

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

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**Part A: General Information**

<b>Screening Date</b>	<b><u>May 26, 2006</u></b>
<b>EA Title</b>	Husky Delineation/Exploration Drilling Program for Jeanne d’Arc Basin Environmental Assessment  Husky Delineation/Exploration Drilling Program for Jeanne d’Arc Basin Environmental Assessment Update
<b>Proponent</b>	Husky Oil Suite 901, Scotia Centre 235 Water Street St. John’s NL A1C 1B6
<b>Contact</b>	Mr. Don Williams Manager, HSEQ
<b>C-NLOPB File No.</b>	7705-H62
<b>CEAR No.</b>	05-01-9005
<b>Referral Date</b>	January 19, 2005 Update - March 06, 2006
<b>EA Start Date</b>	June 14, 2005 Update – March 07, 2007
<b>Location</b>	Jeanne d’Arc Basin Area, North eastern Grand Banks – White Rose field (SDLs 1018/1019/1020/ 1021/1022/1023/1024/1025/1026/1027/1028/1029/ 1030/1043//1044/1045/Trave and ELs 1044, 1045, 1090 and 1091

**Part B: Project Information**

In January 2005, Husky Energy submitted a project description “*Husky Delineation/Exploration Drilling Program Jeanne d’Arc Basin Project Description*” (LGL 2005) to the C-NLOPB, in support of its application to drill up to 10 exploration and delineation wells on acreage held by the operator in the Jeanne d’Arc Basin area over a three year period. A screening level environmental assessment was completed on August 18, 2005. The “*Husky Delineation/Exploration Drilling Program for Jeanne d’Arc Basin Area Environmental Assessment*” (LGL 2005) (herein referred to as the 2005 EA report) provided an environmental assessment of a multi-well drilling program over a three year period. However in order to address deficiencies in

the EA report, Husky Energy was required to submit an environmental assessment update (EA update) for review prior to the commencement of drilling activities in 2006.

The EA Update was submitted on March 7, 2006. and The Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area Environmental Assessment Update (LGL 2006) (herein referred to the 2006 EA Update) describes a modified drilling program from the one assessed in 2005 and addresses regulatory review comments on the 2005 EA report. Husky Energy is now proposing to drill up to 15 wells from 2006 through to 2010.

In completing this Screening Report, information from the 2005 EA Report and the 2006 EA Update was summarized and is included in the following sections.

## **1. Description of Project**

Husky Oil proposes to drill up to 15 exploration/delineation wells in the Jeanne d'Arc Basin area during 2006 to 2010. In 2006, Husky is proposing to drill four to six wells, and for each subsequent year up to four wells per year could be drilled. The wells will be drilled using a semi-submersible or a jack-up mobile operating drilling unit (MODU). The project includes marine support vessels – for shipping goods and personnel to the MODU, helicopter support and shore based facilities – using existing facilities in St. John's Harbour, and wellhead abandonment. VSP profiles, wellsite surveys, and geotechnical drilling may be required for any of the 15 wells drilled. An onsite Environmental Observer (EO) will be onboard the MODU to record and report weather, oceanographic and ice conditions. The EO or an alternate will also conduct seabird and marine mammal observations on a daily basis

If a jack-up rig is to be used, the Board will only authorize the rig to operate in a pre-determined operating window. The operating window will be determined annually by the Board and will depend on the 'ice free period'<sup>1</sup> and weather conditions. For 2006, the C-NLOPB determined the jack-up operating window is from the beginning of April to the end of November. Husky Energy indicates that the wells will be drilled over a four year period either in the pre-determined weather window (in the case of jack-ups) or at anytime throughout the year (for semi-submersible rigs). Wellsite surveys, VSP and geotechnical drilling may be carried out on an as-needed basis at any time of the year.

Drilling will occur in water depths ranging from 100 to 120 m. Water based muds (WBM) will be used for vertical wells, where practicable. However, for deviated wells, synthetic-based muds (SBM) may be used.

For 2006, drilling is scheduled to commence in mid to late May. It is anticipated that it will take approximately 40 days to drill each well, and an additional 20 days if well testing is undertaken.

## **2. Description of Environment**

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<sup>1</sup> Ice free season will be defined by the C-NLOPB annually, based on actual ice conditions, and will take into consideration ice data analysis provided in the "Characterization of Ice-Free Season for Offshore Newfoundland" (C-CORE 2005), commissioned by the C-NLOPB.

## **2.1 Physical Environment**

The 2005 EA Report (LGL 2005) and the 2006 EA Update (LGL 2006) provides a detailed description of the physical environment for the Jeanne d'Arc Basin area. Physical environment information can also be found in the Husky White Rose Comprehensive Study documents (Husky 2000 and 2001).

The Project Area is located on the Northeastern Grand Banks, offshore Newfoundland, in water depths ranging from 100 to 120 m. Physical environmental conditions considered in the environmental assessment include wind, wave and currents; air and sea temperatures; visibility (fog); and, sea ice and icebergs.

### **2.1.1 Wind, Waves and Currents**

On average, winter winds are from the west, west-southwest in the project area. A prevailing southwest wind occurs in the summer months. Wind speeds are higher in the winter months, with maximum wind speeds measured at 30 m/s in February.

Wave data presented in the 2005 EA Report show that the highest sea states occur in the Project Area during storm events, which typically occur from October to March. The lowest significant wave height in the area ranges from 1.7 m (monthly mean) in July to 4.1 m (monthly mean) in January. The maximum monthly mean significant wave heights measured are 6 m in July to 14 m in January/February.

Current data at various wellsites in the White Rose field show that the maximum near-surface current measured 89.9 cm/sec (1999) and a maximum mean of 27 cm/sec (1999). At mid-depth the highest current was 43.7 cm/sec (1985) with a maximum mean of 12.1 cm/sec (1999). At bottom, the maximum current measured 50.6 cm/sec (1985), with a maximum mean of 13.0 cm/sec (1988).

### **2.1.2 Air and Sea Temperatures**

Mean sea surface temperatures range from -0.3 C(mean) in February to a 13.1 C in August. Mean air temperatures range from a low of -0.9 C in February to 13.6 in August.

### **2.1.3 Visibility**

Reduced visibility on the Grand Banks occur primarily to fog in the warmer months, whereas snow reduces visibility in the winter months. On average, July reports the highest number of low visibility days with poor visibility reported in 55% of reports, primarily due to advection fog. October has the highest number of reported good visibility at 78%.

### **2.1.4 Sea Ice and Icebergs**

The project area can expect to see sea ice cover once every three years and can vary in duration from one week to eleven weeks (LGL 2005). Sea ice can vary in thickness from 30 to 100 cm. Concentrations of sea ice range from 2/10ths to 6/10ths. In extreme ice years concentrations have been 9/10ths coverage. Sea ice may be found in the Project area from mid-January to the end of April (LGL 2005). Historical data show that icebergs have occurred in the project area at least once per month from January to December. Maximum numbers of iceberg spotted in the

Project area is over 210, with the mean numbers occurring per year is approximately 50. Data analysis provided by C-CORE (2005), based on pack ice occurrence once in five years, indicate that pack ice occurrence in the White Rose area is from March to April. Data for icebergs based on occurrence less than once in 5 years, show that the White Rose area is iceberg free August to January (C-CORE 2005).

## **2.2 Biological Environment**

The information presented in the 2005 EA Report is presented below, and updated where additional information has been provided in the 2006 EA Update.

### **2.2.1 Plankton**

Planktons are found in the Study Area. Phytoplanktons generally undergo explosions in populations, commonly referred to as blooms. These usually occur in the spring (April/May) and, for some species, and again in the fall-early winter (October/January) of the year. Recent studies by DFO, as indicated by LGL (2005), show lower concentrations across most Grand Banks compared to 1999. However, phytoplankton concentrations were found to be greatest in the upper 60 m of water in the area of the continental slope where the Labrador Current is strongest.

Copepods are the dominant zooplankton species in the waters of Newfoundland; they feed on phytoplankton, but are prey for larger zooplankton and fish. (LGL 2005). The composition of the zooplankton community in 2001 was similar to that reported in 1999 and 2000. However, the abundance of gastropods (pelagic) was higher than in previous years. Overall, zooplankton abundance showed similar densities in spring and summer as in previous years.

### **2.2.2 Benthos**

The benthic community is very diverse and includes a number of invertebrate species such as polychaete worms, molluscs, and crustaceans. Substrate and water depth determine the composition of benthic community structures. In the southern extent of the Study Area, abundant species include echinoderms (sand dollars, sea urchins, sea stars and brittle stars), molluscs, and crustaceans (crabs) as indicated by 2001 studies undertaken by Husky in Gros Morne (EL 1065) and Trepassy (EL 1044).

The environmental effects monitoring program at White Rose, as reported in the 2005 EA report, indicate that polychaetes and bivalves are the most abundant species. LGL reports (2005) recent DFO surveys near the White Rose area describe the area as dominated by polychaetes, crustaceans, echinoderms, and molluscs.

### **2.2.3 Fish and Invertebrates**

Proposed drilling activities will occur in the North Atlantic Fisheries Organization (NAFO) unit area 3Lt. Within this area, and in the larger 3L UA, there are a number of fish species that are commercially harvested. A detailed description of these species is provided in the 2005 EA report and the 2006 EA Update.

Fish species in the area include snow crab, northern shrimp, American plaice (*Hippoglossides*

*platessoides*), Atlantic cod (*Gadus morhua*), Greenland halibut, and Atlantic halibut.

Snow Crab (*Chionoecetes opilio*) prefer water temperatures ranging from -1C to 4C. Soft bottom substrates and water depths over 70 m are primarily habitat for larger snow crabs. Smaller crabs prefer hard substrates. Mating occurs in early spring with the females carrying the fertilized eggs for two years. Hatching occurs in early spring, with larvae remaining in the water column for up to 15 weeks before settling on the bottom. LGL reports that the exploitable biomass and recruitment in NAFO Divisions 2J3KL are declining.

Northern shrimp spawn in the shallower inshore waters in the late summer. Eggs remain attached to the female for one year. Data presented in Ollerhead *et al.* (2004) show greatest occurrences of shrimp along the eastern and northern edges of the Grand Banks in UA 3LN.

Atlantic Halibut (*Hippoglossus hippoglossus*) is the largest of the demersal flatfish species. Halibut are generally found near the slopes of the shelf at temperatures near 5°C, and at depths between 200 and 500m. They move seasonally between the deep and shallow waters. Spawning generally occurs from February to May in soft bottom areas, at depths from 180 to 1000m. The fertilized eggs remain at 300-400 m depths but gradually make the transition to the bottom habitat during its juvenile stage.

Greenland Halibut (turbot) *Reinhardtius hippoglossoides* is a deepwater flatfish preferring water temperatures from -0.5 to 6.0 C, and are typically harvested at water depths greater than 450 m. Spawning is likely to occur in the Davis Strait in the winter and early spring. Spawning may also occur in the Laurentian Channel and Gulf of St. Lawrence in the winter months. Turbot are widely distributed along the deep slopes of the shelf and in the deep channels, primarily in NAFO areas 2GH and 2J3K.

#### **2.2.4 Commercial Fisheries**

NAFO Unit Areas 3Li and 3Lt include the Study Area for the proposed drilling program. Within 3Li and 3Lt, the 2005 EA Report indicate that commercial fishing activity is dominated by snow crab and northern shrimp. Within the Study Area, the crab fishery is the dominant fishery accounting for 100% of the total harvest in 2004 (LGL 2005). Fishery data for 2005, as presented in the 2006 EA Report, show the same trend in fishing activity in 3Li, 3Lt and within the Study Area. Snow crab is harvested with crab pots, a fixed gear. Within the Study Area, the crab fishery is concentrated along the eastern side of 200 mi EEZ. The execution of the crab fishery is dependent on management plans set by DFO. It typically occurs from May to August, with harvesting activity peaking in May to June.

#### **2.2.5 Marine Mammals and Sea Turtles**

There are 16 species of cetaceans and three species of seals that are known to occur in the area (LGL 2005). Baleen whales most likely to be found in the Study area include the blue (*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 catodon*), northern bottlenose (*Hyperoodon ampullatus*), Sowerby's beaked (*Mesoplodon bidens*), killer (*Orcinus orca*), long-finned pilot

whales (*Globicephala melaena*), the common dolphin (*Delphinus delphis*), white-beaked (*Lagenorhynchus acutus*), Risso's (*Grampus griseus*) striped dolphin (*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 known to occur in the Project area. These include the Leatherback turtle (*Dermochelys coriacea*), the loggerhead turtle (*Caretta caretta*), and the Kemp's Ridley turtle (*Lepidochelys kempii*). The Leatherback turtle is listed as Endangered under the *Species at Risk Act*. Leatherback and Loggerhead turtles are likely to occur in the Study Area. The Kemp's Ridley turtle is rare in Canadian waters.

Preliminary data from the marine mammal observations undertaken during Husky's 2005 3D seismic program in October and November 2005 is summarized in the 2006 EA Update. The data indicate that baleen whales were the most numerous marine mammal observed, including humpback whales, fin whales and minke whales. Husky Energy reports that few dolphins were observed. Of the 23 sightings of dolphins, there were two sightings of white-sided dolphins, one sighting of white-beaked dolphin, one sighting of common dolphins and two sightings of unidentified dolphins. There was one sighting of a beaked whale species. Husky indicates that this was likely Sowerby's beaked whale. Two harbour porpoises were also observed in the project area.

### **2.2.6 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* (Phalarope – 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. In its review of the 2005 EA Report, Environment Canada provided a list of updated scientific references for the operator to consult in preparing the 2006 EA Update. Husky Energy reviewed the literature and provided an update on the status of a number species for the Study Area. They are presented in the 2006 EA Update.

### **2.2.7 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
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. They are listed as Special Concern, and their status will be reviewed in May 2006. LGL (2006) report that the global population of the Ivory Gull is approximately 14,000 breeding pairs. Recent surveys in 2002 and 2003 of historic breeding sites in the Canadian Arctic showed an 80% decline in the numbers of nesting Ivory Gulls.

LGL (2006) reports that there is insufficient data to determine population trends of the Blue whale in the northwest Atlantic. It is listed as a Schedule I Endangered Species under the SARA, and a recovery strategy is being developed. In the north Atlantic, the population of the Blue whale may range from 600 to 1500 individuals. One known area of blue whale concentration, as reported by LGL (2006) is the Gulf of St. Lawrence where 350 individuals have been photographically catalogued. In the waters off Newfoundland, very little is known regarding their presence or distribution. LGL (2006) report that the blue whale is rarely sighted on the Grand Banks and there have been no confirmed sightings in or near the Project Area.

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.

Husky Energy has indicated that they will consult with DFO and Environment Canada each year regarding changes to the SARA Schedule 1 listing, recovery strategies and any mitigation measures that may be required as they relate to SAR.

### **2.3 Research Surveys, Vessel Traffic, Recreation and Tourism**

Vessel traffic with respect to fishing vessels is discussed in terms of amount of commercial fishing activity (see Section 2.2.2). For the 2006 survey season, research surveys will occur in the 3L area, but the timing of those surveys is yet to be finalized. However, the 2006 EA Update indicates that the surveys will likely be similar to those carried out in 2005. Therefore, it is estimated that in the 3L area, multi-species surveys will likely be undertaken from mid May to end of June and during October to December 2006. A crab trapping survey is likely to occur from mid to late May. 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 2005, the C-NLOPB completed an environmental Screening report, pursuant to the *Canadian Environmental Assessment Act* (CEA Act) for an exploration/delineation drilling program as proposed by Husky Energy and described in the 2005 EA Report. Of the 10-well program, only



two wells were drilled in 2005. Husky Energy was required to submit an update to the 2005 EA report, to address deficiencies in the report and to provide an assessment of effects for drilling activities beyond 2005. Husky submitted the EA Update on March 7, 2006.

The C-NLOPB, as Responsibility Authority (RA), forwarded the 2006 EA Update on 08 March 2006 to the DFO, Environment Canada, and provincial Departments of Fisheries and Aquaculture, Natural Resources, and Environment and Conservation. Comments received up to April 25, 2006 were considered by the C-NLOPB in completing this Screening Report Update. 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, 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 Husky Energy that is likely to be carried out in relation to their proposed Project.

### **3.1 Scope of Project**

The operator, Husky Energy, proposes to drill up to 15 delineation/exploratory wells on lands held by them in the Jeanne d'Arc Basin, in an area encompassing the White Rose field (SDLs 1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1043/1044/1045/ Trave and ELs 1044, 1045, 1090 and 1091. The temporal scope of the project is from 2006 through to the end of 2010.

Either a semi-submersible, operating year round, or a jack-up rig operating within the designated ice-free period will drill the wells. Husky is proposing to drill from four to six wells in 2006. Typically each well requires 40 days to complete, and if testing is required, an additional 20 days, for a total of 60 days per well. The drilling program includes all ancillary activities in support of a drilling program, such as the use of a MODU (jack-up or semi-submersible), transportation of goods via supply boats, helicopter support, operation of shore-based facilities, and the conduct of vertical seismic profiling, geotechnical programs and geohazard/wellsite survey programs.

At the time of application for subsequent drilling program authorizations in the Study Area, Husky Energy will be required to provide information to the C-NLOPB which outlines the proposed activities, confirms that the proposed program activities falls within the scope of the previously assessed program, and indicates if with this information, the EA predictions remain valid. In addition, Husky Energy 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 I; 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.

### 3.2 Boundaries

The boundaries of the Project are defined in the 2005 EA Report are as follows and are acceptable to the C-NLOPB.

<b>Boundary</b>	<b>Description</b>
<b>Temporal</b>	Year-round (semi-submersible) from 2006 to 2010 Annual designated 'ice-free' season (see Footnote 1) for jack-up;
<b>Project Area</b>	2006 –SDL 1024, 1026 and 1044; Project areas for 2007-2010 will be defined based drilling activities in those years.
<b>Study Area</b>	SDLs-1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/ 1029/1030/1043/1044/1045/Trave and ELs 1044, 1045, 1090 and 1091.

For seismic programs (VSPs, geohazard surveys) undertaken, 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 CEA Act and the Drilling Program Authorization, 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 “*Husky Delineation/Exploration Drilling Program for 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 2006 EA Update, contacted the Department of Fisheries and Oceans, Environment Canada, One Ocean, FFAW, Natural History Society, various fish harvesters and processors, and the Association for Seafood Producers. All consultation were held to inform the stakeholders about the proposed drilling program and to identify issues or concerns which should be considered in the EA. The 2006 EA Update does not list any concerns or issues raised by the stakeholders.

The C-NLOPB is satisfied that the consultations carried out by Husky Energy and reported on in the EA Report and supplemental 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.

## **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 08 April 2006 regarding Husky Energy's proposed program. Prospective Federal Authorities were provided 2006 EA Update for review and comment. The following agencies were notified:

- Department of Fisheries and Oceans (DFO),
- Environment 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 provided comments on 05 April 2006. DFO questioned the discussion provided in the EA Update regarding water masses and their relation to drill cuttings deposition and provided additional comments on Husky's response to DFO 2005 EA review comments. *The C-NLOPB will forward the comments to Husky Energy for their consideration.*

Environment Canada responded on 25 April 2006. Environment Canada provided several comments regarding Husky Energy's discussion on wind speed and wave height. *The C-NLOPB will provide these comments to Husky Energy for their consideration.*

For the other agencies contacted, either no response was received, or they responded that they did not have any environmental assessment requirements for the proposed drilling program.

## **5. Environmental Effects Analysis**

### **5.1 Methodology**

The C-NLOPB reviewed the environmental effects analysis presented by Husky Energy in the 2006 EA Update. The EA approach was consistent with that used in the 2005 EA report (LGL 2005) and provided an update to the VEC based assessment in consideration of new information that was available. 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 2006) 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*

Upon review of the information of the effects assessment presented by Husky Energy in the 2006 EA update, including proposed mitigations, the following effects assessment, as completed in 2005 remains unchanged

## **5.2 Effects of the Environment on the Project**

The variable and sometimes harsh climate on the Grand Banks and the potential for sea ice and icebergs during the winter and springs months can pose significant challenges to drilling operations. As described in the 2005 EA Report (LGL 2005), and in the C-CORE report (2005) the Project Area is 'ice-free' from July to January. As part of its monitoring program, Husky will have marine weather observers on board the rig, observing weather on a 24 hour basis. An ice management plan will be submitted to the C-NOPB as part of the DPA process and includes mitigations to prevent impacts from sea ice and icebergs during drilling activities. The jack-rig will only operate during the ice-free season (as described in Section 1, above), and will be demobilized from site prior to the onset heavy weather events. All these should ensure that impacts from the environment can be minimized. Therefore the effects of the environment on the project will be **not significant**.

## **5.3 Presence of Structures**

The drill rig will be the only surface structure. Subsea structures include drill string and riser. Husky Oil will establish a safety zone of 500m around the rig and a 50 m buffer for each of 8 anchors, for a total safety zone of 5.8 km<sup>2</sup>. For a jack-up, the safety zone is estimated to be 0.8 km<sup>2</sup>.

### **5.3.1 Fish and Fish Habitat**

**1**

The presence of the structures and a safety zone may alter the local abundance and distribution of fish in the area, however it will be for a short duration (generally 40-60 days). Alternatively, the safety zone and presence of the rig may create a reef effect, whereby local populations of fish and benthos are attracted to the structures and become concentrated. Davis (1982), as reported by LGL, indicate that the presence of these structures may modify seabed substrate

characteristics, which may modify benthic communities. Increased predation by fish, which are attracted to the structures, and by invertebrate predators (such as starfish), which are attracted by the presence of epifaunal prey, may also cause changes in the benthic communities.

For jack-up rigs, there is also the covering of the seafloor associated with the spud cans for a 60 day duration. Comments from DFO indicated that this would result in the disruption approximately 700 m<sup>2</sup> of seabed. The EA does not address the temporary loss of habitat associated with the spud cans. The reef effect, the exclusion zone and the temporary alteration of habitat would have an overall short term (duration 60 days), low magnitude and small geographic extent effect on fish populations. Therefore, the overall effect on fish and fish habitat is **not significant**.

### 5.3.2 Lights and Flares

0

The effect due to presence of structures on marine birds is most likely associated with lights and flares. See Section 5.4.2 for a discussion on the effects of lights and flares on marine birds.

### 5.3.3 Marine Mammals and Sea Turtles

1

The physical presence of structures in the marine environment will have a negligible and **not significant** effect on marine mammals and sea turtles. Noise, however, from the drill unit, supply boats and VSP surveys may have an effect. See Section 5.4.3 for a discussion of the effects of noise on marine mammals and sea turtles.

### 5.3.4 Commercial Fisheries

1

The presence of structures and the corresponding safety zone (approximately 5.8 km<sup>2</sup> – semi submersible; 0.8 km<sup>2</sup> – jack-up) would prohibit commercial fishing activities in the drilling area. The exclusion zone around each well is very small compared to the entire fishing area of 3Lt. As indicated in the EA, crab is the primary species harvested in 3Lt, with harvesting typically executed from May to July. Based on the information presented in the EA, there appears to be no large fishing aggregations in the Project Area during the proposed timing of drilling activities in 2005. Husky has indicated that all reasonable efforts will be made to accommodate fishing in the licence areas when drilling is not occurring. Drilling of the two wells will be done sequentially, allowing for fishing in these areas after the rig has moved to the new location.

Cumulative effects on fisheries could occur from operations at Hibernia, Terra Nova and White Rose, from seismic programs and other commercial fishing operations. The 2005 EA Report indicates that the safety zone for a semi-submersible rig is approximately 5.8 km<sup>2</sup> and 0.8 km<sup>2</sup> for a jack-up, for each well drilled. For two wells the total area in an exclusion zone would be 11.6 km<sup>2</sup> and 1.6 km<sup>2</sup>, respectively. Taken together with Terra Nova's exclusion zone (13.8 km<sup>2</sup>), Hibernia's zone (5.2 km<sup>2</sup>) and White Rose (15.4 km<sup>2</sup>) they represent at most 45 km<sup>2</sup>. In addition, given the short time frame for exploration drilling, Husky Oil predicts there would be no cumulative effect on commercial fisheries. With regard to supply vessels, the number of trips to be made by Husky supply ships will be very small in comparison to current fishing activity.

Husky Oil predicts that the effect of presence of structures on commercial fisheries will be of

low magnitude, low geographic extent (<10 km<sup>2</sup>) and of short duration. Overall, taking mitigation measures into consideration, Husky predicts the effects will be **not significant**.

### 5.3.5 Species at Risk

0

As indicated above, the presence of structures is predicted to be not significant for fish and marine mammals. Therefore, the impact on fish and marine mammal species at risk will be **not significant**.

## 5.4 Lights and Flares

### 5.4.1 Fish and Fish Habitat

0

Fish and squid may be attracted to illuminated surface waters, due to the use of floodlights in working areas on the drill rig and supply vessels. The effect would be negligible and **not significant** due to the small area affected and the short duration of the project. There would be no cumulative effect.

### 5.4.2 Marine Birds

1

The illumination of rigs and supply vessels on the Grand Banks may attract marine birds to the structures. In particular, nocturnal seabirds, such as Leach's Storm-petrels, may be at risk of attraction to offshore lights, particularly during their fall migration to offshore wintering grounds. The attraction of birds may result in some strandings on the rig.

The drilling program according to the schedule will be run for a period of approximately 60 days per well, with up to two wells drilled in 2005. Husky reports the presence of lights on the rig and supply boats would have a low effect within a 10 km<sup>2</sup> radius for the entire duration of the drilling program. There is continuous use of lights at night, but at daylight, there would be no such effect. Flaring will only occur if a well test is run. It has the potential to have a low effect within an 10 km<sup>2</sup> area for a short period of time during testing.

In terms of stranded birds, Husky has committed to a recovery and release program for the rig and supply boats, consistent with the requirements of the Canadian Wildlife Service. Husky has indicated that the environmental officer on board the rig will also be responsible for monitoring and observing seabirds and marine mammals in the area, with established protocols.

The effects on birds from lights and flares is low and likely. However, given the mitigation of recovery and release, the short period of flare operation, and the short time frame for a drilling operation, effects on seabirds will be **not significant**.

The presence of two production facilities located approximately 50 km to the east and southeast, as well as rig and support vessels for these operations should not increase the amount of illumination at night on the southern Grand Banks. The effects on seabirds regarding lights and flares for Terra Nova and White Rose production facilities were determined to be not significant in each of the projects environmental assessments. Cumulatively, the effects may be additive, and may overlap. The implementation of mitigations at Terra Nova and White Rose facilities, as

well as on seismic vessels operating to the north would reduce any cumulative effects associated with strandings. Cumulative effects therefore are **not significant**.

#### **5.4.3 Marine Mammals and Sea Turtles 0**

There should be no interaction between lights and flares and marine mammals and sea turtles. Therefore, there should be no environmental effect.

#### **5.4.4 Commercial Fisheries 0**

There should be no impact on commercial fisheries due to lights and flares.

#### **5.4.5 Species at Risk 0**

As indicated above, the light from structures is predicted to be not significant for fish and marine mammals. Therefore, the impact on fish and marine mammal species at risk will be not significant.

### **5.5 Noise**

Underwater noise may be caused by supply boats, drilling operations, seismic energy associated with the conduct of VSP surveys and wellhead severance using chemical explosives. Air-borne noise is normally associated with helicopters servicing the drill rig.

#### **5.5.1 Fish and Fish Habitat 1**

In general most fish show avoidance reaction to underwater noise from vessels, and the avoidance reaction varies depending on the species, life history stage, behaviour, time of day, whether the fish have eaten, and the water's sound propagation characteristics (LGL 2005). It is also reported by LGL that effects of noise from supply ships on fish is transitory and similar to fishing vessels. Given the ambient noise in the area from commercial fishing activities, the addition of noise from supply vessels should be negligible.

Impacts from VSP surveys, using a typical 760 in<sup>3</sup> array as the seismic source, would be expected to be less than impacts from a standard 2D or 3D seismic survey. VSPs are usually take 8-24 hours to complete with minimal shotpoints compared to a 2D/3D survey. Given the smaller seismic source, reduced duration, area covered and number of shotpoints, Husky Oil predicts that the effect of VSP on fish populations will be **not significant**.

Cumulative impacts of noise on fish associated with commercial fishing activity and other drilling operations offshore should be not significant. Drilling operations are short term – up to 60 days to drill each well. The increase in vessel traffic in the area from supply boats, will be minimal, compared to commercial vessel traffic and international vessel traffic, thus the increase in noise would be negligible and should not impact fish. With regard to seismic activity, the impact on fish larvae would be minor, sub-local, short-term and likely to occur. While it is recognized that seismic activity may have an impact on fish eggs and larvae, estimate of effects on population mortality on fish larvae are less than 1%, whereas natural mortality is between 5-15% per day. Therefore, the interaction of seismic activity with exploration drilling should not have a cumulative impact on fish and fish habitat.

### 5.5.2 Marine Birds

0

There is concern of aircraft flying over colonies of seabirds, which may cause a panic response and result in eggs and flightless young being pushed off cliff edges. Helicopters, stationed in St. John's, will fly a direct path from the airport in St. John's to the rig, and generally will not come in contact with seabird colonies. As mitigation, aircraft will be directed to avoid colonies of seabirds, and will be instructed to avoid repeated overflights of concentrations of birds and their habitat. In addition, aircraft will not come within eight km seaward and 3 km landward of major seabird colonies from April 1 to November 1. Therefore, effects of noise from helicopters will be negligible and **not significant**.

Effects of seismic activity on marine birds predicted to be negligible. Birds which spend time underwater foraging may be affected if they dive within a few metres of the airgun. Murres 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). 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**.

Cumulative effects are predicted to be not significant.

### 5.5.3 Marine Mammals and Sea Turtles

1

There is a concern with the noise produced by ships and drill rigs on marine mammals, as they depend on the underwater acoustic environment. The zone of influence of underwater noise, in addition to the drill sites, includes the zones produced by a VSP survey, and those around the shipping routes and helicopter flight paths. Effects of noise from drilling operations may be negligible to low within a 100 km<sup>2</sup> area, and will be continuous throughout the drilling period, for a period of up to 60 days per well.. Overall, the effects of noise on marine mammals from drilling operations will be **not significant**.

The passage of marine vessels may also impact marine mammals. For the duration of the drilling program (approximately 60 days total) the effects from ship are likely to be low and within an area of 101-1000 km<sup>2</sup>. Effects may be reduced if supply boats maintain a steady course and speed, and avoid areas with large numbers of whales. Overall the effects are **not significant**.

Low flying aircraft could cause low magnitude effects on marine mammals in the water. These effects would be within a 10 km<sup>2</sup> area and occur intermittently throughout the drilling program. Helicopters will fly at an altitude of 600 m. They are prohibited from flying over wildlife for passengers to view. Therefore, the effects will be negligible.

For seismic surveys, it is predicted that the overall effect on marine mammals and sea turtles will be less than that from a typical 2D or 3D seismic survey, given the smaller array, reduced duration, and area covered. The Lewis Hill EA provides references for a number of reports which predict that there would not be significant impact of seismic surveys on marine mammals



or sea turtles. In order to further reduce impacts to marine mammals and sea turtles, Husky will implement the following mitigation measures during the conduct of VSPs:

- ramp up of air guns prior to conduct of survey;
- use of trained observers aboard the rig or supply vessel to monitor for marine mammals and sea turtles 30 minutes prior to ramp-up
- if marine mammals/sea turtles spotted within 1000m of the array, ramp-up will not commence until the animal has moved outside the 1000 m zone.
- the observer will monitor for marine mammals and turtles when the source is active and note location and behaviour.

In addition, during the conduct of VSP surveys, the Board will require that the Operator implement the mitigations outlined in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (2004) and implement a 500 m monitoring zone. Based on the information presented above, and the mitigations proposed, effects will be negligible to low, for a limited duration (up to 24 hours for each VSP), in an area up to 100 km<sup>2</sup>. Therefore, the effects on marine mammals or sea turtles will be **not significant**.

Oil and gas activities ongoing on the Grand Banks include production operations at Hibernia and Terra Nova, supply vessels transiting (300 trips per year); 156 trips by oil tankers, 2-4 drill rigs for exploration drilling, and 4 seismic operations, on average per year. In addition, production drilling may see 2 rigs in operation per year. Commercial traffic (tankers, cargo ships, bulk carriers, and container ships) in Newfoundland waters account for approximately 3300 transits per year. Fishing vessel trips to NAFO area 3L account for approximately 20,000 transits per year. Therefore there is considerable noise in the underwater environment. The addition of the drill rig and supply vessels from the drilling program will not contribute to an increase in over all noise in the marine environment. However, locally, there may be an incremental increase in noise levels. However, the cumulative effects will be not significant.

#### 5.5.4 Commercial Fisheries

0

As indicated above, there will be no significant impact on fish populations, therefore there will be **no significant impact** on commercial fisheries. Cumulative impacts will be not significant.

#### 5.5.5 Species at Risk

0

As indicated above, the effects of noise from drilling operations and VSP surveys is predicted to be not significant for fish and marine mammals. Therefore, the impact on fish, marine mammal and bird species at risk will be not significant.

### 5.6 Atmospheric Emissions

The potential emissions from offshore drilling include

- burning of well fluids during production tests and clean-ups
- engine, generator and heating exhausts from the rig, helicopters and supply vessels
- mud, degassing and other mudroom exhausts
- fugitive emissions

Fugitive emissions are not expected to be significant and will be minimized through implementation of best management practices and preventative maintenance measures.

#### **5.6.1 Fish and Fish Habitat**

**0**

Effects on fish and fish habitat from atmospheric emissions will be negligible and **not significant**. Cumulative effects will be negligible

#### **5.6.2 Marine Birds**

**0**

Effects on marine birds from atmospheric emissions will be negligible. Cumulative effects will be negligible.

#### **5.6.3 Marine Mammals and Sea Turtles**

**0**

There should be no interaction between marine mammals and sea turtles and atmospheric emissions.

#### **5.6.4 Commercial Fisheries**

**0**

There should be no interaction between commercial fisheries and atmospheric emissions.

#### **5.6.5 Species at Risk**

**0**

As indicated above, emissions from drilling operations is predicted to be not significant for fish and marine mammals. Therefore, the impact on fish and marine mammal species at risk will be not significant.

### **5.7 Discharge of Drilling Muds and Cuttings**

Husky Energy is proposing to use water based (WBM) and synthetic based muds (SBM) for its drilling program. WBM will be directly discharged to the seafloor when drilling the initial sections of the hole, after that cuttings will be discharged from the rig at surface. When SBMs are used, all cuttings are treated in accordance with the *Offshore Waste Treatment Guidelines* (NEB 2002) prior to discharge. The muds are recycled and returned to shore for on-land disposal. Approximately 810 m<sup>3</sup> of WBM and 239 m<sup>3</sup> of cuttings will be discharged directly to the seafloor when drilling the initial sections of the hole.

#### **5.7.1 Fish and Fish Habitat**

**1**

The primary effects associated with the discharge of muds and cuttings is the smothering of benthos, toxicity (based on chemical constituents of the mud) and bioaccumulation. In modelling exercises conducted by Husky for the White Rose comprehensive study, whereby the fate of cuttings and muds are estimated from a discharge point at the center of the drill location, for cuttings the area covered would be approximately 0.2 km<sup>2</sup>. The maximum thickness of deposition would be approximately 10 mm within a 200 m radius of the well. The 2005 EA indicates that smothering of benthos will occur if the thickness of the deposition layer is greater than 1 cm. Literature cited in the EA report indicates that within months to years, benthos would recover once drilling stopped.

Water based muds are generally non-toxic. The primary additives are bentonite, barite and potassium chloride, with seawater the main component. Chemicals, such as caustic soda,

viscosifiers and shale inhibitors, are added to control mud properties. Husky reports that many of the metals present in WBM are not in a bioavailable form and there have been few, if any, biological effects associated with the metals from these discharges. The SBMs to be used by Husky Energy are non-toxic, and they have the potential to biodegrade rapidly (LGL 2005). SBMs typically require less mud for the same distance drilled and the discharged cuttings tend to clump together, resulting in less dispersion from the drill hole.

It is predicted that the area of impact from SBM and cuttings depositions would be less than 1 km<sup>2</sup> for a multi-well program from a single drill centre, based on analysis used during the White Rose Comprehensive Review. Thus for a single well (one well drilled per location) exploration program, the predicted impact should be less. All SBM cuttings will be treated in accordance the OWTG prior to discharge.

Currently there are 2 oil fields in production and 1 under construction, on the northeast Grand Banks. Drilling activities are ongoing in association with these programs. However, cuttings are re-injected at Hibernia. Thus, there is potential for cumulative effects from drilling activities at Terra Nova and White Rose. Cumulative effects are predicted to be additive, with low magnitude, small geographic extent and **not significant**.

Based on mitigations indicated in the EA (e.g., cuttings treatment, chemical screening, compliance with 2002 OWTG), the predicted recolonization of benthic species in the cuttings deposition area, and the short duration of the program, the effects of drilling muds and cuttings on fish and fish habitat will be **not significant**.

### 5.7.2 Marine Birds

0

There is concern that the discharge of cuttings will produce a sheen on the water, thereby creating the potential for oiling of marine birds. The drilling program is using WBM and SBM, where required. Sheens are not likely associated with the discharge of WBM. For SBM, if they are used, mitigations such as treatment prior to release, and release of cuttings below surface, will reduce likelihood of sheens on the water surface. Therefore, the discharge of drill muds and cuttings will have a negligible and **not significant** effect on marine birds.

Cumulative effects, associated with other offshore facilities, will be negligible and **not significant**.

### 5.7.3 Marine Mammals and Sea Turtles

0

The deposition of muds and cuttings on the seafloor may have increased concentrations of heavy metals. However, their concentration will not be harmful to marine mammals as they are not bioavailable, as referenced by Husky in the EA. Therefore, effects from deposition of drill muds and cuttings will be negligible and **not significant**. Cumulative effects will be negligible.

### 5.7.4 Commercial Fisheries

0

As indicated above, the effect of fish and fish habitat from drill cuttings deposition is not significant, therefore the effect on commercial fisheries will be **not significant**. There will be no cumulative impact.

### 5.7.5 Species at Risk

0

As indicated above, the discharge of drill cuttings is predicted to be not significant for fish and marine mammals. Therefore, the impact on fish and marine mammal species at risk will be not significant.

## 5.8 Operational Discharges

Discharges associated with drilling include cement slurry and blowout preventer (BOP) fluid. However, BOP fluid is not discharged from a jack-up rig. Wastes and discharges from the rig include deck drainage, cooling water, sanitary and domestic waste, garbage and other solid waste, ballast water, bilge water, and produced fluids. All wastes will be treated in accordance with the OWTG prior to discharge. Solid wastes, such as garbage, will be shipped to shore for proper disposal or recycling. Husky indicated in the EA that it will implement an offshore chemical management system (OCMS) to screen all chemicals intended for use on the rig.

In exploration drilling programs, produced water would only be discharged once the well is tested for production. However, if any produced water is encountered during the well test, it is likely that it will be atomized and flared during testing. If produced water must be disposed of at sea, it will be treated in accordance with the OWTG prior to discharge at sea.

### 5.8.1 Fish and Fish Habitat

0

It is predicted that for each well, approximately 26.4 m<sup>3</sup> of excess cement will be released to the marine environment. The discharge will result in the local smothering of benthos, but according to the EA, literature suggests that the cement will act as an artificial reef, and will be colonized by epifaunal animals and attract fish. The effect, while negative, is negligible.

The blowout preventer is required to undergo periodic testing, during which approximately 1 m<sup>3</sup> of BOP fluid is released. Husky indicated that glycol-water mixes, with low toxicity will be used. The release of the BOP fluid will have a negligible effect.

As indicated above, all chemicals will be screened through Husky's OCMS, and all discharges will be treated in accordance with the 2002 OWTG prior to discharge. Therefore, overall, there effect on fish and fish habitat will be **not significant**.

### 5.8.2 Marine Birds 1

In compliance with the OWTG, sanitary waste from the rig will be macerated to 6 mm and will be released at depth. There is concern that seabirds, particularly gulls, will be attracted to the particles. Husky indicates that gulls may be attracted to the sanitary waste, but the short duration of the drilling program should not increase the gull population offshore. Associated with an increase in gull population is the possibility of increase in gull predation on Leach's Storm Petrels. However, as indicated, there should not be an increase in offshore gull populations, therefore the impact on Leach's Storm Petrels should be minimal. Husky predicts that the effects of discharge of sanitary waste will be low and of short duration. The effects from other operational discharges is negligible (LGL 2005). Other discharges, particularly oily waste and bilge water may cause sheening on the water surface. However, as indicated previously, all discharges are treated prior to release and discharged at-depth, thereby reducing potential for

sheening. The overall effect of operational discharges on seabirds will be **not significant**.

All rigs, production platforms, supply vessels and seismic vessels, treat operational discharges prior to discharge in compliance with regulations and guidelines. Each production operation and drilling program is separated geographically from each other and do not overlap. Given the short duration of drilling program, the cumulative effect of operation discharges on seabirds will be not significant.

### **5.8.3 Marine Mammals and Sea Turtles**

**0**

Operational discharges from the rig should have a negligible and **not significant** effect on marine mammals and sea turtles. Cooling water discharges will be chlorinated to a level of 1-2 mg/L chlorine and discharged at 30°C above ambient. A low volume of water will be discharged and the area of thermal effects will be small. Therefore, cooling water discharge effects will be negligible. Treatment of all discharges for all production facilities and rigs operating on the Grand Banks will result in a **not significant** cumulative effect on marine mammals and sea turtles.

### **5.8.4 Commercial Fisheries**

**0**

As indicated above, any effects on fish and fish habitat will be of short duration, and low magnitude, therefore not significant. Subsequently effects on commercial fisheries will be negligible and **not significant**.

### **5.8.5 Species at Risk**

**0**

As indicated above, operational discharges from drilling activities area predicted to be not significant for fish and marine mammals. Therefore, the impact on fish and marine mammal species at risk will be not significant.

## **5.9 Well Abandonment**

Upon completion of its drilling program, it is Husky's intent to abandon and remove all wells, in accordance with the C-NLOPB regulations, using mechanical separation. In the event that mechanical separation fails, Husky will use directed chemical charges to sever the wellhead. In the event that chemical explosives are required for well abandonment, the C-NLOPB will require Husky Energy to undertake a marine mammal observation program during the abandonment program. An authorization will also be required.

### **5.9.1 Fish and Fish Habitat**

**1**

The effects of using directed chemical charges underwater are dependent on the magnitude and timing of the explosion. In previous EA reviewed by the C-NLOPB, it is noted that fish and invertebrates nearest the explosion will be affected. For fish, those nearest the blast center might sustain damage to their sensory epithelia. In a study cited in the previous EAs, surface observations of killed fish were noted in three of 15 blasts, in a wellhead severance program in the North Sea. In the event chemical explosives are required in the well abandonment program, the C-NLOPB will implement a monitoring program and investigate, in consultation with Husky Oil, possible mitigations to reduce impacts to fish and fish habitat. The effects on fish and fish

habitat, will be of short duration, low magnitude and low frequency, and therefore **not significant**.

### 5.9.2 Marine Birds

0

There should be no interaction between marine birds and well abandonment (mechanical or directed charges), and therefore no environmental effect.

### 5.9.3 Marine Mammals and Sea Turtles

1

Mechanical severance using chemical explosives may result in injury to marine mammals present in the area. Explosives have rapid rise times, which are related to the extent of biological injury. Previous EAs report that a 2 kg TNT charge has a source level of 271 dB re 1 $\mu$ Pa-m<sub>0-peak</sub> and that a 20 kg charges has an equivalent source level of 279 dB re 1 $\mu$ Pa-m<sub>0-peak</sub> in water depths of 60 m. There is little information available regarding the effects of underwater explosions on marine mammals. If chemical wellhead severance is required, mitigation measures such as marine mammal observations within a set radius around the rig installation prior to wellhead severance will be required. The very short duration of the activity, the low frequency (< 2 events/year) and the medium geographic extent (up to 100 km<sup>2</sup>), and with the implementation of mitigations, well severance using chemical explosives will have a **not significant** impact on marine mammals or sea turtles.

### 5.9.4 Commercial Fisheries

0

There should be no impact on commercial fisheries associated with well abandonment. As indicated above, impacts on fish and fish habitat are predicted to be not significant, therefore, it can be expected that effects on fisheries would be negligible and **not significant**.

### 5.9.5 Species at Risk

0

The impact on fish and marine mammal species at risk resulting from well abandonment operations will be not significant.

## 5.10 Accidental Events

During exploration drilling programs the possible accidental events, which may impact the environment, include blowouts and batch spills. For the proposed drilling program, the probability of a blowout during the drilling of an exploration well is estimated to be 1 in 17,500 for spills greater than 150,000 bbl, 1 in 5800 for spills greater than 10,000 bbls and 1 in 4,400 for spills greater than 1000 bbl (LGL 2005). The frequency of platform based spills have been estimated to range from 0.15 to 1 per year, for spills less than 49 bbls.

The characteristics of White Rose crude show that the crude is very waxy and if spilled in water, it would form near-solid particles and may persist for weeks, up to months on the surface. Data from spill trajectory modeling conducted for the White Rose Comprehensive Study (as reported in LGL 2005, show that of the 14,600 trajectories modeled, there was no contact with the shoreline. While the trajectory analysis predicts the track of oil, it cannot predict the state of the oil (consistency, particle size, patch, etc. Estimates for the geographic extent of a batch spill is presented in the 2005 EA report (LGL 2005). In summer months, it is estimated that the slick will travel approximately 700 km, whereas in winter it would travel 933 km from the rig.

### 5.10.1 Fish and Fish Habitat

1

Fish eggs and larvae are more likely to be affected by oil spills. Eggs and larvae present in the area will be exposed to hydrocarbons from spill events. In the White Rose comprehensive study, Husky evaluated the impact of the eggs and larvae of 8 species (some of which are the same as above) and determined that the effects of an oil spill would be *adverse* due to the potential lethal and sublethal effects to the sensitive life stages. However, the effects would be negligible to low magnitude with a geographic extent less than 10,000 km<sup>2</sup>. Mitigation measures such as spill prevention and remediation would reduce overall impacts. Therefore impact on fish and fish habitat would be **not significant**.

### 5.10.2 Marine Birds

2

Oil on water is a threat and potential impact to marine birds. Significant numbers and concentration of birds occur on the Grand Banks. Any oil spill could cause bird mortality. As indicated above, the waxy nature of the White Rose crude slows evaporation and dispersion. As a result, the oil maintains its volume and persist on the water's surface, and may lasts for months at a time. While spilled oil may reach land, it is unlikely, based on the spill trajectory predictions that oil will impact seabird colonies. However, birds in the area of the rig would be at risk. During the summer, shearwaters, gulls, kittiwakes, storm-petrels and fulmars would be the species most likely to be in the area and exposed to oil near the surface.

Depending on the time of the year and the extent of the spill, the magnitude of the effects will range from negligible to high. Blowouts will have a larger geographic extent (>10,000 km<sup>2</sup>) than batch spills (<10,000 km<sup>2</sup>) with a duration from one to 12 months. While the likelihood of an event occurring is **low** (less than 1 event per year) the effects would be **significant and adverse**. Countermeasures such as bird scaring devices would reduce some birds from oiling. However, overall, oil spill countermeasures would more than likely be ineffective at reducing the effect. Note, however, that even though there would be a significant effect on birds, the likelihood of a spill is very small, as there are mitigations in place to prevent spills from occurring.

### 5.10.3 Marine Mammals and Sea Turtles

1

Marine mammals and sea turtles exposed to oil from a spill could suffer sublethal effects, through oiling of mucus membranes, but would be reversible. However, whales are present in the area in low numbers and at certain times of the year. Seals are not normally present in large numbers during the months when drilling is planned. Depending on the time of year, location of whales and seals in the study area, and volume of oil spilled, effects could range from negligible to low magnitude, extend between 1000 to 10,000 km<sup>2</sup> for batch spills, and greater than 10,000 km<sup>2</sup> for blowouts, with a duration of 1-12 months. Oil spill countermeasures, may reduce the number of marine mammals exposed to oil. Therefore this will result in a **not significant** effect.

### 5.10.4 Commercial Fisheries

1

Commercial fisheries could be impacted if there is an effects on eggs and larvae. In the event of a large spill (greater than 10,000 bbls), an oil spill would not cause not significant effects on fish or result in fish taint. Gear may be damaged, but compensation to fishers would reduce that impact. However, the marketability and the perceived commercial value of the fish may be

impacted. Such an impact would be considered significant in economic terms. However, compensation to the fishers could lessen the significance. Overall, the effects on commercial fisheries is **not significant**.

### 5.10.5 Species at Risk

1

It is predicted that accidental events will not have significant impact on fish or marine mammal species. For fish and marine mammal species at risk likely to be present in the area, the effects from accidental events therefore, will be not significant.

### 5.11 Follow-up Monitoring

Required

Yes

No

The C-NLOPB does not require Husky Energy to undertake follow-up monitoring, as defined in the CEA Act.

## 6. Other Considerations

Mitigations presented by Husky in its environmental assessment for the Jeanne d'Arc Basin Delineation/Exploration Drilling Program (LGL 2005) and 12 August 2005 correspondence (K. Dyer to D. Burley) are sufficient to prevent or reduce environmental impacts. If chemical explosives are required during wellhead abandonment, an biological observation program will be required. Specific details of the monitoring program will be discussed with Husky at time of application for the well abandonment program. Depending on the timing of the well abandonment program, additional mitigations or monitoring protocols may be required.

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 drilling program, and is 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 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 any authorization(s) if the Project is approved.

#### For drilling/geotechnical programs:

- *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 "Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area Environmental Assessment (LGL. 2005) and*



addendums, and the “*Husky Delineation/Exploration Drilling Program for Jeanne d’Arc Basin Area Environmental Assessment Update*” (LGL 2006).

- *A marine mammal monitoring protocol shall be developed in consultation with the C-NLOPB at the time of application for approval to terminate the well(s) with the use of chemical explosives.*

#### **For VSP and/or Wellsite Surveys**

- *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 “Husky Delineation/Exploration Drilling Program for Jeanne d’Arc Basin Area Environmental Assessment (LGL. 2005) and addendums, and the “Husky Delineation/Exploration Drilling Program for Jeanne d’Arc Basin Area Environmental Assessment Update” (LGL 2006).*
- *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 VSP and wellsite surveys.*
- *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) respecting VSP and wellsite surveys, and includes monitoring during ramp-up and at all times when the airgun(s) are active.*
- *The “safety zone” defined for marine mammal protection respecting VSP and/or wellsite surveys is designated to be 500 m*
- *During ramp-up, and/or when the airgun array is active, the airgun(s) shall be shut down, if a marine mammal or sea turtle, listed as **Endangered** or **Threatened** (as per Schedule I 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**

#### **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     Date: May 26, 2006  
Kimberly A. Coady  
Environmental Assessment Officer

**References:**

- C-CORE. 2005. Characterization of Ice-Free Season for Offshore Newfoundland. C-CORE Report Number R-04-093-341, Version 2, May.
- C-NLOBP. 2005. Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area Scoping Document.
- LGL. 2005. Husky Energy Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area Environmental Assessment. Prepared for Husky Energy.
- LGL. 2006. Husky Energy Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area Environmental Assessment Update. Prepared for Husky Energy.
- 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.