

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

Part A: General Information

Screening Date	<u>February 15, 2008</u>
EA Title	Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008-2017 Environmental Assessment
Proponent	Husky Oil Operations Limited Suite 901, Scotia Centre 235 Water Street St. John's NL A1C 1B6
Contact	Mr. Don Williams Manager, HSE&Q
C-NLOPB File No.	7705-H65
CEAR No.	07-01-28877
Referral Date	April 26, 2007
EA Start Date	May 18, 2007
Location	Jeanne d'Arc Basin Area, Northeastern Grand Banks

Part B: Project Information

On April 26 2007, Husky Energy submitted a project description "*Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2007-2016, Project Description*" (LGL 2007) to the C-NLOPB, in support of its application to drill up to 18 exploration and delineation wells on acreage held by the operator in the Jeanne d'Arc Basin area over a nine year period. A screening level environmental assessment was completed on November 16, 2007. The "*Husky Delineation/ Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008-2017, Environmental Assessment*" (LGL 2007) (herein referred to as the 2007 EA Report) provided an environmental assessment of a multi-well drilling program over a nine year period. Husky Energy is now proposing to drill up to 18 wells from 2008 through to 2017.

In completing this Screening Report, information from the 2007 EA Report was summarized and is included in the following sections.

1. Description of Project

Husky Energy proposes to drill up to 18 exploration/delineation wells on any current or future Husky land holdings in the Jeanne d'Arc Basin area during 2008 to 2017. The current list of licenses held by Husky, either exclusively or in partnership with others is provided in the 2007

EA Report. It is proposed that drilling operations may commence in early 2008. The wells will be drilled using a drillship, semi-submersible, or a jack-up mobile operating drilling unit (MODU), depending on the time of year. The project includes marine support vessels – for shipping goods and personnel to the MODU, helicopter support, shore-based facilities – using existing facilities in St. John’s Harbour, and abandonment. Vertical Seismic Profiling (VSP) and testing, and geohazard/well site surveys may be required for any of the 18 wells drilled. An onsite Environmental Observer (EO) will be onboard the drilling unit to record and report weather, oceanographic and ice parameters. The EO will also conduct seabird and marine mammal observations on a daily basis in accordance with established protocols.

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’¹ and weather conditions. Husky Energy indicates that the wells will be drilled over a nine 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 and drillships). VSP and geohazard surveys may be carried out on an as-needed basis at any time of the year.

Water depths in the Project Area range from <100 m to approximately 1,000 m, with maximum depths in the Study Area exceeding 4,000 m. Water based muds (WBM) will be used for vertical wells, where practicable. However, for deviated wells, synthetic based muds (SBM) may be used.

Drilling is scheduled to commence in early 2008. 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

2.1 Physical Environment

The 2007 EA Report (LGL 2007) 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) and the Husky White Rose Development Project: New Drill Centre Construction and Operations Program documents (LGL 2006 and 2007).

The Project Area is located on the Northeastern Grand Banks, offshore Newfoundland, in water depths ranging from <100 m to 1,000 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 and summer winds are southwesterly in the Project

¹ 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.

Area. A prevailing south to southwest wind occurs in the western section and southwest to west-southwest in the eastern section during the summer months. Mean wind speeds are notably higher during the winter months, with the highest mean wind speeds occurring in the months of December, January and February (10.4 to 11.0 m/s) and the lowest in July (6.2 m/s).

Wave data presented in the 2007 EA Report show that the highest sea states occur in the Project Area during severe storm systems, which typically occur from December to February. 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 was described for four sub-areas in the Project Area. Sub-area 2 is in the section of the Grand Banks where White Rose and the northern prospective drill site are located. Results show that the maximum near-surface current measured 90 cm/sec and a maximum mean of 21 cm/sec. At mid-depth, the highest current was 75 cm/sec with a maximum mean of 14 cm/sec. At bottom, the maximum current measured 72 cm/sec, with a maximum mean of 14 cm/sec. The data for Sub-area 1 (Terra Nova and the southern prospective drill site), Sub-area 3 (outside White Rose where the water depth is between 200 m and 400 m and includes the area to the northeast known as the Nose of the Grand Banks), and Sub-area 4 (western side of the Flemish Pass) is included in the 2007 EA Report.

2.1.2 Air and Sea Temperatures

Mean sea surface temperatures range from near 0°C in February and March to over 13°C in August. Mean air temperatures range from around the freezing point in January and February to 13°C 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, reduced visibility occurs most often in the month of July with fair to poor visibility reported in 68% of observations. The lowest incidence of reduced visibility occurs during October with fair to poor visibility reported in just 23% of observations.

2.1.4 Sea Ice and Icebergs

Between 1998 and 2006, sea ice was present at the White Rose field drilling and exploration site during three of the nine years (LGL 2007). Sea ice was approximately 15 km from the White Rose field in 1997, 2002 and 2003. During those three years, sea ice occurred between March and April and the duration of coverage ranged from one to five weeks. The mean concentration of the sea ice was 4.3 (on a scale of 10). The 10-year average number of icebergs observed in the White Rose block is 41 icebergs with sightings between the months of March and June.

2.2 Biological Environment

A summary of information presented in the 2007 EA Report is presented below.

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, again in the fall-early winter (October/January) of the year. There may be areas of enhanced production in the Study Area, similar to other slope areas that have been studied. Copepods are the dominant zooplankton species in the waters of Newfoundland; they feed on phytoplankton, but are prey for larger zooplankton and fish (LGL 2006).

2.2.2 Benthos

The benthic community is very diverse and includes a number of invertebrate species such as polychaete worms, molluscs, crustaceans, and certain fish species such as flatfish. Substrate type and water depth determine the composition of benthic community structures. The environmental effects monitoring program at White Rose, as reported in LGL (2006), indicate that polychaetes and bivalves are the most abundant species. 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 (Project Area) will occur in the North Atlantic Fisheries Organization (NAFO) Unit Areas (UAs) 3Lh, 3Li, 3Lr and 3Lt. Within these areas as well as 3L, 3M, and 3N UAs (Study Area), there are a number of fish species that are commercially harvested. A detailed description of these species is provided in the 2007 EA report.

Fish species in the Study Area include snow crab (*Chionoecetes opilio*), Northern shrimp (*Pandalus borealis*), Stimpson's (Arctic) surf clam (*Mactromeris polynyma*), Greenland cockle (*Serripes groenlandicus*), ocean quahaugs (*Arctica islandica*), northern propeller clam (*Cyrtodaria siliqua*), Iceland scallop (*Chlamys islandica*), Atlantic halibut (*Hippoglossus hippoglossus*), Greenland halibut (*Reinhardtius hippoglossoides*), yellowtail flounder (*Limanda ferruginea*), American plaice (*Hippoglossoides platessoides*), redfish (*Sebastes spp.*), and roughhead grenadier (*Macrourus berglax*). The principal fisheries in the Study Area and Project Area are for deepsea clams, northern shrimp and snow crab. Northern shrimp, Atlantic cod, and Greenland halibut represent some of the main commercial species caught during surveys on the Flemish cap.

Snow Crab (*Chionoecetes opilio*) prefer water temperatures ranging from -1°C to 4°C. 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.

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.

Stimpson's surf clams spawn during the late summer/fall months. They have been found in

benthic communities that also include Greenland cockles and northern propeller clams, two bivalve species also known to occur in the Study Area.

Atlantic cod off northeast Newfoundland and Labrador is known as the northern cod. Cod spawn both inshore and offshore in the Newfoundland-Labrador region and its eggs and larvae are both planktonic. Atlantic cod fertilized eggs, larvae and early juvenile stages remain in the plankton for 10 to 12 weeks. Most cod are found in water less than 900 m deep.

Greenland Halibut (turbot) 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

The principal fisheries (by quantity of harvest) within both the Study Area and the Project Area are for deepsea clams, northern shrimp and snow crab. These together accounted for almost 99% of the Study Area harvest and 100% of the harvest weight within the Project Area in 2006. Most of the fish harvesting within and near the Study and Project Areas is concentrated on the Shelf slope in the southwestern portion of fisheries Unit Area 3Le, and the northern part of 3Li. This is mostly in depths between 200 m and 500 m. Shrimp trawls and pots for snow crab were used to harvest more than 32% each of the Study Area catch. Within the Study Area, the crab fishery is concentrated along the eastern side of 200 mi EEZ. Harvesting effort in the Study Area was highest in June in 2006 and lowest during August to October. In the Project Area, June and February were the highest months.

2.2.5 Marine Mammals and Sea Turtles

There are at least 17 species of cetaceans and three species of seals that are known to occur in the area (LGL 2007). 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 (*Eubalaena glacialis*). Toothed whales include the sperm (*Physeter macrocephalus*), northern bottlenose (*Hyperoodon ampullatus*), Sowerby's beaked (*Mesoplodon bidens*), killer (*Orcinus orca*), long-finned pilot (*Globicephala melas*) whales, the short-beaked common (*Delphinus delphis*), Atlantic white-sided (*Lagenorhynchus acutus*), white-beaked (*Lagenorhynchus albirostris*), Risso's (*Grampus griseus*), striped (*Stenella coeruleoalba*) dolphins, and the harbour porpoise (*Phocoena phocoena*). Seal 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 Study 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; however, 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 indicates that baleen whales were the most numerous marine mammal observed, including humpback whales, fin whales and minke whales. Husky Energy reported that few dolphins were observed. Of the 23 sightings of dolphins, there were two sightings of white-sided dolphins, one sighting each of white-beaked dolphin and common dolphin and two sightings of unidentified dolphins. There was one sighting of a beaked whale species. Two harbour porpoises were also observed. The DFO cetacean sightings database confirmed that most sightings of whales were humpback followed by long-finned pilot, fin and minke.

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 27 marine birds have been identified as occurring in the Study Area. These include species of *Alcidae* (Dovekie, Murres – Common and Thick-billed, Razorbill and Atlantic puffin), *Stercorariidae* (Skuas – Great and South polar; Jaegers – Pomarine, Parasitic, and Long-tailed; *Laridae* (Gulls – Herring, Lesser Black-backed, Iceland, Glausous, Great Black-backed, and Ivory; Black-legged Kittiwake and Arctic Tern), *Sulidae* (Northern Gannet), *Hydrobatidae* (Wilson's and Leach's Storm Petrels); *Phalaropodinae* (Phalarope – Red and Red-necked), and *Procellariidae* (Northern Fulmar and Greater, Sooty and Manx Shearwater). Specific information can be found in the 2007 EA Report.

The abundance and distribution of marine birds varies depending on the season. For instance, the Northern Fulmar (*Fulmaris glacialis*) is common throughout the year except from June to August, whereas the Greater Shearwater (*Puffinus* spp.) is common from June to October, and absent from December to April. Leach's storm petrels are only present in October and November, whereas the Black-legged Kittiwake is common from October to May. Of all the species present, the Northern Fulmar and Black-legged Kittiwake are the most common throughout the year.

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

Species	SARA Status
Blue Whale (<i>Balaenoptera musculus</i>) (Atlantic population)	Schedule 1 - Endangered
North Atlantic Right Whale (<i>Eubalaena glacialis</i>)	Schedule 1 - Endangered
Leatherback Seaturtle (<i>Dermochelys coriacea</i>)	Schedule 1 - Endangered
Northern Wolffish (<i>Anarhichas denticulatus</i>)	Schedule 1 - Threatened
Spotted Wolffish (<i>Anarhichas minor</i>)	Schedule 1 - Threatened

Species	SARA Status
Atlantic (Striped) Wolffish (<i>Anarhichas lupus</i>)	Schedule 1 - Special Concern
Ivory Gull (<i>Pagophila eburnea</i>)	Schedule 1 - Special Concern
Fin Whale (<i>Balaenoptera physalus</i>) (Atlantic population)	Schedule 1 - Special Concern

LGL (2007) reports that there has been only one blue whale sighting in the Husky Study Area based upon available data by DFO. This occurred in June 1993 in the vicinity of Lilly Canyon approximately 200 km south of the Project Area. According to the DFO sightings database (DFO 2007), most sightings of blue whales in Newfoundland have occurred near the coast. It is possible that blue whales may occur in the Jeanne d'Arc Basin but numbers are expected to be low. A Recovery Strategy is in place for the blue whale.

The North Atlantic right whale is the most endangered species in the northwest Atlantic. Population estimates indicate that there are approximately 300 individuals. Off Atlantic Canada, right whales typically concentrate in the Bay of Fundy and off southwestern Nova Scotia. Right whales were only recorded once in the Study Area on 27 June 2003 north of the Project Area.

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. Two leatherbacks were sighted in mid-August 2006 in the Study Area during Husky's seismic program. A Recovery Strategy was finalized by DFO in December 2006.

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

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. 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.

There were 187 sightings of the fin whale within the Study Area based upon the DFO sightings database (DFO 2007). It was the second most abundant mysticete observed. Fin whales were

commonly sighted in the Study Area during Husky's seismic monitoring programs in 2005 and 2006.

2.3 Research Surveys and Vessel Traffic

Vessel traffic with respect to fishing vessels is discussed in terms of amount of commercial fishing activity (see Section 2.2.4). In any year, there will be overlap between the Study Area and DFO research surveys in NAFO 3L, 3N and/or 3M. Typically, DFO conducts a spring survey in sections of 3LNOPs (April-July), and a fall survey of 2HJ3KLMNO (late September/early October to late December). The fall survey may employ two vessels. Husky Energy will be required to communicate with DFO to avoid any potential conflict with research surveys that may be operating in the area.

Part C: Environmental Assessment Process

3. Procedures

On April 26, 2007, Husky Energy submitted a project description "*Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area 2007-2016 Project Description*" to the C-NLOPB, in support of its application to conduct a delineation/exploration drilling program. Pursuant to Section 12.2 (2) of the CEA Act, and the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*, the C-NLOPB assumed the role of the Federal Environmental Assessment Coordinator (FEAC) for the Screening. Input was sought from federal and provincial regulatory agencies and interested stakeholders respecting the scope of project and environmental assessment review.

A Federal Coordination Regulations (FCR) notification was sent on 17 May 2007 regarding Husky Energy's proposed program. Environmental Canada (EC) and Fisheries and Oceans Canada (DFO) responded that they would participate as FAs in the EA review.

On 05 July 2007, the C-NLOPB notified Husky Energy that a screening level of assessment was required and the proponent was provided with a Scoping Document.

Husky Energy submitted the 2007 EA Report to the C-NLOPB on 19 November 2007. The C-NLOPB, as Responsible Authority (RA), forwarded the report on November 19, 2007 to the DFO, EC and the provincial Departments of Environment & Conservation, Fisheries & Aquaculture, and Natural Resources. The FFAW and One Ocean were provided a copy of the EA report to review. Comments were received from DFO, EC, One Ocean and FFAW. On 21 January 2008, the C-NLOPB requested additional information from Husky Energy in order to satisfy the requirements of the CEAA and to complete the Screening Report. Husky Energy was requested to provide additional information on the following: the fact that more than one drilling unit may be operating concurrently within the Study Area during the nine year period and that may be outside the scope of the project; and to consider the environmental effects that are likely to result from the proposed project in combination with other projects or activities that have been or will be carried out. Husky Energy provided a response to this request on 11 February, 2008.

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.

4. Environmental Assessment Review

Comments on the EA Report were received from DFO, EC, One Ocean and the FFAW.

DFO provided comments on January 21, 2008 and requested that Husky Energy provide them with an annual project update outlining proposed project activities such as wellsite locations, timing of activities, and rig type. They felt that for the discussion on species at risk, there should be a comprehensive list of species and a discussion as to why particular species were included. They also suggested that regular monitoring for marine mammals should occur during all project activities that could potentially affect marine mammals such as geohazard and VSP surveys, and dynamically positioned rigs and vessels. They also provided a number of editorial comments.

EC responded on January 7, 2008 asking Husky Energy to consider alternatives to chlorine use in coolant systems. They also provided a reference for the most recent estimates on Leach's Storm-petrel colonies for Middle Lawn and Green Islands.

One Ocean responded on January 08, 2008 requesting that Husky Energy provide One Ocean and the FFAW union with applicable updates/information regarding scheduled activities and that fish and fish habitat in the project area is actively monitored.

The FFAW provided a response on January 10, 2008 requesting that they be kept informed of operations (i.e. drilling, delineation, excavation, dredging, sub-sea structures, seismic, decommissioning) as they develop over the 2008 to 2017 time period.

Comments were provided to Husky Energy on 21 January 2008 for a response before the Screening Report could be issued. All other comments were provided to Husky Energy for consideration in planning project activities and future programs.

5. Scope of Project

The operator, Husky Energy, proposes to drill up to 18 exploration/delineation wells on any current or future lands held by them in the Jeanne d'Arc Basin. The temporal scope of the project is from 2008 through to the end of 2017.

Either a drill ship or semi-submersible operating year round, or a jack-up rig operating within the designated ice-free period will drill the wells. 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. Over the

temporal scope of the Project, there is the possibility that Husky will use two MODUs for concurrent exploration/delineation drilling in the Project Area. 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 drilling activities to be undertaken beyond 2008 in the Project Area, Husky Energy will be required to provide information to the C-NLOPB that 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 1; additional mitigations; implementation of recovery strategies and/or monitoring plans). If there are any changes in the scope or information available, which may alter the EA conclusions, then a revised EA will be required at the time of authorization renewal. The Canadian Environmental Assessment Registry will be updated as required.

5.1 Boundaries

The boundaries of the Project are defined in the 2007 EA Report are as follows and are acceptable to the C-NLOPB.

<i>Boundary</i>	Description
<i>Temporal</i>	Year-round from 2008 to 2017
<i>Project Area</i>	Project areas will be defined based upon drilling activities
<i>Study Area</i>	Based on the oil spill trajectory modeling using two release points; one inside and one outside the 200 m isobath
<i>Affected Area</i>	Geographic extent of a specific potential effect on a species or species group
<i>Regional Area</i>	The Study Area and the Grand Banks

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.

6. Consultation carried out by Husky Energy

Husky Energy undertook consultations with relevant government agencies, representatives of the fishing industry and other interest groups, local area residents and local businesses. Copies of

the Project Description describing the proposed drilling program were sent to all agencies and groups. Consultations were undertaken with DFO, EC, Natural History Society, One Ocean, Fish, Food and Allied Workers Union (FFAW), Association of Seafood Producers (ASP), Fishery Products International (FPI), Groundfish Enterprise Allocation Council (GEAC), Clearwater Seafoods, and Icewater Seafoods. All consultations were held to inform the stakeholders about the proposed drilling program, to identify issues or concerns which should be considered in the EA and to gather additional information relevant to the EA report. The results of those consultations, and issues identified are documented in the 2007 EA Report. There were no major concerns or issues about the proposed drilling program.

The C-NLOPB is satisfied that the consultations carried out by Husky Energy, and reported on in the EA Report included all elements of the Project. The RA is not aware of any public concerns with respect to the environmental effects of the project, and does not require that further consultations be undertaken for the 2008 field season.

7. Environmental Effects Analysis

7.1 Scope of Assessment

For the purpose of meeting the requirements of the CEAA, the factors that were considered to be within the scope of the environmental assessment are those set out in subsection 16(1) of the CEAA, and those listed in the “*Jeanne d’Arc Basin Area Delineation/Exploration Drilling Program 2007-2016 Scoping Document*” (C-NLOPB 2007).

7.2 Methodology

The C-NLOPB reviewed the environmental effects analysis presented by Husky Energy in the 2007 EA Report. A VEC based assessment based on the interaction of project activities on those 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 RAs. The following environmental effects analysis uses the information presented by the operator and takes into consideration mitigation proposed by the Proponent to assess the potential for residual environmental effects.

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

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

after taking mitigation measures into account,

- significance of residual effect.

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

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

These ratings, along with the likelihood of the effect, are considered in determining overall significance of residual effects.

7.3 Effects of the Environment on the Project

Effects of the physical environment on the Project include those caused by wind, ice, waves, and currents. 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 2007 EA Report, the White Rose Field has only had sea ice present three out of ten years (1998 to 2006) and icebergs sighted between the months of March and June with the 10-year average number of icebergs observed in the White Rose block reduced to 41 icebergs. As part of its monitoring program, Husky will have marine weather observers on board the rig, observing weather and ice conditions on a 24 hour basis. An Ice Management Plan will be submitted to the C-NLOPB 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 of 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**.

7.4 Presence of Structures

The drill rig will be the only surface structure. Either a semi-submersible or a jack-up rig will be used. Subsea structures include drill string and riser. Husky Energy will establish a safety zone around the rig. The proposed safety zone could extend as much as 1.65 km from the drill centre for the semi-submersible rig (*i.e.*, 50 m beyond the anchor locations of a new type of semi-submersible with a larger anchorage area) or approximately 500 m from the platform of the jack-up rig. The maximum areas of the semi-submersible and jack-up rig safety zones would be about 6.6 km² and 1 km², respectively. Under the scenario of two MODUs concurrently drilling exploration/delineation wells in the Project Area, the maximum safety zone area at any one time attributable to delineation/exploration drilling would be 17.1 km². Under the scenario of three semi-submersibles with 1,600 m anchor chains concurrently drilling three wells in the Project (two of which are for Husky), the total area of the three delineation/exploration drilling rig safety zones would be 25.7 km². The safety zone extends 50 m beyond the anchor pattern.

7.4.1 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. For jack-up rigs, there is also the covering of the seafloor associated with the spud cans for a 60 day duration. 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**. Cumulative effects are predicted to be **not significant**.

7.4.2 Marine Birds

0

The effect due to the presence of structures on marine birds is most likely associated with lights and flares. See Section 7.5.2 for a discussion on the effects of lights and flares on marine birds.

7.4.3 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 7.6.3 for a discussion of the effects of noise on marine mammals and sea turtles.

7.4.4 Commercial Fisheries

1

The presence of structures and the corresponding safety zone (approximately 6.6 km² – semi submersible and 1 km² – 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 areas of the affected NAFO Unit Area. As indicated in the EA, offshore deepwater clams are the primary species harvested in Study Area. Husky has indicated that all reasonable efforts will be made to accommodate fishing in the licence areas when drilling is not occurring.

Only a very small proportion of the available grounds would be potentially affected by structures in any given year. Assuming a 1.65 km radius safety zone (6.6 km² in total), a no-fishing area would occupy approximately 0.01% of the Project Area. The artificial reef effect would likely have positive effects on the commercial fishery. Based on possible mitigations identified in the 2007 EA Report to minimize negative effects of the physical presence of structures, the residual effects of the physical presence of structures on the commercial fishery would be **not significant**.

The approximate areas of the White Rose safety zone (including the proposed new drill centres), the Terra Nova exclusion zone and safety zone, and the Hibernia safety zone are 95 km², 14 km² and 255 km² (269 km²) and 6 km², respectively. This amounts to a total of 370 km² or 0.80% of the Project Area. The percentage of the Project Area accounted for by total worst case scenario of safety zones for three rigs concurrently drilling exploration wells is 0.06%. Therefore, the total area of the safety zones (exclusion zone plus safety zone in the case of Terra Nova) associated with three MODUs concurrently drilling exploratory wells and the existing production operations in the Project Area is approximately 395.7 km². This area represents 0.86% of the total Project Area (46,000 km²). The total area of Safety/Exclusion Zones relative to both the Project Area and the traditional fishing ground areas within the Study Area is small. The actual area from which fishers are excluded is smaller (i.e. exclusion zone at Terra Nova), both within- and between-project cumulative effects associated with fishing grounds availability are predicted to be not significant. Also, given that the residual effects of the presence of

structures on the commercial fishery are predicted to be not significant, the cumulative effects on the commercial fisheries will be **not significant**.

7.4.5 Species at Risk

0

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

7.5 Lights and Flares

Lights are used on the drill rig and supply/support vessels for navigation aids and work area illumination. Light and heat could also be emitted for short periods by flaring during well testing.

7.5.1 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.

7.5.2 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. Husky reports the presence of lights on the rig and supply boats would have a low effect within a 10 km² 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 has to be run. It has the potential to have a low effect within a 10 km² area for a short period of time during testing.

In terms of stranded birds, Husky Energy has committed to a recovery and release program for the rig and supply boats, consistent with the requirements of the Canadian Wildlife Service. Husky Energy has indicated that the environmental observer on board the drilling rig will also be responsible for monitoring and observing seabirds and marine mammals in the area, using established protocols and overseeing mitigations such as seabird handling and documentation.

The effects on birds from lights and flares are 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 three production facilities (White Rose, Hibernia and Terra Nova), marine exploration (StatoilHydro Canada Exploration & Development Inc. is proposing an 18 well exploratory drilling program with the same spatial and temporal scope), commercial fishery

activity, and marine transportation all have the potential to interact. The maximum safety zone area at any one time attributable to delineation/exploration drilling would be 17.1 km². Cumulatively, the effects may be additive and overlap however with the implementation of mitigations; the cumulative effect will be **not significant**.

7.5.3 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.

7.5.4 Commercial Fisheries 0

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

7.5.5 Species at Risk 0

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

7.6 Noise

Underwater noise may be caused by supply/support vessels, drill rig machinery and thrusters, echo sounders, VSP seismic array, and wellhead severance using chemical explosives. Air-borne noise is normally associated with helicopters servicing the drill rig.

7.6.1 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 2006). 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. Mitigation such as minimization of VSP source level and ramp up of VSP air gun array will be in place during project activities. Based on predictions in other Environmental Assessments for Husky projects in the Study Area that the residual effects of noise on fish and fish habitat would be not significant, the residual effects of the 9-year delineation/exploration drilling program on fish and fish habitat will be **not significant**.

Noise is produced by all activities occurring on the Grand Banks however, given the fact that most fish are able to move away from any noise source, it is likely that the cumulative effects of exposure to noise is negligible. Eggs and larvae do not have the capability of avoiding a noise source but exposure to very high sound energy levels would be required before damage is done. Cumulative effects of noise on fish and fish habitat will be **not significant**.

7.6.2 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**.

The effects of seismic activity on marine birds are 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. 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**.

7.6.3 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 and continuous throughout the drilling period, for a period of up to 60 days per well. Overall, the effects of noise on marine mammals and sea turtles from drilling operations will be **not significant**.

The passage of marine vessels may also affect marine mammals. There will be one marine vessel that could potentially be shared with the Searose, depending on the proximity. It is estimated that 10 round trips will be made per well. For the duration of the drilling program (approximately 60 days total), the effects from vessels are likely to be negligible to low. Effects may be reduced as supply boats maintain a steady course, 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 occur intermittently throughout the drilling program. A total of 35 flights will take place per well. 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 and **not significant**.

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

- ramp up of VSP air gun array;
- minimization of VSP source level;
- VSP temporal avoidance;
- VSP delay start/shut down/safety zone; and
- an Environmental Observer will monitor for marine mammals and turtles.

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. Therefore, the effects on marine mammals or sea turtles will be **not significant**.

The addition of the drill rig and supply vessels for the drilling program will not contribute to an increase in overall noise in the marine environment. Locally there may be an incremental increase in noise levels; however, the cumulative effects will be **not significant**.

7.6.4 Commercial Fisheries **0**

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

7.6.5 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, marine birds, and marine mammals and sea turtles. Therefore, the effect on fish, marine birds, and marine mammal and sea turtle species at risk will be **not significant**.

7.7 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; and
- fugitive emissions.

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

7.7.1 Fish and Fish Habitat **0**

Effects on fish and fish habitat from atmospheric emissions will be negligible and **not significant**. It is unlikely that routine activities associated with other marine exploration, marine transportation and existing production areas will have adverse direct effects on fish and fish habitat, therefore the cumulative effects on fish and fish habitat will be **not significant**.

7.7.2 Marine Birds **0**

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

7.7.3 Marine Mammals and Sea Turtles **0**

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

7.7.4 Commercial Fisheries **0**

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

7.7.5 Species at Risk

0

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

7.8 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 just below 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. The total quantity of SBM mud and cuttings that would be deposited on the seabed would be in the order of 230 m³ per well. In the case of two MODUs concurrently drilling exploration/delineation wells in the Project Area, about 0.8 km² of seabed would be covered by mud and cuttings to a thickness of at least one centimetre per well. An approximate total of 1.6 km² of fish habitat could be covered by mud and cuttings.

7.8.1 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, the zone of influence (ZOI) is generally confined within approximately 500 m of the drilling area. Study results show that smothering of benthos will occur if the thickness of the deposition layer is greater than 1 cm and that benthos would recover within months to years once drilling stops.

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 have the potential to biodegrade rapidly (LGL 2007). 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 for WBM, SBM, and cuttings depositions would be less than 1 km² for a multi-well program from a single drill centre, based on analysis used during the White Rose Comprehensive Review. Based on a ZOI radius from the well centre of 500 m, a thickness of one centimeter or greater would cover approximately 0.8 km² of the seabed. For two wells, an area of 1.6 km² could be smothered within the Project Area due to delineation/exploration drilling representing about 0.0035% of the total Project Area. All SBM cuttings will be treated in accordance the OWTG prior to discharge.

Based on mitigations indicated in the EA (e.g., treatment of mud and discharge cuttings, mud recycling, 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**.

Currently there are three oil fields in production on the northeast Grand Banks. Drilling activities are ongoing in association with these programs. There is potential for cumulative effects from drilling activities at Terra Nova and White Rose; however, cuttings are re-injected at Hibernia. Assuming the worst-case scenario of three exploratory wells being drilled concurrently in the Project Area; two by Husky using two MODUs and one by StatoilHydro using one MODU, the mud and cuttings will cover an area of the seabed of about 0.8 km² to a thickness of at least one centimeter per well, an approximate total of 2.4 km² of fish habitat will be smothered at the same time within the Project Area. This represents about 0.0052% of the total area of the Project Area. Both within- and between-project cumulative effects associated with the deposition of drilling mud and cuttings on the seafloor are predicted to be additive, with low magnitude, small geographic extent and **not significant**.

7.8.2 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 will be 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 the 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**.

7.8.3 Marine Mammals and Sea Turtles **0**

The deposition of muds and cuttings on the seafloor may have increased concentrations of heavy metals. Drilling activities are unlikely to produce concentrations of heavy metals in muds and cuttings that are harmful to marine mammals and sea turtles (Husky 2000). Therefore, effects from deposition of drill muds and cuttings on marine mammals and sea turtles will be negligible and **not significant**. Cumulative effects will be negligible.

7.8.4 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.

7.8.5 Species at Risk **0**

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

7.9 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 *Offshore Waste Treatment Guidelines* (OWTG) (NEB et al. 2002) prior to discharge. Solid wastes, such as garbage, will be containerized and shipped to shore for disposal in an approved manner or recycling. Husky indicated in the EA that it currently utilizes an Offshore Chemical Management System (OCMS), similar to that in use by Terra Nova and Hibernia, whereby all chemicals that have the potential to reach the environment that are used in the offshore are screened.

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 with hydrocarbons and flared. If the flare capacity is exceeded, then small amounts of treated produced water will be brought ashore for disposal. If produced water must be disposed of at sea, it will be treated in accordance with the OWTG prior to discharge at sea.

7.9.1 Fish and Fish Habitat

0

It is predicted that for each well, approximately 26.4 m³ of excess cement will be released to the marine environment. The discharge will result in the local smothering of benthos. If the cement remains in a pile, it may act as an artificial reef, be colonized by epifaunal animals, and attract fish. The effect, while negative, is negligible with the residual effect of cement on fish habitat of **not significant**.

The blowout preventer is required to undergo periodic testing, during which approximately 1 m³ of BOP fluid is released by semi-submersible rigs per test. Husky indicated that glycol-water mixes with low toxicity will be used and will quickly disperse. The effect of periodic releases of this small amount of glycol on fish and fish habitat would be negligible in magnitude. The residual effects of BOP fluid on fish and fish habitat will be **not significant**.

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, the effect of operational discharges on fish and fish habitat will be **not significant**. Effects will be additive with other projects but the cumulative effect will be **not significant**.

7.9.2 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 are negligible (LGL 2007). 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 the drilling program, the cumulative effect of operation discharges on seabirds will be **not significant**.

7.9.3 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, the effects of the discharge of these small amounts of cooling water on fish and fish habitat would be negligible resulting in a rating of the residual effects of cooling water on fish and fish habitat of **not significant**. 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. The cumulative effects of operational discharges on marine mammals and sea turtles will be **not significant**.

7.9.4 Commercial Fisheries 0

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

7.9.5 Species at Risk 0

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

7.10 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 be required. On some occasions, the wells may be suspended for future re-entry. This is similar to the abandonment process but the wellhead is not removed. A suspension cap is installed to protect the wellhead connector. Proper notification will be made if the well is to be suspended instead of abandoned.

7.10.1 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 EAs 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 Energy, 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**. The cumulative effects of well abandonment on fish and fish habitat will be **not significant**.

7.10.2 Marine Birds

0

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

7.10.3 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 μ Pa-m_{0-peak} and that a 20 kg charge has an equivalent source level of 279 dB re 1 μ Pa-m_{0-peak} 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. With the implementation of mitigations and the short duration of the activity, well severance using chemical explosives will have a **not significant** effect on marine mammals and sea turtles. The cumulative effects of well abandonment on marine mammals and sea turtles will be **not significant**.

7.10.4 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**. The cumulative effects of well abandonment on the commercial fisheries will be **not significant**.

7.10.5 Species at Risk

0

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

7.11 Accidental Events

During exploration drilling programs the possible accidental events, which may affect 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 17,544 for spills greater than 150,000 bbl, 1 in 5834 for spills greater than 10,000 bbls and 1 in 10,000

for spills greater than 1000 bbl (LGL 2007). The probability of platform-based spills has been estimated to be 1 in 0.72 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 2007 EA Report, show that of the 19,032 trajectories modeled for each of two locations within the proposed drilling block boundaries, there was no contact with the shoreline. Blowout modeling was conducted using various crude flow rates at two release locations during both summer and winter, and batch spill modeling was conducted using various diesel and crude volumes in both summer and winter. While the trajectory analysis predicts the track of oil, it cannot predict the state of the oil (e.g. consistency, particle size, patch). Estimates for the geographic extent of a batch spill are presented in the 2007 EA Report (LGL 2007). Generally, most trajectories from both release locations are to the southeast and east. Winter trajectories tend to extend further than those in the summer. The modeling did not indicate any shoreline contacts from any of the spill trajectories originating from the two release locations (on and off the shelf). Maps of monthly trajectory plots are included in the 2007 EA Report.

7.11.1 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 eight species 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 residual effect of an accidental event on fish eggs and larvae would be negligible to low in each blowout/spill scenario. The geographic extents for oil blowout and diesel spill scenarios are greater than 10,000 km² and between 1,001 and 10,000 km², respectively. The predicted frequency of large spills is much less than one event/year and predicted duration is one to 12 months. Mitigation measures such as spill prevention and remediation would reduce overall impacts. Therefore, in all scenario-life stage component interactions, the residual effects of accidental events on fish and fish habitat would be **not significant**.

7.11.2 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 persists on the water's surface, and may last for months at a time. While spilled oil may reach land, it is unlikely, based on the spill trajectory predictions that oil will affect seabird colonies. However, birds in the area of the rig would be at risk.

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 km²) than batch spills (1,001 to 10,000 km²) 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. Overall, however, 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. Although the residual effects on individual birds are likely irreversible, the residual effects on seabirds at the population level are deemed reversible in all scenarios.

7.11.3 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 or the eyes if they swim through a slick. These effects are reversible and would not cause permanent damage to the animals. Based on available marine mammal data for the Jeanne d'Arc Basin area and the biology of marine mammals known to occur in the area, the Project Area is not likely an exclusive feeding or breeding area. Whales are present in the area in low numbers and at certain times of the year. Seals are present on or near Jeanne d'Arc Basin for at least part of the year. Sea turtles are likely uncommon in the Study Area and are even less likely to occur in the proposed drilling area. Depending on the time of year, location of marine mammals and sea turtles within the affected area, and type of oil spilled, effects could range from negligible to low magnitude. A geographic extent of >10,000 km² is predicted for all subsea and above-surface blowout scenarios which were modeled. A geographic extent of 1001-10,000 km² is predicted for all modeled batch spill releases, with a duration of 1-12 months for all spill scenarios. Oil spill countermeasures, may reduce the number of marine mammals exposed to oil. Therefore, this will result in a **not significant** effect from accidental events on marine mammals and sea turtles.

7.11.4 Commercial Fisheries

1

Commercial fisheries could be impacted if there is an effect on eggs and larvae. In the event of a large (greater than 10,000 bbls) oil spill or blowout on the eastern Grand Banks, effects on fish and fish habitat would be not significant and would not result in fish tainting. 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 the commercial fisheries are **not significant**.

7.11.5 Species at Risk

1

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

7.12 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.

8. Other Considerations

Mitigations presented by Husky Energy in its environmental assessment for the Jeanne d'Arc

Basin Delineation/Exploration Drilling Program (LGL 2007) are sufficient to prevent or reduce environmental impacts. If chemical explosives are required during wellhead abandonment, a biological observation program will be required. Specific details of the monitoring program will be discussed with Husky Energy at the 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 2007 EA Report, and those listed below are implemented, the Project is not likely to cause significant adverse environmental effects.

8.1 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, 2008-2017 Environmental Assessment (LGL 2007).*
- *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, 2008-2017 Environmental Assessment (LGL 2007).*
- *Husky Energy shall implement or cause to be implemented the mitigation measures outlined in 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 1 of SARA), including the North Atlantic right whale, Blue whale, and leatherback turtle, is observed within 500 m of the airgun array.*
- *During line changes, the seismic airgun array shall be reduced to a single airgun and the airgun shall remain active during the line change. If, for any reason, the airgun is shut down for a period greater than 30 minutes, then ramp-up procedures shall be implemented as per the Geophysical, Geological, Environmental and Geotechnical Program Guidelines.*

Part D: Screening Decision

9. Decision/Decision Date

The Canada-Newfoundland and Labrador Offshore Petroleum Board is of the opinion that, taking into account the implementation of proposed mitigation measures set out in the conditions above and those committed to by 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: February 15, 2008

Kimberly A. Coady

Environmental Assessment Officer

References:

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