the Operator will be required to provide information to the C-NLOPB which outlines the proposed activities, confirms that the proposed program activities fall within the scope of the previously assessed program, and indicates if with this information, the EA predictions remain valid. In addition, the Operator will be required to provide information regarding the adaptive management of requirements of the SARA into program activities (e.g., introduction of new species or critical habitat to Schedule 1; additional mitigations; implementation of recovery strategies and/or monitoring plans). If there are any changes in the scope or information available, which may alter the EA conclusions, then a revised EA will be required at the time of

authorization renewal. The Canadian Environmental Assessment Registry will be updated as required.

5.1 Boundaries

The boundaries of the Project are defined in the 2008 EA Report as follows.

<i>Boundary</i>	Description
<i>Temporal</i>	Year-round from 2008 – 2016 Seismic Surveys – 1 April to 31 October each year up to 2016. Geohazard Surveys – Any time of year.
<i>Project Area</i>	Defined as the area bounded by: NW Corner: 48° N, 49.5° W NE Corner: 48° N, 47° W SW Corner: 46° N, 49.5° W SE Corner: 46° N, 47° W
<i>Study Area</i>	The Project Area and a 25 km buffer zone around the Project Area.

There would also be an area of influence from the sound array. However, depending on the marine species present, this area of influence will vary in size. Hearing thresholds have been determined for a number of species (seals and odontocetes), but the threshold is not known for others (baleen whales). The sound that is actually received by the marine species depends on the energy released from the source and its propagation (and loss) through the water column. Therefore, the hearing ability of the species and background noise will affect the amount of noise from an airgun array detected.

6. Consultation carried out by StatoilHydro

StatoilHydro, as reported in the 2008 EA report, met with or discussed the proposed project with government agencies, representatives of the fishing industry and other interest groups. Consultations were held with the DFO, EC, One Ocean, the FFAW, the Natural History Society, the Association of Seafood Producers, Fishery Products International, Clearwater Seafoods, and the Groundfish Enterprise Allocation Council, and Icewater Seafoods. All consultations were held to inform the stakeholders about the planned program, to identify issues or concerns that should be considered in the EA, and to gather additional information relevant to the EA report. Discussions were held about the multi-year approach and that an annual update would be quite helpful in other users planning. Representatives of the fish harvesting sector suggested that details about the proposed program in its annual review should be included in the FFAW's regular publication the "Union Forum". There were no concerns or issues raised by the stakeholders concerning the conduct of neither the seismic program nor the environmental assessment process.

The C-NLOPB is satisfied that the consultations carried out by StatoilHydro and

reported on in the 2008 EA during the preparation of the environmental assessment included all elements of the Project. The C-NLOPB is not aware of any public concerns with respect to the environmental effects of the project, and does not require that further consultations be undertaken for the 2008 field season.

7. Environmental Effects Analysis

7.1 Scope of Assessment

For the purpose of meeting the requirements of the CEAA and the “*Geophysical, Geological, Environmental and Geotechnical Program Guidelines*” (C-NLOPB 2004), the factors that were considered to be within the scope of an environmental assessment are those set out in subsection 16(1) of the CEAA and those listed in the “Norsk Hydro Canada Oil & Gas Inc. Seismic Survey Program for Jeanne d’Arc Basin Area, 2008 - 2016 Scoping Document’ (C-NLOPB 2007).

7.2 Methodology

The C-NLOPB reviewed the environmental effects analysis presented by StatoilHydro in the 2008 EA. The environmental assessment methodology and approach used by the Proponent is acceptable to the C-NLOPB. The following environmental effects analysis uses the information presented by the Proponent (in LGL 2008) and takes into consideration mitigation proposed by the Proponent and those required by the C-NLOPB, to assess the potential for residual environmental effects.

The potential adverse environmental effects, including cumulative effects, were assessed with respect to:

- magnitude of impact;
- scale of impact (geographic extent);
- duration and frequency;
- reversibility;
- ecological, socio-cultural and economic context; and

after taking mitigation measures into account;

- significance of residual effect.

The potential effect significance of residual effects, including cumulative effect, for each VEC is rated in this environmental screening report as follows.

- 0 = No Detectable Adverse Effect*
- 1 = Detectable Effect, Not Significant*
- 2 = Detectable Effect, Significant*
- 3 = Detectable Effect, Unknown*

In the 2008 EA, StatoilHydro presented information regarding the potential effects of seismic and wellsite geohazard activities on invertebrates and fish, commercial fisheries, seabirds, marine mammals and sea turtles, and Species at Risk. Information regarding hearing effects in fish, sound detection and behavioural changes in

invertebrates, behavioural and disturbance effects in marine mammals, and discussion of marine mammal monitoring results from recent seismic programs in the Newfoundland and Labrador offshore area were presented. Upon review of the information and review of the mitigations proposed by StatoilHydro, the effects assessment is as follows.

7.3 Valued Ecosystem Components/Potential Environmental Effects

7.3.1 Fish and Invertebrates

1

In the natural environment, fish show avoidance responses and swim away as the array ramps up or as the survey slowly approaches. The airgun will be ramped-up, thereby allowing fish in the area to leave. Studies referenced in the 2008 EA Report indicated that fish mortality did not result from exposure to seismic sound sources. Stress response (physiological effects) to seismic exposure occurs in fish but effects are both short-term and most obvious after exposure at close range. Behavioural responses to seismic appear to occur at greater distances from the seismic sound source than physical effects. In general, fish show startle response and change direction and speed of swimming. In some studies looking at the effects on commercial catch rates, the change in swimming direction accounted for a decrease catch rate. However, some studies show that this effect was temporary, whereas other studies report that fish behaviour was altered for a number of days (LGL 2008). The temporary nature of these responses varies depending on the fish species and the sound source.

To date, there are not any documented cases of acute mortality of juvenile or adult fish exposed to seismic sound characteristic of typical field seismic surveys. LGL (2008) reports that physical effects on fish will be negligible to low magnitude, in an immediate area ($<1 \text{ km}^2$), of low frequency and medium duration (1 -12 months, but not continuous throughout duration). Taking avoidance behaviour into account, any potential physical impact to finfish is considered to be negligible, immediate to sub-local in geographic extent, immediate in duration, would have a low likelihood of occurrence. Disturbance effects are likely to be negligible to low but not constant duration (1 - 12 months) with a geographic extent of 11-100 or 101-1,000 km^2 . The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

There is a lack of knowledge of the effects of seismic sound on marine invertebrates. Available experimental data suggest that there may be physical impacts on the fertilized eggs of snow crab and on the egg of cod at very close range. The results indicate that effects are both short-term and most obvious after exposure at close range.

Any potential physical or behavioural impact to invertebrate species is considered to be negligible to low, with a geographic extent between <1 to 1,000 km^2 , immediate in duration, and would have a low likelihood of occurrence. The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

7.3.2 Commercial Fishing and DFO Vessel Research Surveys

1

Potential interactions with this VEC include potential for a decrease in catch rates,

interference with fishing gear and potential impact on DFO research survey trawls. As indicated above, seismic activity can result in a dispersion of fish species, and subsequently reduced catch rates for a short duration. Section 2.2.2 above indicates that the potential 2008 survey area has had no recorded harvesting activity over the past three years, however there has been fishing in well-defined parts of the Project Area. This consists of fixed-gear snow crab fishing just beyond the 200 NMI EEZ boundary and in the northwest quadrant of the Project Area, and mobile-gear shrimp harvesting between the 200 m and 500 m contour in the north-central area. The potential for impacts on fish harvesting will depend on the location of the surveying activities in relation to fishing areas in any given season. If the survey work is situated away from fishing areas, the likelihood of any effects on commercial harvesting will be greatly reduced. There is potential however for interaction between seismic operations (streamers) and fishing gear, especially fixed gear such as crab pots.

StatoilHydro indicated that a number of mitigations, consistent with those outlined in the *“Geophysical, Geological, Environmental and Geotechnical Program Guidelines”* (C-NLOPB 2004), will be implemented. These include: avoidance of heavily fished areas; use of a Fisheries Liaison Officer (FLO) at sea; communication with fishers (notice to mariners/fishers) and DFO research vessels; single point of contact (SPOC), and a fish gear compensation plan. In addition, relevant information about the survey operations will be publicized in the FFAW “Union Forum” as was suggested during consultations.

During vessel transit there is potential for interference with the towed streamers and fixed gear. To avoid fishing locations, StatoilHydro has indicated that the following measures will be undertaken to avoid conflict with potential fishing enterprises. A transiting plan will be developed that identifies the fixed gear areas. A FLO will be onboard at all times, there will be an onshore SPOC to provide guidance on route selection during the survey and transit, and a Canadian Coast Guard (CCG) Notice to Mariners will be issued.

To avoid potential conflict with DFO Research surveys, StatoilHydro will maintain communications with DFO personnel to keep up-to-date on the timing of planned research surveys. In addition, a temporal and spatial buffer zone will be implemented, in consultation with DFO, to reduce any potential interference with fish behavioural patterns.

It is predicted that seismic and geohazard activity, including vessel movement, will be negligible and not significant. Therefore, taking mitigations into account, effects to the commercial fishery are not likely and **not significant**.

7.3.3 Marine Mammals and Sea Turtles

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A potential effect of the proposed operation upon marine mammals and sea turtles, which may be present in the area, is that of sound pulses from the survey equipment. The 2008 EA Report (LGL 2008) describes in more detail the numbers and the species of cetaceans, which have been observed in, or which are considered likely to frequent, the Study Area. The 2008 EA Report provides an effects assessment, based on

available data on the effects of seismic and geohazard surveys on marine mammals. Baleen whales tend to avoid operating airguns, but avoidance radii are quite variable. Whales are often reported to show no overt reactions to airgun pulses at distances beyond a few kilometres, even though the airgun pulses remain well above ambient noise levels out to much longer distances. Based on results of studies reported in LGL (2008) very little is known about the potential for seismic survey sounds to cause either auditory impairment or other non-auditory physical effects in marine mammals or sea turtles. Available data suggest that such effects, if they occur at all, would be limited to short distances however, there is uncertainty in predicting effects because of data gaps.

The 2008 EA Report summarizes the results from recent (2004 – 2007) marine mammal monitoring programs undertaken in association with 2D and 3D seismic programs and geohazard surveys. It also provides the results of the DFO cetacean sighting database within the Study Area for the years 1945 – 2007. Humpback whales accounted for most sightings in the Study Area followed by sperm whales, long-finned pilot whales, fin whales, and minke whales. There were relatively few sightings of dolphins and harbour porpoise recorded in the Study Area. LGL (2008) reports that baleen whales tend to avoid operating airguns, but avoidance radii are quite variable. Data on short-term reactions of cetaceans to impulsive noises do not necessarily provide information about long-term effects. LGL reports that there are no specific data on responses of beaked whales to seismic surveys, but it is likely that most if not all species show strong avoidance due to their documented tendency to avoid vessels in general.

Sea turtles are likely to show behavioural changes and/or avoidance behaviour within an area of unknown size near a seismic vessel. Seismic operations in or near areas where turtles concentrate are likely to have the greatest effect. However, the Jeanne d'Arc Basin, including the Project Area, is not a known breeding or feeding area for sea turtles. Therefore, high concentrations of sea turtles are unlikely. LGL (2008) reports that turtles might experience temporary hearing loss if the turtles are close to the airguns. If sea turtles were present, the mitigation measures applied (as outlined in the 2008 EA Report) should reduce impact.

There are a number of mitigations which, when applied, can reduce impacts to marine mammals and sea turtles in the vicinity of a seismic survey (e.g. ramping up of airguns, use of observers, shut-down procedures). The 2008 EA Report lists a number of mitigations that will be implemented during the seismic program, some of which are consistent with the mitigations recommended in Appendix 2 of *"The Geophysical, Geological, Environmental and Geotechnical Program Guidelines"* (C-NLOPB 2004). In addition to those mitigations listed in the 2008 EA Report, the following mitigations will be required:

- *Monitoring for marine mammals and sea turtles shall be consistent with the approach outlined in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2004), and includes monitoring during ramp-up and at all times when the airgun(s) are active;*

- During ramp-up, and when the airgun array is active, airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array; and
- During line changes, the seismic airgun array shall be reduced to a single airgun and the airgun shall remain active during the line change. If for any reason, the airgun is shut down for a period greater than 30 minutes, then ramp-up procedures shall be implemented as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines.

It is uncertain how many toothed and baleen whales may occur in the Study Area at various times of the year. The Study Area is not known to be an important feeding or breeding area. It is uncertain how many seals may occur in the Project Area during the period when seismic (and geohazard) activities are most likely to occur (summer, early fall). Most harp and hooded seals would be in arctic water at this time of year. The effects on marine mammals are predicted to be of low magnitude, short duration (<1-12 months), low to medium geographic extent (up to 1000 km² during seismic activities) (11-100 km² for geohazard surveys), low frequency and reversible. With the application of mitigation measures, the likelihood of effects occurring is low, and effects will be **not significant**.

The effects on sea turtles are predicted to be of low magnitude, over a duration of <1 month or 1 to 12 months, and a low to medium geographic extent (11 to 100 km²). With the application of mitigation measures, the overall likelihood of effects occurring is low, and effects will be **not significant**.

7.3.4 Marine Birds

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The 2008 EA Report indicates that the effects of seismic sound on seabirds is unknown. They may be affected by underwater sound from airgun arrays, leakage of petroleum product from streamers, and attraction to ship lights at night. The 2008 EA Report indicates that the *Alcidae* (Dovekie, Common Murre, Thick-billed Murre, Razorbill and Atlantic Puffin) may potentially be the most sensitive group due to their time spent underwater diving for food. They can reach depths of up to 120 m below water. Shearwaters and fulmars are likely to be present in large numbers in the project area in June. Sound from the array, above the water, is similar to a muffled shot and should have little or no effect on birds that do not have their heads in the water. Storm-petrels may be attracted to vessel lighting and become stranded on the survey vessel. However, if birds do become stranded on the vessel, StatoilHydro or its contractor will release the birds in a manner consistent with the Canadian Wildlife Service (CWS) bird handling procedures. StatoilHydro will design a marine bird monitoring program prior to commencement of activities in consultation with the CWS and as per the C-NLOPB *Geophysical, Geological, Environmental and Geotechnical Program Guidelines*.

The effects of noise, leakage, and lights are predicted to be of low magnitude, with a small geographic extent (<1 km² and 1 to 10 km² for lights), and of short duration (<1

month to 1 to 12 months). Therefore, an environmental effect is not likely and **not significant**.

7.3.5 Species at Risk

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LGL reports that leatherback turtle are not expected to occur regularly in the Study Area. There have been two reported sightings of leatherback sea turtles in the Study Area. As indicated above, effects on turtles are likely to be not significant; therefore, effects on Leatherback turtles are not likely to be adverse and therefore **not significant**.

Blue whales are reported by LGL to be rare in the Study Area and there have been no confirmed sightings of blue whales. Therefore, the potential for interaction with project activities is unlikely. LGL reports that the North Atlantic right whale may be extremely rare in the Study Area, but there was one reported sighting north of the Project Area (but within the Study Area) in 2003. Fin whales, listed as Special Concern, are expected to occur regularly in the Study Area, particularly during summer months.

The following mitigations will be required to reduce or prevent impacts to SAR.

- ♦ *During ramp-up, and when the airgun array is active, airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array.*
- ♦ *During line changes, the seismic airgun array shall be reduced to a single airgun and the airgun shall remain active during the line change. If for any reason, the airgun is shut down for a period greater than 30 minutes, then ramp-up procedures shall be implemented as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines.*

There are no available recovery strategies or action plans in place for marine mammals in Atlantic Canada. A recovery strategy for leatherback sea turtles is available. With the implementation of these mitigations, and with the rare likelihood of these marine mammals occurring, effects therefore will be **not significant**.

Two species of wolffish, the northern and spotted, are likely to occur, however the water depths in the Study Area are primarily shallower than the known preferred water depths that wolffish typically inhabit. As indicated above, effects on wolffish are likely to be not significant, therefore effects on wolffish are not likely to be adverse and therefore **not significant**.

The foraging behaviour of Ivory Gulls would not likely expose it to underwater sound. Ivory Gulls are unlikely to occur in the Study Area, particularly during the summer when seismic surveys are most likely to be conducted. As well, Ivory Gulls are not known to be sensitive to stranding on vessels. As indicated above, effects on Ivory Gulls are likely to be not significant; therefore, effects on Ivory Gulls are not likely to be adverse and therefore **not significant**.

7.3.6 Water Quality/Discharges

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Routine discharges, which are likely to occur during operation, are similar to those associated with many typical vessel operations. The vessels proposed for the survey are equipped with on-board environmental protection equipment, and a sewage treatment system for wastewater. The effect of the seismic operation and geohazard surveys on marine water quality will be negligible and **not significant**.

7.4 Accidents and Malfunctions

Accidental discharge of oil into the marine environment may result from improper operational procedures (e.g., improper draining of streamer reel trunks), loss of streamer fluid due to breakage, or, as a worst case, because of total vessel loss.

The vessel is required to carry a "Shipboard Oil Pollution Emergency Plan" pursuant to MARPOL 73/78. The Plan contains a description of procedures and checklists, which govern operations involving hydrocarbons, adherence to which should prevent unintended "operational" releases. The vessel will also carry a copy of StatoilHydro's "Oil Spill Response Plan".

Effects due to accidental spills associated with the proposed operation, therefore, are considered, overall, to be detectable if they occur, but neither significant nor likely.

7.5 Cumulative Environmental Effects

The 2008 activities that may overlap in time and space with the seismic program include: offshore oil and gas industry; commercial fishing; vessel traffic (e.g. transportation, recreational, defence); and hunting (e.g. seabirds, seals). Within the 2008 Project Area, there are three existing offshore production developments (Hibernia, Terra Nova, and White Rose) on the northeastern part of the Grand Banks. StatoilHydro may be conducting exploration, appraisal, and delineation drilling in the Jeanne d'Arc Basin area from 2008 to 2016. Petro-Canada may be undertaking a 3D seismic program in the Jeanne d'Arc Basin from 2008 to 2010. The White Rose new drill centre construction and operations program may be conducted from 2008-2015. Husky Energy may be undertaking a 3-D seismic program in the Jeanne d'Arc Basin and ConocoPhillips may be conducting an exploration drilling program in the Laurentian Sub-basin (2009-2012). 2-D seismic programs will likely be ongoing off the coast of Labrador and Greenland until late November. Any cumulative effects (i.e. disturbance) if they occur will be additive (not multiplicative or synergistic) and predicted to be **not significant**.

Commercial fishing may be occurring in the Study Area. Fish species in the area include snow crab (*Chionoecetes opilio*) and northern shrimp (*Pandalus borealis*). Both of these fisheries dominated the domestic harvest in both the Study and Project areas during the 2004 to 2006 period. DFO datasets indicate, for the last three years there was no harvesting recorded within the proposed 2008 Survey Area for any time of the year. Temporal overlap of activities includes seismic, wellsite geohazard, and drilling programs within the Project Area. The seismic and geohazard programs will be scheduled to such an extent to avoid spatial overlap in areas of concentrated fishing

and to reduce interference with research surveys. Loss of access to fishing areas will occur with the seismic and geohazard survey activities (<1 month per area). The cumulative effects may be additive, however the geographic extent is small and represents a very small portion of the overall fishing area. Any effects therefore may be additive, but **not significant**.

In the summer, the main North Atlantic shipping lanes between Europe and North America lie to the north of the Grand Banks into the Strait of Belle Isle. In the winter, that traffic shifts to the main shipping lanes along the southern Grand Banks into the Gulf of St. Lawrence. Potential for cumulative effects with other shipping is predicted to be negligible to low.

The vast majority of hunting of seabirds (mostly murre) in Newfoundland and Labrador waters occurs near shore from small boats and thus, there is little or no potential for cumulative effects. In addition, most, if not all seal hunting would occur inshore of the Project Area.

7.6 Follow-up Monitoring Required Yes ☐ No ☒

The C-NLOPB does not require follow-up monitoring, as defined in the *CEA Act*, to be undertaken.

8. Other Considerations

The C-NLOPB is satisfied with the environmental information provided by StatoilHydro regarding the potential adverse environmental effects which may result from the proposed seismic and wellsite geohazard surveys, and satisfied with the operator's proposed monitoring and mitigative measures.

The C-NLOPB is of the view that the environmental effects from the Project, in combination with other projects or activities that have been or will be carried out, are not likely to cause significant adverse cumulative environmental effects.

The C-NLOPB is of the view that if the proposed environmental mitigative measures outlined in the 2008 EA Report and those listed below are implemented, the Project is not likely to cause significant adverse environmental effects.

9. Recommended Conditions and/or Mitigations

The C-NLOPB recommends that the following conditions be included in the authorization if the Project is approved.

- *StatoilHydro shall implement, or cause to be implemented, all the policies, practices, recommendations and procedures for the protection of the environment included in or referred to in the "Environmental Assessment of StatoilHydro's Jeanne d'Arc Basin Area Seismic and Geohazard Program, 2008-2016" (January 2008).*

- *StatoilHydro shall implement or cause to be implemented the mitigation measures outlined in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2004) respecting seismic programs.*
- *For any wellsite surveys undertaken, StatoilHydro shall implement or cause to be implemented the mitigation measures outlined in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2004) respecting wellsite surveys.*
- *The “safety zone” defined for marine mammal protection is designated to be 500 m.*
- *Monitoring for marine mammals and sea turtles shall be consistent with the approach outlined in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2004), and includes monitoring during ramp-up and at all times when the airgun(s) are active.*
- *During ramp-up, or when the airgun array is active, airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array.*
- *During line changes, the seismic airgun array shall be reduced to a single airgun and the airgun shall remain active during the line change. If for any reason, the airgun is shut down for a period greater than 30 minutes, then ramp-up procedures shall be implemented as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines.*

Part D: Screening Decision

10. Decision/Decision Date

The Canada-Newfoundland and Labrador Offshore Petroleum Board is of the opinion that, taking into account the implementation of proposed mitigation measures set out in the conditions above and those committed to by StatoilHydro Canada Ltd., the Project **is not likely to cause significant adverse environmental effects**. This represents a decision pursuant to Section 20(1)(a) of the CEA Act.

Responsible Officer *Original Signed by K. Coady*
 Kimberly A. Coady
 Environmental Assessment Officer

Date: April 30, 2008

References:

- C-NLOPB. 2007. Norsk Hydro Canada Oil & Gas Inc. Seismic Survey Program for Jeanne d'Arc Basin Area, 2008 - 2016 Scoping Document. 8 p.
- Husky. 2000. White Rose oilfield comprehensive study. Report for Husky Oil Operations Ltd., St. John's, NF. 1011 p.
- LGL. 2002. Husky Jeanne d'Arc Basin exploration drilling program project description and environmental assessment. LGL Rep. SA723. Rep. by LGL Limited, St. John's, NL, Oceans Limited, St. John's, NL, PAL environmental Services, St. John's, NL, and SL Ross Environmental Research Limited, Ottawa, ON, for Husky Oil Operations Limited, St. John's, NL. 179 p.
- LGL. 2005a. Husky delineation/exploration drilling program for Jeanne d'Arc Basin area environmental assessment. LGL Rep. SA845. Rep. by LGL Limited, Canning and Pitt Associates, Inc., and PAL Environmental Services, St. John's, NL, for Husky Oil Operations Limited, St. John's, NL. 340 p. + App.
- LGL. 2005b. 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.
- LGL. 2006a. Husky White Rose Development Project: New Drill Centre Construction & Operations Program Environmental Assessment. LGL Rep. SA883. Rep. by LGL Limited, St. John's, NL, for Husky Energy Inc., Calgary, AB. 299 p. + App.
- LGL. 2006b. Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area Environmental Assessment Update. LGL Rep. SA886. Rep. by LGL Limited, St. John's, NL, Oceans Limited, St. John's, NL, Canning & Pitt Associates, Inc., St. John's, NL, and PAL Environmental Services, St. John's, NL, for Services, St. John's, NL for Husky Oil Operations Limited, St. John's, NL. 67 p. + App.
- LGL. 2007. Husky White Rose Development Project: New Drill Centre Construction & Operations Program Environmental Assessment Addendum. LGL Rep. SA883a. Rep. by LGL Limited, St. John's, NL for Husky Energy Inc., Calgary, AB. 126 p. + App.
- LGL Limited. 2008. Environmental Assessment of StatoilHydro's Jeanne d'Arc Basin Area Seismic and Geohazard Program, 2008-2016. LGL Rep. SA947a. Rep. by LGL Limited, Canning & Pitt Associates Inc., and Oceans Ltd., St. John's, NL, for StatoilHydro Canada Ltd., St. John's, NL. 174 p. + appendices.
- Moulton, V.D., B.D. Mactavish and R.A. Buchanan. 2006. Marine mammal and seabirds monitoring of Chevron Canada Limited's 3-D seismic program on the

Orphan Basin, 2005. LGL Rep. SA843. Rep. by LGL Limited, St. John's, NL, for Chevron Canada Limited, Calgary, AB, ExxonMobil Canada Ltd., St. John's, NL, Shell Canada Limited, Calgary, AB, and Imperial Oil Resources Ventures Ltd., Calgary, AB 111 p. + appendices.

Norsk Hydro Canada Oil & Gas Inc. 2007. Project Description Seismic Survey Program for Jeanne d'Arc Basin Area, 2008 - 2016. 17 p.