

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

Part A: General Information

Screening Date	<u>September 21, 2005</u>
EA Title	Northern Jeanne d'Arc Basin Seismic Program Environmental Assessment
Proponent	Husky Oil Suite 901, Scotia Centre 235 Water Street St. John's NL A1C 1B6
Contact	Mr. Ken Dyer Manager, HSEQ
C-NLOPB File No.	7705-H61
CEAR No.	05-01-8783
Referral Date	January 11, 2005
EA Start Date	January 19, 2005
Location	Jeanne d'Arc Basin Area, North eastern Grand Banks – White Rose field and ELs 1065, 1067, 1089, and portions of EL 1090 and 1091.

Part B: Project Information

In January 2005, Husky Energy submitted a project description “*Northern Jeanne d’Arc Basin Seismic Program Draft Project Description*” (LGL 2005a) to the C-NLOPB, in support of its application to conduct a 3D seismic program on exploration licences held by the operator in the Jeanne d’Arc Basin area. Husky Energy submitted an application, pursuant to Section 134(1)(b) of the *Canada Newfoundland Atlantic Accord Implementation Act* to conduct a 3D seismic survey in this area. In support of that application and pursuant to the *Canadian Environmental Assessment Act* (CEA Act), Husky Energy submitted an environmental assessment report on 16 March 2006 and an addendum to the EA on 18 July 2005 - “*Northern Jeanne d’Arc Basin Seismic Program Environmental Assessment*” (LGL 2005b) (herein referred to as the 2005 EA report) and an addendum to the 2005 EA report (*Northern Jeanne d’Arc Basin Seismic Program Environmental Assessment Addendum* (LGL 2005c).

In addition, Husky Energy has contracted the Western Geco seismic vessel, the Western Neptune, to conduct its seismic program. The Western Neptune will be transiting to the 3D

seismic project area from the south coast with streamers in-tow. The Board requested a fishery analysis of the proposed transit route to determine if there would be potential for interaction or effects on commercial fishery operations along the transit route. Husky Energy submitted the “*Transit Route Fisheries Analysis for Husky Energy*” (Canning and Pitt, 2005) in response to the C-NLOBP request.

In completing this Screening Report information from the 2005 EA Report, EA addendum and the Transit Route Fisheries Analysis report was summarized and is included in the following sections.

1. Description of Project

In support of exploration activities on acreage held by Husky Energy in the Jeanne d’Arc Basin area, Husky Energy is proposing to conduct 3D seismic surveys and wellsite/geohazard surveys on ELs 1065, 1067, 1089, and portions of EL 1090 and 1091 over the next three years. In 2005 a 3D seismic survey will be carried out on EL 1067 and 1089 in an area approximately 1500 km². The survey will take approximately 30 days to complete and is scheduled to run from 1 September to 31 October in 2005. The 3D seismic project includes the transit of the seismic vessel from the Laurentian Subbasin to the Project area with the streamers in tow. Additional 3D surveys may be undertaken in 2006 and 2007 and will run from May to October each year.

The wellsite surveys include the acquisition of geotechnical and geophysical data. WSS typically involve a four sleeve-gun array and a single streamer, side scan sonar, Hunttec Deep Tow System (DTS) sub bottom profiler, single-beam echo sounder, and, if required a magnetometer. Water depths in the area range from 100 to 120 m. Geohazard surveys will be undertaken as required, commencing in May 2006 up to December 2007. Surveys may be conducted between May to December in each year. Each survey will require four to 14 days to complete. The temporal scope of the environmental assessment is to include any wellsite surveys that may be required on in the Project Area from May to December each year from 2005 to 2007.

Prior to the commencement of 3D and geohazard surveys beyond 2005, Husky-Energy will be required to provide documentation to the C-NLOPB. The documentation will outline the proposed wellsite survey activities for that year, whether those activities and the timing of those activities fall within the scope of the 2005 3D EA report, provide an update to existing environmental information, if applicable, and indicate if with this information, the EA predictions remain valid.

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 “*Northern Jeanne d’Arc Basin Seismic Program Environmental Assessment*” (LGL 2005b). Water depths range from approximately 100 m on the Grand Banks to 400 m on the slope area. Predominant wind speeds are from the west to south west in the project area.

Average maximum significant wave heights during September and October are between 10 – 11 m.

2.2 Biological Environment

2.2.1 Fish and Commercial Fisheries

The proposed 3D seismic surveys and wellsite surveys will be conducted in the NAFO Unit Area 3Li. 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 the 2005 EA Report and is summarized below.

Fish species in the area include snow crab (*Chionoecetes opilio*), northern shrimp, and Greenland halibut.

Snow Crab (*Chionoecetes opilio*) distribution on the Grand Banks has shifted in the last few years, as determined by DFO research survey trawls. Snow crab prefer water with temperatures ranging from -1C to 4C. Crab generally mate in the spring, with female carrying the fertilized eggs for 1 – 2 years prior to larval hatch. Based on recent DFO multispecies bottom trawl survey data, fishery logbook data, and observer sampling data, there are indications that the exploitable biomass and recruitment stock in NAFO divisions 2J3KL may be in decline

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 once per year, in late June or early July (LGL 200b). The eggs remain attached to the females until the following spring or summer. Recent spring and fall DFO research surveys indicate that in the 3L area, the greatest concentrations of shrimp occur along the slope region between 185 and 55 m water depths. Over 90% of the 3LNO northern shrimp biomass has been found within the 3L area (LGL 2005b).

Greenland halibut can be found in water temperatures ranging from -0.5 to 6 C and are typically harvested in the water depths greater than 450 m. Spawning is thought to occur in the Davis Strait in the winter and early spring, and in the Laurentian Channel and the Gulf of St. Lawrence

Commercial fishing activity in the NAFO area 3Li consists primarily of snow crab and northern shrimp, with these two fisheries accounting for over 99% of the domestic harvest in the Project Area. In 2004, shrimp account for 74% of species harvested and snow crab 25%. Crab are harvested with fixed gear – crab pots, whereas shrimp are harvested using a mobile shrimp trawls. Within the Project Area, the shrimp fishery is concentrated in the northeastern region, and the crab fishery is concentrated in the western portion of the Project Area.

2.2.2 Marine Mammals and Sea Turtles

There are 16 species of cetaceans and three species of seals that are know to occur in the area (LGL 2005). Baleen whales most likely to be found in the Study area include the blue (likely rare), fin, sei, humpback, mike and North Atlantic right whale. Toothed whales include the

sperm, northern bottlenose, Sowerby's beaked, killer, and long-finned pilot whales, the common, white-beaked, Risso's and striped dolphins and the harbour porpoise. Seals species likely in the area are the grey, harp and hooded seals.

There are three species of sea turtles known to occur in the Project area. These include the Leatherback turtle (*Dermochelys coriacea*), which is listed as endangered under SARA; the loggerhead turtle (*Caretta caretta*), which is listed as threatened by the US National Marine Fisheries Service (NMFS) and the Fish and Wildlife Service (FWS), and the Kemp's Ridley turtle (*Lepidochelys kempii*) which is listed as endangered by the US NMFS and FWS. Loggerhead turtles are likely to occur in the Study Area during summer and fall months. The Kemp's Ridley turtle is rare in Canadian waters.

2.2.3 Marine Birds

The Grand Banks of Newfoundland have been identified as important habitat for many species of marine birds (LGL 2005). Over 25 marine birds have been identified as occurring in the Study Area. These include species of *Alcidae* (Dovekie, Murres – Common and Thick-billed, Razor Bill and Atlantic puffin) *Laridae* (Skuas – Great and South polar; Jaegers – Polmarine, Parasitic, and Long-tailed; Gulls – Herring, Iceland, Glausous, Great Black-backed, and Ivory; Black-legged Kittiwake and Arctic Tern), *Sulidae* (Northern Gannet), *Hydrobatidae* (Wilson and Leach's Storm Petrels); *Phalaropodinae* (Pharlarope – Red and Red-necked), and *Procellariidae* (Northern Fulmar;, Cory's, Greater, Sooty and Manx Shearwaters), Information specific can be found in the 2005 EA Report (LGL).

The abundance and distribution of marine birds varies depending on the season. For instance, the Northern Fulmar (*Fulmaris glacialis*) is common throughout the year, whereas the Greater Shearwater (*Puffinus spp.*) is common from June to September, and absent from January to March. Leach's storm petrels are common from May to October, whereas the Black-legged Kittiwake is most abundant in the fall and winter. Dovekies while abundant in the winter are absent in the summer. Birds that are common throughout the year include murres, and gulls.

2.2.4 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. The following table identifies the species likely to be present and their SARA listing.

Species	SARA Status
Blue Whale (<i>Balaenoptera musculus</i>)	Schedule I - endangered
North Atlantic Right Whale (<i>Eubalaena glacialis</i>)	Schedule I - endangered
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	Schedule I - endangered
Northern Wolffish (<i>Anarhichas denticulatus</i>)	Schedule I – threatened
Spotted wolffish (<i>Anarhichas minor</i>)	Schedule I - threatened
Atlantic (Striped) Wolffish (<i>A. lupus</i>)	Schedule I – special concern
Ivory Gull (<i>Pagophila eburnea</i>)	Schedule I – special concern

Species	SARA Status
Harbour porpoise (<i>Phocoena phocoena</i>) (Northwest Atlantic population)	Schedule II - Threatened
Fin Whale (<i>B. physalus</i>)	Schedule III – special concern
Northern bottlenose whale (<i>Hyperoodon ampulatus</i>) (Scotian Shelf population)	Schedule III – special concern
Sowerby’s beaked whale (<i>Mesoplodon bidens</i>)	Schedule III – special concern
Atlantic Cod (<i>Gadus morhua</i>)	Schedule III – special concern

Atlantic cod (*Gadus morhua*) are distributed over the Grand Banks. In the Jeanne d’Arc Basin area, the cod can be found on the continental slope to the east and northeast of the Project Area. In the summer cod are usually found in the shallower parts of the Bank, and move to the slopes of the Bank in the winter. Spawning occurs both inshore and offshore. Peak spawning times for cod in the Grand Banks peaks in May, with highest abundances in 3L, near the Study Area (Ollerhead *et al.* 2004). In recent years, DFO research surveys show that the in the 2J3KL areas, have failed to show substantial numbers of cod. In May 2003, COSEWIC listed the Newfoundland and Labrador population of cod (includes 3NO) as endangered (COSEWIC 2003) and is listed as special concern on Schedule III of the *Species at Risk Act*. DFO is reviewing whether Atlantic Cod should be placed on Schedule 1 of the *Species at Risk Act*.

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 stripped species. Atlantic wolffish, like striped wolffish is more abundant along the slope area in the fall.

The Ivory Gull may appear in low numbers in the Study Area. They are typically found on the edge of pack ice on the northern Grand Banks in late winter.

LGL (2005b) report that the blue whale is rarely sighted on the Grand Banks. Information on their abundance is limited.

The North Atlantic right whale is the most endangered species in the northwest Atlantic. 1996 population estimates indicate that there are approximately 284 individuals.

Population estimates of Leatherback turtles are between 26,000 and 43,000 species worldwide (LGL 2005b). Adult leatherback turtles are commonly sighted in the waters off Newfoundland from June to October, with peak abundance in August. 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.

2.3 Research Surveys, Vessel Traffic, Recreation and Tourism

The EA report does not provide any information regarding recreation use or tourism. Vessel traffic with respect to fishing vessels is discussed in terms of amount of commercial fishing activity. Vessel traffic with respect to fishing vessels is discussed in terms of amount of commercial fishing activity. Information regarding DFO vessel research surveys are provided in the EA Report. For the 2005 survey season, research surveys may be held in the DFO Newfoundland Region, but are dependent on vessel time. The 2005 EA Report provides a list of potential DFO research surveys. In the 3L area, multi-species surveys will likely be undertaken from May 14 to June 17, and October to December 2005. A crab trapping survey is likely to occur beginning May 24 through to June 12 in the 3L area. Husky Energy will be required to communicate with Fisheries and Oceans to avoid any potential conflict with research surveys that may be operating in the area.

Part C: Environmental Assessment Process

3. Procedures

In accordance with Section 18 of the *Canadian Environmental Assessment Act* (CEA Act), and in keeping with the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB, April 2004), the C-NLOPB has carried out an environmental screening for the proposal based on the Application, public concerns and specialist advice.

The C-NLOPB, as Responsibility Authority (RA), has an obligation to determine the scope of the Project in relation to which an environmental assessment is to be conducted. On 19 January 2005, the C-NLOPB initiated a scoping process in accordance with the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements* (Federal Coordination Regulations) in order to meet its obligations under the *CEA Act*. Responses to the proposed scope and an identification of each department or agency's role with respect to the Project were to be received by 15 February 2005. Comments received up to and including 18 February 2005, were considered in the scoping document. Federal Coordination responses and comments were received from the Department of Fisheries and Oceans, Environment Canada, Natural Resources Canada, Transport Canada, and National Defence as a result of this scoping process.

The 2005 EA Report (LGL 2005b) was submitted by the Husky Energy on 16 March 2005 and an addendum to this report was submitted on 18 July 2005. The RA requested comment from federal and provincial authorities by on the EA report by 02 May 2005 and on the addendum by 26 August 2005. Comments received up to and including 28 August 2005, were considered by the C-NLOPB in completing this screening report. Comments were received from DFO and EC.

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 addendum, it would constitute a single project for the purposes of Section 15(2) of CEEA. For the purposes of Subsection 15(3) of CEEA, 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 Husky Energy that is likely to be carried out in relation to their proposed Project.

3.1 Scope of Project

Husky Energy is proposing to conduct 3D seismic surveys and wellsite/geohazard surveys on ELs 1065, 1067, 1089, and portions of EL 1090 and 1091 over the next three years. In 2005 a 3D seismic survey will be carried out on EL 1067 and 1089 in an area approximately 1500 km². The 2005 3D seismic project includes the transit of the seismic vessel from the Laurentian Subbasin to the Project area with the streamers in tow. It will take approximately 77 hours transit time to the Project Area. Geohazard surveys will be undertaken as required in 2005 through to 2007. This screening report therefore considers the activities associated with 3D and geohazard surveys within 2005 to 2007, and the transit of the seismic vessel on the Grand Banks during September 2005. Seismic surveys and geohazard may be conducted between May to October in each year, whereas geohazard surveys may be conducted from May to December each year.

For the 2005 3D seismic program, a single seismic vessel will collect data using a multiple streamer configuration with 10 streamers towed behind the vessel. A 5085 in³ airgun array (3 sub-arrays each at 1695 cu. in) 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 106.4 bar-m (or 242.5 dB re 1 µPa (rms)). The wellsite surveys include the acquisition of geotechnical and geophysical data. WSS typically involve a four sleeve-gun array and a single streamer, side scan sonar, Hunttec Deep Tow System (DTS) sub bottom profiler, single-beam echo sounder, and, if required a magnetometer.

At the time application for additional seismic or wellsite surveys in the Project Area, the operator will be required to provide information to the C-NLOPB which outlines the proposed activities, confirm that the proposed program activities program falls within the scope of the previously assessed program, provide an update to existing environmental information, if applicable, and indicate if with this information, the EA predictions remain valid. If there are any changes in the scope or information is 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.

3.2 Boundaries

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

<i>Boundary</i>	Description
<i>Temporal</i>	May to October 31 each year up to 2007; duration for 2005 seismic – 30 days; duration for WSS any year – up to 14 days each survey; duration for seismic in 2006 and 2007 – up to 90 days each year

<i>Project Area</i>	defined as the area incorporating ELs 1065, 1067, 1089, and the northerly portions of EL 1090 and 1091. .
<i>Study Area</i>	An area around the Project Area large enough to encompass effects reported in the literature
<i>Affected Area</i>	varies according to specific vertical and horizontal distributions and sensitivities of each VEC of interest and is defined as the area within which effects (physical or important behavioural ones) have been reported to occur;
<i>Regional Area</i>	is the boundary of the Grand Banks as defined in the Hibernia, Terra Nova, and White Rose EA reports; however, this Regional Area only applies to cumulative effects assessment, not project –environment interactions

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.

3.3 Scope of Assessment

For the purpose of meeting the requirements of the CEEA and the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB, April 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 CEEA and those listed in the “*Husky Energy Seismic Program - Jeanne d’Arc Basin Area Scoping Document*” (C-NLOPB 2005).

4. Consultation

4.1 Consultation carried out by Husky Energy

Husky Energy, as reported in the 2005 EA Report held consultation meetings with the Department of Fisheries and Oceans, Environment Canada, One Ocean/FFAWU, the Natural History Society, the Association of Seafood Producers; Fishery Products International, Clearwater Seafood’s Limited Partnership; and Iceswater Harvesting. All consultation were held to inform the stakeholders about the survey and to identify issues or concerns which should be considered in the EA. Representatives of the fish harvesting sector informed the Operator of planned fishing activities in the 3L area and the timing of those activities. There were no concerns or issues raised by the stakeholders concerning the conduct of the 3D seismic program, wellsite surveys nor the environmental assessment process.

The C-NLOPB is satisfied that the consultations carried out by Husky Energy and reported on in the 2005 EA Report and addendum information, 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 2005 field season.

4.2 Consultations with other Federal Authorities and Other Government Departments

In accordance with the CEA Act and the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements* and the Board's environmental assessment procedures, various federal and provincial government departments were notified on 16 July 2004 regarding Husky Energy's proposed program. Prospective Federal Authorities were provided with a draft scope of project, scope of assessment and factors to be assessed (Scoping Document). The following agencies were notified:

- Department of Fisheries and Oceans (DFO),
- Environment Canada,
- Department of National Defence,
- Canadian Environmental Assessment Agency,
- Transport Canada,
- Natural Resources Canada,
- Newfoundland and Labrador Department of Environment and Conservation,
- Newfoundland and Labrador Department of Fisheries and Aquaculture, and
- Newfoundland and Labrador Department of Natural Resources.

DFO replied on July 30, 2004 that it was a federal authority and that it will provide expert advice on the review of the EA report. Comments on the WSS EA report were submitted by DFO on May 5, 2005 and focussed on clarification of information provided in the EA, and concerns for species at risk during seismic data acquisition. *The C-NLOPB through its condition of authorization will require ramp-up/shut-down procedures for Schedule 1 Species at Risk Act. These procedures address DFO concerns. All other comments will be provided to Husky Energy for consideration in future programs.*

Environment Canada responded on 30 July 2004, that it was a federal authority and that it will provide expert advice on the review of the EA report. Comments on the WSS EA were received on 28 April 2005 and requested clarification to some of the information presented in the report on migratory birds. These comments will be provided to Husky Energy for consideration in future environmental assessments.

Natural Resources Canada responded on 22 July 2004 that it was a federal authority and that it could provide expert advice on the review of the EA report. Given the nature and short duration of the project, the C-NLOPB did not seek advice from NRCan for this wellsite survey.

The Department of National Defence responded on 19 July 2004 that it would not be providing expert advice on the review of the EA report.

5. Environmental Effects Analysis

5.1 Methodology

The C-NLOPB reviewed the environmental effects analysis presented by Husky Energy in the 2005 EA Report. A VEC based assessment based on the interaction of project activities on the identified VECs, was used in assessing environmental effects, including cumulative effects and

accidental events. 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 2005b) 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; and
- 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*

5.2 Valued Ecosystem Components/Potential Environmental Effects

5.2.1 Eggs, Larvae and Planktons

0

The EA reports that studies to date on the effects on eggs, larvae and plankton indicate that the damage is minimal and the effects were not different than the experimental controls. Mathematical modelling by Saetre and Ona (1996, as reported in LGL 2005b) indicate that mortality effects on eggs and larvae are comparable to natural mortality, and can be considered insignificant. No specific mitigation is indicated. Impacts are predicted to be negligible and **not significant**.

5.2.2 Impacts on Fish

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. Other studies referenced in the EA report indicated that fish mortality did not result from exposure to seismic sound sources. Stress responses (physiological effects) to seismic exposure occur in fish but are temporary. Stress responses to seismic exposure occur in fish but are temporary. Christian *et al.* (2005) report that the temporary nature of these responses vary depending on the fish species and the sound source. Behavioural responses to seismic have been documented in a number of studies and reported by Christian *et al.* (2004). In general, fish show startle response and change in 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 (Christian *et al.* 2005). LGL (2005b) reports that the temporary nature of these responses vary depending on the fish species and the sound source. Studies to determine effects on the auditory thresholds of fish have shown that the temporary threshold shift (TTS) can occur in fish exposed to seismic, under certain conditions. However in the studies referenced by LGL (2005b) hearing sensitivity recovered within 14 days of exposure. Behavioural responses to seismic have been documented in a number of studies and reported by LGL (2005b). In general, fish show startle response and change in 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 2005b).

LGL reports that physical effects on fish will be of low magnitude, in an immediate area (<1 km²), 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 low, of medium, but not constant duration (1 - 12 months) with a geographic extent of <1000 km². The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

5.2.3 Invertebrates (Commercial Species)

1

The results from an ESRF sponsored study (Christian *et al.* 2004), indicate that there was no pathological (acute or chronic mortality) effects on caged male or female snow crab from an airgun array passing over at close range. However, there was a significant difference in development rates between exposed and unexposed fertilized eggs from a single female. Christian *et al.* (2004, as reported in LGL 2005b) reported that there was no significant difference in stress indicators between exposed and non-exposed adult male snow crab. The 2005 EA Report (LGL 2005b) reports on a study conducted by DFO in 2003 on caged egg-bearing female snow crabs exposed to a commercial seismic survey. LGL (2005b) reports that the observations from the study show that there were no acute or chronic mortality to the crab or to feeding activity of treated crabs held in a laboratory; for egg-bearing females exposed to seismic energy, the survival of the embryos being carried by the female, nor the locomotion of the larvae after hatch were affected. Results of a study on shrimp, as summarized by LGL (2005) exposed to a noisy environment show that there were significant differences in growth and reproduction rates between two groups. The noisier environment shrimp showed lower rates than the shrimp in the quieter environment.

In the Christian *et al.* (2004) study, a decrease in catch rate of the snow crab was not observed after seismic shooting commenced. LGL (2005b) also report that another experiment where caged snow crab were exposed to an airgun array there were no startle behaviours observed. In studies on squid species, as summarized in the EA report, startle responses were observed such as movement towards the water surface, and an increase in swimming speed. If the airgun was not ramped-up the squid fired ink sacs, this did not occur if the array was ramped up.

Any potential physical or behavioural impact to invertebrate species finfish is considered to be negligible to low, immediate to sub-local in geographic extent, immediate in duration, and would have a low likelihood of occurrence. The likelihood of effects (behavioural and physical) is low and therefore **not significant**.

5.2.4 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 has resulted in a dispersion of fish species, and subsequently reduced catch rates in the studies referenced by LGL (2005b) for short duration. Section 2.2.1 above indicates that there is likely to be some fishing in the project area. There is potential therefore for interaction between seismic operations (streamers) and fishing gear, especially fixed gear such as gillnets and crab pots. Husky Energy 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 at sea, communication with fisheries (notice to mariners) and DFO research vessels, and a fish gear compensation plan.

During vessel transit from the Laurentian Subbasin, there was potential for interference with the towed streamers and fixed gear in fishing area 3PSh (Canning and Pitt, 2005). Based on 2004 catch data for September, it was estimated that fishing would likely occur in the same location as in 2004 along a portion of the transit route. To avoid these fishing locations, the original proposed transit line was moved to the north. Fishing data shows that the new transit line should avoid most fixed gear. Mitigation measures which will be employed during transit include use of a Fisheries Liaison Officer and scout vessel during transit; a CCG Notice to Mariners, a single point of contact, and gear compensation plan.

To avoid potential conflict with DFO Research surveys, Husky Energy 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.

LGL predicts the WSS will have a negligible to low effect, be of short duration (< 1 month) with a geographic extent not greater than 1000 km². Taking mitigations into account, impacts to commercial fishery are not likely and **not significant**.

5.2.5 Marine Mammals and Sea Turtles 1

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 WSS EA and previous EA reports for the same study area describe in more detail the numbers and the species of cetaceans which have been observed in, or which are considered likely to frequent, the Regional Area. The EA Report provides an impact assessment, based on available data on the effects of seismic on marine mammals. Data is lacking concerning the potential for sub-lethal effects, with the exception of avoidance behaviour. Several different surveys in other marine areas indicate that avoidance behaviour usually is exhibited in response to airgun seismic

surveying (as reported in LGL 2005). For instance, in one study referenced by LGL (2005) baleen whales remained significantly further from active airguns than when the airgun were inactive. Median distances were reported at 1.6 km away from the array during shooting, whereas they were approximately 1 km from the array when it was inactive. LGL also report that fin/sei whales are less likely to remain underwater when airgun are active. There is a risk that auditory damage may occur, including temporary hearing impairment, at close range to the array. However, as LGL reports (2005), there is uncertainty in predicting these effects because of the data gaps.

There are a number of mitigations recommended by various organizations (JNCC, MMS) which when applied can reduce impacts to marine mammals and sea turtles in the vicinity of a seismic survey (ramping up of airguns, use of observers, shut-down procedures, etc.). The WSS EA report lists a number of mitigations that will be implemented during the seismic program, 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 shut down procedures during ramp-up, the C-NLOPB will also require that the airguns be shut down if a marine mammal or sea turtle, listed as endangered (as per SARA Schedule 1) including the North Atlantic right whale, Blue whale, or leatherback turtle is observed within 500 m of the airgun array.***

Sea turtles are likely to show avoidance behaviour during seismic surveys. However the extent of avoidance is unknown (LGL 2005b). LGL (2005) 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 2005 EA Report) should reduce impact. The effects on sea turtles are predicted to be of negligible to low magnitude, medium geographic extent (up to 1000 km²), low frequency and reversible. With the application of mitigation measures, the overall likelihood of effects occurring is low, and effects will be **not significant**

The effects on marine mammals are predicted to be of low magnitude, short duration (<1 month) medium geographic extent (up to 1000 km²), low frequency and reversible. With the application of mitigation measures, the likelihood of effects occurring is low, and effects will be **not significant**.

5.2.6 Marine Birds

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The EA reports that the effects of seismic sound on seabirds is unknown. EA report indicates that murre and shearwaters may be potentially the most sensitive group due to their time spent underwater diving for food, and can reach great depths (up to 100 m below water). Shearwaters 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, Husky Energy or its contractor will release the birds in a manner consistent with CWS bird handling procedures. The effects are predicted to be of low magnitude, with a small geographic extent and of short duration. Therefore, the environmental effect is not likely and **not significant**.

5.2.7 Species at Risk

LGL report that leatherback turtle may occur in the project area. As indicated above, effects on turtles are likely to be not-significant, therefore effects on the Leatherback turtles are not likely to be adverse and therefore **not significant**.

Blue whales are reported by LGL to be rare in the project area, therefore the potential for interaction with project activities is unlikely. Effects therefore will be **not significant**.

LGL reports that the North Atlantic right whale may be rare in the project area, but do occur further to the south. As indicated above, the effects on whales, including baleen whales is predicted to be not significant, therefore the effect on the North Atlantic Right whale will be **not significant**.

5.2.8 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 on marine water quality will be negligible and **not significant**.

5.3 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, as a result of total vessel loss.

The vessel is required to carry "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.

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.

5.4 Cumulative Environmental Effects

Adjacent to the Project Area in the White Rose field, there is are two drilling program ongoing. One is scheduled to be completed by the end of November. A 3D seismic program is ongoing to the north of the Project Area. A 2D seismic program is ongoing off the coast of Labrador. Ongoing activities include production and drilling activities at Hibernia and Terra Nova, and construction activities at White Rose. Commercial fishing will be occurring in the Regional Area. In 2005, therefore, activities that may overlap in time and space with the seismic program are likely to be commercial fishing, DFO/Industry research surveys, and marine transportation. Temporal overlap of activities include 3D seismic program and drilling programs in areas adjacent to the Project Area. The seismic 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 WSS (<1 month) and proposed drilling program (<3 months). There cumulative effects may be additive, however the geographic extent

is small and represents a very small portion of the overall 30 fishing area. Any effects on fish or marine mammals, therefore may be additive, but **not significant**.

5.5 Follow-up Monitoring Required Yes No

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

6. Other Considerations

The C-NLOPB is satisfied with the environmental information provided by Husky Energy regarding the potential adverse environmental effects which may result from the proposed 3D seismic and wellsite 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 2005 EA Report and the addendum, and those listed below are implemented, the Project is not likely to cause significant adverse environmental effects.

6.1 Recommended Conditions and/or Mitigations

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

- *Husky Energy 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 “Northern Jeanne d’Arc Basin Seismic Program Environmental Assessment (14 March 2005) the ““Northern Jeanne d’Arc Basin Seismic Program Geohazard Surveys Environmental Assessment Addendum” (18 July 2005), and the “Transit Route Fishery Analysis for Husky Energy” (Canning and Pitt, 21 September 2005)*
- *Husky Energy shall implement or cause to be implemented the mitigation measures outlined in Appendix 2 of the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2004) respecting 3D seismic programs.*
- *For any wellsite surveys undertaken, Husky Energy shall implement or cause to be implemented the mitigation measures outlined in Appendix 2 of 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*
- *Husky Energy or its contractors shall shut down the seismic array if a marine mammal listed as **endangered** (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 ramp-up procedures and when the array is active.

Part D: Screening Decision

7. Decision/Decision Date

The Canada-Newfoundland 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 Husky Energy, 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: September 21, 2005

References:

LGL. 2005a. Northern Jeanne d'Arc Basin Seismic Program Draft Project Description. Prepared for Husky Energy.

LGL. 2005b. Northern Jeanne d'Arc Basin Seismic Program Environmental Assessment. Prepared for Husky Energy.

LGL. 2005c. Northern Jeanne d'Arc Basin Seismic Program Environmental Assessment Addendum.

Canning and Pitt. 2005. Transit Route Fisheries Analysis For Husky Energy. (21 September 2005)

Ollerhead, L.M.N., M.J. Morgan, D.A. Scruton, and B. Marrie. 2004. *Mapping spawning times and locations for 10 commercially important fish species found on the Grand Banks of Newfoundland*. Can. Tech. Rep. Fish. Aquat. Sci. 2522: iv + 45 p.