Husky Energy Exploration Drilling Project – Project Description Summary

Prepared for:
Husky Oil Operations Limited

Prepared by:
Stantec Consulting Ltd.
141 Kelsey Drive
St. John's, NL A1B 0L2
Tel: (709) 576-1458
Fax: (709) 576-2126

File No: 121413837.500

FINAL REPORT

September 1, 2016

Table of Contents

1.0 INTRODUCTION 1
1.1 Proponent Information 1
1.2 Proponent Contacts 3
1.3 Regulatory Framework 3

2.0 PROJECT DESCRIPTION 5
2.1 Project Location 5
2.2 Project Components and Activities 7
2.2.1 Well Site/Geohazard/Geotechnical Surveys 7
2.2.2 Drilling 7
2.2.3 Vertical Seismic Profiling 8
2.2.4 Well Testing 9
2.2.5 Decommissioning and Abandonment 9
2.3 Emissions, Discharges and Waste Management 10
2.3.1 Atmospheric Emissions 10
2.3.2 Noise 11
2.3.3 Drilling Wastes 11
2.3.4 Other Wastes 11
2.3.5 Hazardous Wastes and Dangerous Goods 12
2.4 Logistical Support 12
2.5 Project Schedule 13
2.6 Accidental Events and Emergency Response 13

3.0 ENVIRONMENTAL SETTING 16
3.1 Previous Studies 16
3.2 Physical Environment 16
3.3 Biological Environment 17
3.4 Socio-economic Setting 20

4.0 CONSULTATION AND ENGAGEMENT 23
4.1 Aboriginal Engagement 23
4.2 Stakeholder and Community Engagement 23

5.0 POTENTIAL PROJECT-RELATED CHANGES TO THE ENVIRONMENT AND SCOPING CONSIDERATIONS 25
5.1 Potential Project-related Changes to the Environment 25
5.2 Non-routine Project Activities 27
5.3 Scoping Considerations 29

6.0 REFERENCES 31
6.1 Personal Communications 31
6.2 Literature Cited 31

LIST OF TABLES

Table 2.1 Project Area Corner Coordinates (NAD_1983_UTM_Zone_22N) 5
Table 4.1 Stakeholder Concerns and Comments Raised to Date 24
Table 5.1 Potential Environmental Interactions with Routine Project Activities 25
Table 5.2 Potential Environmental Interactions with Accidents and Malfunctions during Project Activities 27
Table 5.3 Proposed Environmental Components to be Assessed in the Environmental Impact Statement 29

LIST OF FIGURES

Figure 1-1 Exploration Drilling Project Area and Designated Project Components 2
Figure 2-1 Proposed Study and Project Areas 6
Figure 2-2 Location of Oil Spill Models Conducted in the Jeanne d'Arc-Flemish Pass Region to Date 15
Figure 3-1 Special Areas in and Near the Study Area 19
Figure 3-2 Legacy and Shipwreck Sites in Offshore Newfoundland 22

Acronyms and Abbreviations

BOP	blow-out preventer
CEAA, 2012	*Canadian Environmental Assessment Act, 2012*
CEA Agency	Canadian Environmental Assessment Agency
cm/s	centimetres per second
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DP	dynamic positioning
EA	environmental assessment
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EL	Exploration Licence
EPCMP	Environmental Protection and Compliance Monitoring Plan
FFAW-Unifor	Fish Food and Allied Workers-Unifor
km	kilometre
L	litre
m	metre
m^2	square metre
m^3	cubic metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MODU	mobile offshore drilling unit
NAFO	Northwest Atlantic Fisheries Organization
nm	nautical mile
PD	Project Description
PL	Production Licence
ROV	remotely operated vehicle
SARA	*Species at Risk Act*
SBM	Synthetic-based drilling mud
SDL	Significant Discovery Licence
TVD	total vertical depth
UXO	Unexploded ordinance
VSP	vertical seismic profile
WBM	water-based drilling mud
WREP	White Rose Extension Project

1.0 INTRODUCTION

Husky Oil Operations Limited (Husky) proposes to conduct exploration drilling activities within the area of its offshore exploration licences (ELs) (ELs 1121 and 1134) on the Grand Banks (Jeanne d'Arc Basin) and the Flemish Pass, and potential future ELs within the Jeanne d'Arc Basin that may be acquired from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) by Husky (as operator) during the 2016 Call for Bids process. These existing and potential future ELs on the Grand Banks and Flemish Pass are located approximately 350 km east of St. John's, Newfoundland and Labrador (NL), in the Northwest Atlantic Ocean.

The Project to be assessed is defined as a multi-well exploration drilling program on existing ELs 1121 and 1134 and future ELs to be awarded to Husky (as operator) in November 2016 during the 2016 Call for Bids. The Project includes up to ten wells to be drilled at any time between 2018 and 2025. Offshore exploration drilling is a designated activity under the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012). A Project Description (PD) has been submitted to the Canadian Environmental Assessment Agency (CEA Agency) to initiate the environmental assessment (EA) process under CEAA, 2012. Should an environmental assessment be required, the CEA Agency would set the scope of the Project for assessment. Given timing of the award of ELs through the 2016 Call for Bids process (November 2016), additional clarity on the specific ELs that are proposed for inclusion as part of the Project would be provided to the CEA Agency prior to submission of the Environmental Impact Statement (EIS) should it be determined a federal environmental assessment is required.

This PD Summary provides an overview of the information required under sections 1 to 19 of the *Prescribed Information for the Description of a Designated Project Regulations*. This PD Summary is also submitted to the CEA Agency to provide Project information to enable government agencies, Aboriginal groups, and stakeholders to determine interest in the Project.

Husky is the operator of the White Rose field, located approximately 360 km east-southeast of St. John's, 50 km northeast of the Terra Nova FPSO and 50 km east-northeast of the Hibernia Platform. Husky is currently investigating the development of the White Rose Extension Project (WREP), west of the Central Drill Centre, using either a wellhead platform or a drill centre similar to existing drill centres in the White Rose field.

1.1 Proponent Information

Husky is a Canadian-based integrated energy company with headquarters in Calgary, Alberta. Atlantic Region operations are managed from the local offices in St. John's, Newfoundland and Labrador, and will be supported using established logistics infrastructure and resources in St. John's.

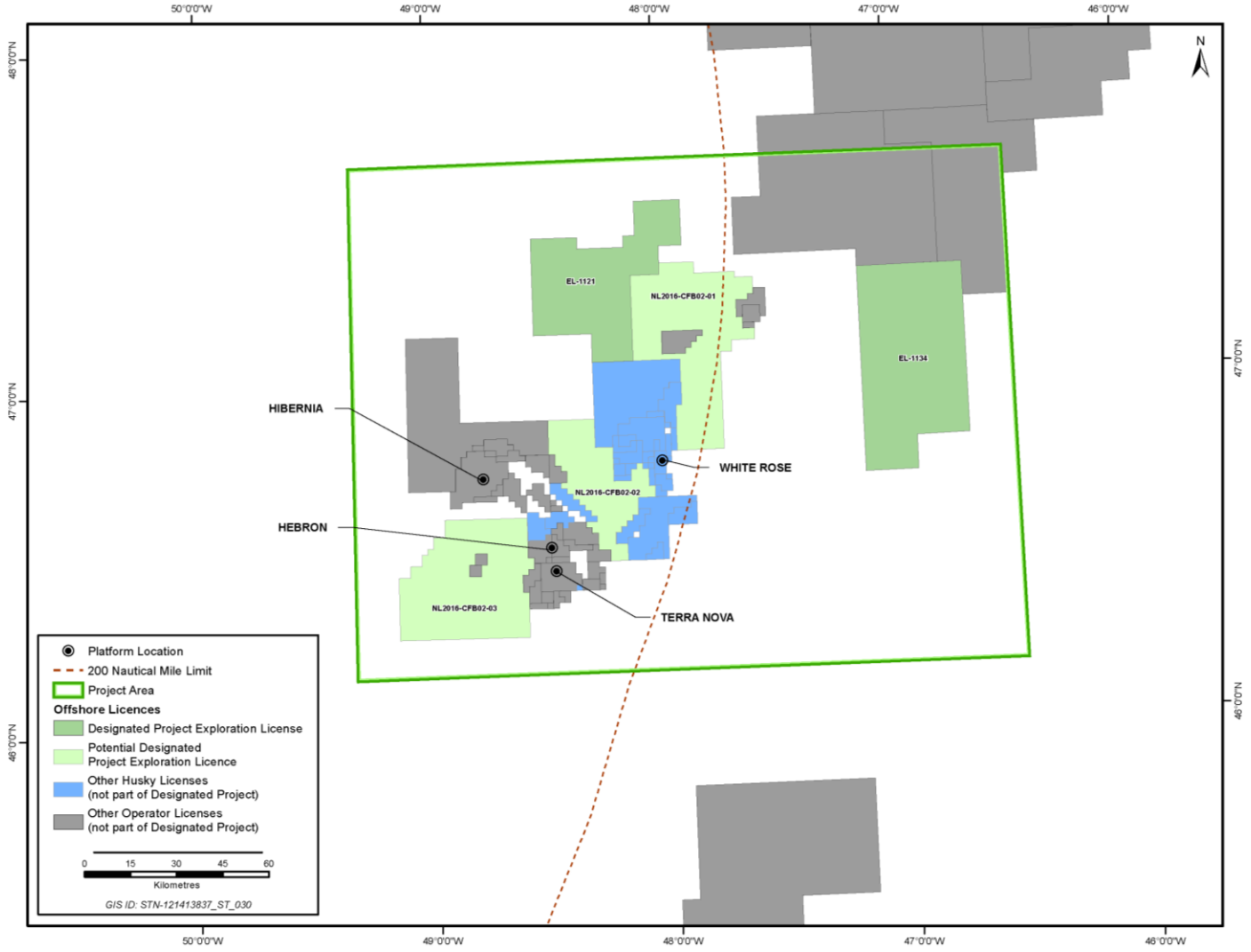


Figure 1-1 Exploration Drilling Project Area and Designated Project Components

Husky has conducted exploration in the region since 1982, and to date, has drilled a total of 86 wells. Husky is operator of several Production Licences (PLs), Significant Discovery Licences (SDLs) and ELs in the Newfoundland and Labrador offshore area, including three ELs as the sole interest holder (ELs 1090R, 1121 and 1122) and one in partnership with Suncor Energy (EL 1134). Husky also holds interest in ELs 1112 and 1124, both of which are operated by Statoil Canada Limited; only ELs 1121 and 1134 are within the scope of the Designated Project to be assessed under CEAA, 2012.

1.2 Proponent Contacts

Husky's Atlantic Region office is located in St. John's, NL. All communications regarding the EA for this Project should be sent to the following:

David Pinsent
Senior Environmental Advisor
Husky Energy
Atlantic Region
351 Water St. Suite 105
St. John's, NL
A1C 1C2
Phone: (709) 724-3997
Email: David.Pinsent@huskyenergy.com

OR

Don S. Forbes
Vice President, Drilling and Completions
Husky Energy
Atlantic Region
351 Water St. Suite 105
St. John's, NL
A1C 1C2
Phone: (709) 724-3900
Email: Don.S.Forbes@huskyenergy.com

1.3 Regulatory Framework

The Project is expected to require an EA under CEAA, 2012, since the drilling, testing and abandonment of offshore exploratory wells in the first drilling program in an area set out in one or more ELs, issued in accordance with the *Canada–Newfoundland and Labrador Atlantic Accord Implementation Act* or the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, is listed under section 10 of the Schedule of Physical Activities included in the *Regulations Designating Physical Activities*.

Although previously subject to a C-NLOPB EA process (CEAR#07-01-28877), ELs 1134 and EL 1121 have not had a well drilled during the term of the licence. Therefore, the proposed exploration drilling program will constitute the first drilling program in those ELs (as will also be the case for any new ELs acquired by Husky, as operator, during the 2016 Call for Bid process) and may be subject to a federal EA.

An EA is also required as part of operations authorizations pursuant to the *Canada-Newfoundland Atlantic Accord Implementation Act*, and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (the Accord Acts) that are granted by the C-NLOPB for the Project. The C-NLOPB is responsible for regulating activities related to the exploration, development, production, and transportation of oil and gas offshore of Newfoundland and Labrador through permits and approvals. It is expected that an EIS completed to satisfy the CEAA, 2012 requirements will satisfy the C-NLOPB EA requirements. In addition to the requirements for an EA, a Drilling Program Authorization and one (or more) Approvals to Drill a Well are required from the C-NLOPB. A provincial-level EA under the *Environmental Protection Act* is not anticipated based on the current Project scope.

Federal legislation that is generally relevant to the environmental aspects of the Project includes:

- *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act*
- *Canada Shipping Act*
- CEAA, 2012
- *Canadian Environmental Protection Act, 1999*
- *Fisheries Act*
- *Migratory Birds Convention Act, 1994*
- *Species at Risk Act* (SARA)
- *Navigation Protection Act*

A provincial-level EA under the *Environmental Protection Act* is not anticipated based on the current Project scope.

Pending Project design and regulatory review, and an assessment of potential environmental effects, authorizations may also be required under the *Fisheries Act* and SARA. A Migratory Bird Handling Permit will likely be required from Environment and Climate Change Canada to permit the salvage of stranded birds on offshore vessels during the Project.

It is not anticipated that Husky will be required to seek additional regulatory approvals for use of the existing onshore supply base. Federal funding will not be required for the Project.

2.0 PROJECT DESCRIPTION

2.1 Project Location

The Study Area includes the Jeanne d'Arc Basin and Flemish Pass. The C-NLOPB has regulatory jurisdiction over Husky's ELs, SDLs and PLs in both of these offshore areas. This area is subject to regulations by both the federal government of Canada, which maintains jurisdiction over fisheries within its Exclusive Economic Zone (EEZ), and jurisdiction over seabed resources on the continental shelf, and by the Northwest Atlantic Fisheries Organization (NAFO), which regulates fisheries in international waters.

The spatial boundaries of the Project Area encompass ELs 1134 and 1121, as well as leases that are part of the 2016 Call for Bid process that could be acquired by Husky (as operator) as new ELs (see Figure 1-1). The spatial boundary of the Project Area has been delineated to account for all activities related to drilling a well, including vessel and helicopter traffic, and vessel traffic associated with geohazard/environmental surveys. The southern boundary is approximately 219 km long; the northern boundary is approximately 213 km long; and each side is approximately 167 km long, creating a total area of approximately 36,050 km². The corner coordinates of the Project Area are provided in Table 2.1.

Table 2.1 Project Area Corner Coordinates (NAD_1983_UTM_Zone_22N)

Corner	Latitude	Longitude
Northeast	47 40'0" N	46 30'0"W
Southeast	46 10'0" N	46 30'0"W
Southwest	46 10'0" N	49 20'0"W
Northwest	47 40'0" N	49 20'0"W

There are other existing ELs, PLs, and SDLs in the Project Area, but these are not part of the Designated Project.

The proposed Study Area (Figure 2-1) for this EA has been determined by oil spill modelling conducted for Husky's WREP. The model boundaries were determined by a worst-case blowout scenario lasting 120 days (Husky 2013) (see Section 2.6 for details on the spill models conducted in the Study Area to date).

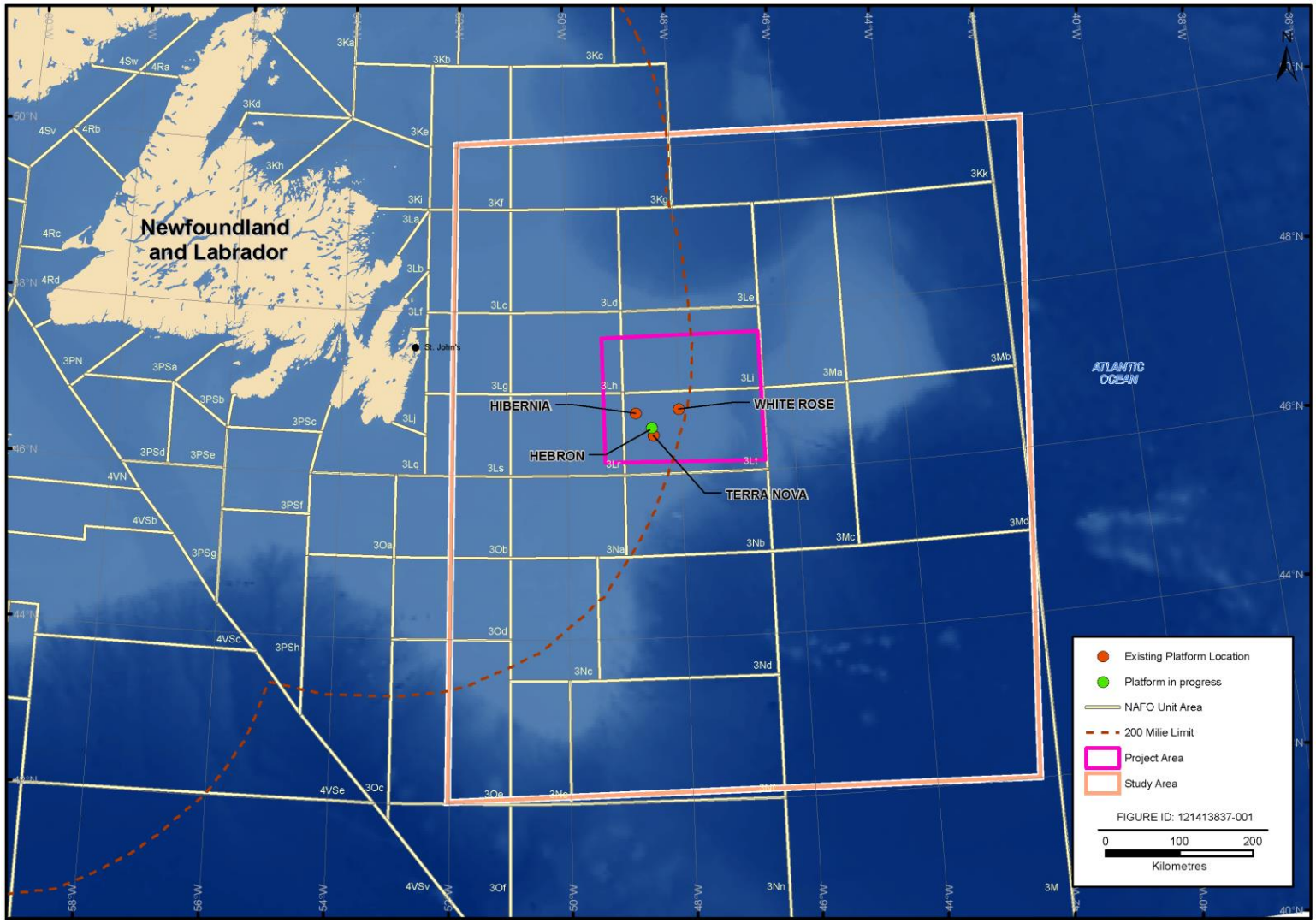


Figure 2-1 Proposed Study and Project Areas

2.2 Project Components and Activities

The key Project components include the drilling platform and the multi-well drilling program (the number of wells to be drilled is contingent upon geophysical surveys, drilling results and whether new ELs are acquired; up to ten wells may be drilled during the Project). All logistical support components associated with the Project are existing sites, infrastructure, and/or equipment that have been used in past and/or ongoing offshore oil and gas projects for Husky and other operators; it is proposed that any activities outside the Project Area not be considered within the scope of the Project should a federal EA be required.

The following Project activities are associated with the drilling of an exploration well:

- well site/geohazard/geotechnical surveys
- drilling by mobile offshore drilling unit (MODU), drillship, and/or jack-up
- vertical seismic profiling (VSP)
- well testing, well completions, workovers/data logging
- decommissioning and abandonment of wells
- vessel and helicopter operations

2.2.1 Well Site/Geohazard/Geotechnical Surveys

Well site/geohazard/geotechnical surveys are conducted in advance of initiating drilling to identify and avoid unstable areas and hazards or potential hazards (such as seabed instability, obstacles, and shallow gas) in the immediate vicinity of proposed well locations. A small air source array is typically used in a restricted area for a 12 to 18 hour period; geohazard surveys may also include sonar. Geotechnical surveys may be conducted to determine that substrate is suitable for positioning a jack-up rig as a drilling platform, so that drilling activities can be conducted in a manner that does not endanger personnel or the environment. A borehole(s) is typically drilled at each potential jack-up well site to collect sediment samples and determine *in situ* sediment conditions.

2.2.2 Drilling

Exploration drilling activities will be carried out using a semi-submersible, drillship, or jack-up rig MODU. The specific MODU to be used for the Project has not yet been selected and will depend on suitability and availability. MODUs are typically capable of drilling year-round and are rated to support the specific needs of the Project. Some of the key components of a MODU include:

- a dynamic positioning (DP) system to maintain position while drilling (as well as monitoring environmental conditions with wind sensors, satellite global positioning system, and gyroscopes)
- drilling derrick (housing the drilling equipment)
- maintaining stability through ballast control
- power supplied through diesel generation

- helideck with refueling capabilities
- storage for drilling materials (fuel oil, drilling muds, cement) and equipment (casing)
- storage for subsea equipment (including well control equipment and marine risers)
- waste management facilities including treatment (for offshore disposal) or temporary storage for shipment to shore
- emergency and life-saving equipment (including lifeboats and rafts for emergency evacuation)
- accommodations for up to 200 persons on board, depending on the unit

The drilling of an exploration well can be broken into riserless drilling (i.e., an open water operation with no conduit for returns back to the MODU) and riser drilling (i.e., closed loop system with fluid returns back to the MODU). Total vertical depth (TVD), drilling string depths, and casing size vary for each well and it is anticipated to take up to approximately 90 days to drill to TVD per well.

During the drilling of the initial sections of the well (i.e., the riserless drilling), there is no closed loop fluid system in place to return drilling fluid back to the MODU. As a result, the associated drilling fluids, excess cement, and cuttings are released directly to the seafloor. The initial well sections (conductor and surface strings) are drilled using water-based drilling mud (WBM) to cool the drill bit as well as transport the cuttings to the seabed. The conductor section is drilled or "jetted" approximately 100 m below the sea floor. The drill string is then inserted into the conductor pipe, drilling a surface hole section to approximately 800 m below sea floor. The surface casing is then lowered into the wellbore and cemented in place. A blow-out preventer (BOP) stack is placed at the end of the drilling riser and connected to the wellhead via the surface casing, creating a connection between the MODU and well.

A riser system is then required for drilling the additional sections to target depth. Once the BOP stack is installed, the riser system transports the associated drilling fluids and cuttings back to the MODU for further processing. The remaining well sections are drilled to TVD using either a WBM or synthetic-based drilling mud (SBM). Intermediate casing is set at established depths to reinforce the wellbore, based on assessment of geological and pore pressure parameters. The casing is cemented in place at each intermediate section.

Specific section depths and associated casing sizes have not yet been determined. Review and approval by the C-NLOPB will be required for each well prior to drilling activities as part of an Authorization to Drill a Well application, submitted in association with the Project.

2.2.3 Vertical Seismic Profiling

Following the drilling of each well to TVD, VSP may be used to assist in further defining a petroleum resource. Measurements from VSP operations are used to correlate drilled strata with surface seismic data, obtain higher resolution images than surface seismic images, and to possibly collect data ahead of the drill bit.

VSP uses a number of different configurations based on the positioning of the associated source and receivers (hydrophones typically placed within the wellbore). This includes zero-offset VSP, offset VSP, and walkaway VSP.

VSP uses equipment similar to that used in seismic operations (i.e., a source array); however, the associated size and volume of the array are much smaller than a traditional surface seismic survey. The VSP is focused around a wellbore; and therefore, sound effects are localized.

2.2.4 Well Testing

The flow testing of hydrocarbons is an activity addressed under the C-NLOPB regulations. Wells may be tested by multiple methods to gather additional details on potential reservoirs and to assess the associated commercial potential of a discovery. A decision to proceed with a drillstem test on an exploration well may be taken after cuttings, core samples, and logs collected during drilling activities are evaluated. Drillstem testing may not be conducted immediately following drilling activities, but may occur at a later date from a returning MODU or on a subsequent well, as appropriate.

Collecting a fluid sample is a key objective of well testing. Drillstem testing generally requires perforating casing that has been set across the hydrocarbon-bearing reservoir. Once the casing and reservoir have been perforated, reservoir fluids are allowed to flow into and up the wellbore to the MODU, which will have a temporary drillstem testing facility installed to handle the flow of any fluids from the wellbore. The hydrocarbons in the reservoir fluids are measured and separated from any produced water. If hydrocarbon flow to surface occurs, it will be flared using a high-efficiency burner to reduce emissions. Once drillstem testing is complete, the associated test string is removed from the well and the well is abandoned in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations*.

2.2.5 Decommissioning and Abandonment

Well abandonment will follow industry standard abandonment procedures and practices in accordance with C-NLOPB regulations. Exploration wells may either be suspended or abandoned. For a suspended well, a suspension cap is installed to protect the wellhead connector. The suspension cap protrudes above the seabed. Proper notification via Notice to Shipping is made to identify the subsea obstruction until it is removed. To abandon a well, all subsea infrastructure is removed upon completion of the well, so nothing protrudes above the seabed.

Well abandonment would include plugging the well with a cement mixture to isolate the wellbore and removing the wellhead and any associated equipment to below the seafloor with mechanical cutters. The plugs are placed at varying depths in the wellbore and the well casing is typically cut just below the surface of the seal. The seabed is inspected using a remotely operated vehicle (ROV) to confirm no equipment or obstructions remain. Husky's preferred method of wellhead severance and recovery is to use a mechanical cutting system, and

wellhead designs make provision for this kind of removal. Wellheads may be removed by the drill rig or by ROV. However, circumstances can arise when mechanical cutting cannot effectively perform the task of wellhead severance. In such instances, shaped charges must be used. This method, if required, will only be used after the Drilling Superintendent, the C-NLOPB, and any of its relevant advisory agencies thoroughly review and approval is granted on a case-by-case basis.

2.3 Emissions, Discharges and Waste Management

Offshore drilling operation will generate air and noise emissions and wastes that will be discharged both offshore and onshore. Wastes discharged offshore will be treated as per the Offshore Waste Treatment Guidelines (National Energy Board et al. 2010) and in compliance with Husky's Environmental Protection and Compliance Monitoring Plan (EPCMP) for the drilling installation. Any substances, wastes, residues, or discharges not identified in the EPCMP are not permitted for discharge.

In addition to the Offshore Waste Treatment Guidelines, the International Convention for the Prevention of Pollution from Ships (MARPOL) and the *Canada Shipping Act* and its regulations will apply to offshore waste discharges from vessels associated with the Project.

Wastes that will be disposed of onshore (either through treatment, recycling, and/or disposal) will meet the requirements of Part V (Waste Management; sections 18 to 21) of the Newfoundland and Labrador *Environmental Protection Act* (chapter E-14.2), and will comply with any applicable municipal by-laws. Onshore waste management and disposal will be handled by a third-party contractor.

Typical wastes to be generated over the course of Project activities and how these wastes will be managed are described below.

2.3.1 Atmospheric Emissions

The primary source of atmospheric emissions for the Project are exhaust emissions from the operation of the MODU and offshore supply vessels; well testing could result in potential flaring associated with produced gas. These emissions will include the following criteria air contaminants: carbon dioxide; sulphur dioxide; nitrogen oxides; and particulate matter. These exhaust emissions will comply with the Newfoundland and Labrador *Air Pollution Control Regulations, 2004*, National Ambient Air Quality Objectives under the *Canadian Environmental Protection Act*, and any relevant regulations under MARPOL. Potential flaring will occur in accordance with the *Drilling and Production Guidelines* (C-NLOPB and Canada-Nova Scotia Offshore Petroleum Board 2011).

A preliminary estimate indicates that the emissions of greenhouse gases from the operation of the MODU, support vessel, and helicopter during the multi-well exploration drilling could be 63,033 tonnes CO_{2eq}/yr (Husky 2012). This estimate is an annual rate based on continuous

exploration drilling using Husky's current MODU, and likely represents a worst-case scenario. These emissions represent 0.59% of the total reported provincial greenhouse gas emissions for 2014 and 0.009% of the national emissions (Environment and Climate Change Canada 2016).

2.3.2 Noise

Atmospheric and underwater noise is generated from various activities associated with exploration drilling, including the operation of helicopters, offshore supply vessels and the drill rig. DP drillships and semi-submersibles are typically noisier than anchored semi-submersibles, which, in turn, are noisier than jack-ups (Richardson et al. 1995). Underwater noise from MODU and offshore supply vessels has been modelled several times in the offshore Newfoundland. The most recent and directly applicable model was undertaken by JASCO Applied Sciences for the WREP EA, the results of which (JASCO 2012) will be applied to this Project.

2.3.3 Drilling Wastes

A combination of WBM and SBM will be used to drill a well. Wastes generated from drilling include drilling mud, drilling fluid, and cuttings that retain a portion of the drilling muds.

Until the riser is connected, WBM cuttings are transported to the seabed and disposed in place. Once the riser is connected, SBM are generally used and associated cuttings are transported back to the MODU, where they are separated from the drilling fluid for management and disposal through the use of shale shakers, mud recovery units, and centrifuges. Once treated, cuttings will be discharged to the sea in accordance with Husky's EPCMP. The recovered drilling mud is reconditioned and reused. Once spent, SBM is returned to shore for disposal at an approved facility.

The deposition of drill cuttings has been modelled numerous times within the Project Area, most recently (AMEC 2012a, updated in AMEC 2016) for the WREP EA (Husky 2012). Since the modelling is directly applicable, it will be applied to this Project. Drill cuttings dispersion has also been modelled in the Flemish Pass portion of the Project Area in an EL (Annieopsquotch) adjacent to Husky's EL 1134 (Jacques Whitford Environment Limited (JWEL) 2002a). The potential effects of drill cuttings are well documented (DeBlois et al. 2014a, 2014b, 2014c; Neff et al. 2014; Paine et al. 2014a, 2014b; Whiteway et al. 2014; International Association of Oil and Gas Producers 2016) and are being monitored by all three production facilities through their environmental effects monitoring programs.

2.3.4 Other Wastes

Other discharges associated with the drilling program include bilge water, deck drainage, cooling water, produced water, BOP fluid, grey/black water, and ballast water. All operational discharges during drilling will be in compliance with Husky's EPCMP for the drilling installation. Any substances, wastes, residues, or discharges not identified in the EPCMP are not permitted for discharge.

2.3.5 Hazardous Wastes and Dangerous Goods

Husky will manage its waste materials in accordance with their Waste Management Plan. Hazardous wastes generated during the Project, including any dangerous goods, will be stored on the MODU in designated areas in appropriate containers/containment for transport to shore in compliance with the *Transportation of Dangerous Goods Act* and its regulations. Once onshore, a third-party contractor will collect and dispose of the hazardous waste at an approved facility and in compliance with any federal and provincial regulations and requirements.

2.4 Logistical Support

Husky currently maintains logistical support to the *SeaRose FPSO* and to MODUs operating within the White Rose Field. Therefore, the required infrastructure and support services are already in place to support exploration drilling. Key areas of support during operation includes shore-based marine logistics, warehouse services, personnel transportation by helicopter, standby and offshore supply vessels, communications, ice management services, marine fuel supply, waste management, medical services, and weather forecasting.

The current offshore supply base in St. John's Harbour (operated by A. Harvey and Company Ltd.) has been providing support to offshore oil and gas activity in the Newfoundland offshore since the early 1990s. These facilities have the required permits and approvals to undertake activities related to offshore oil and gas projects. No additional modifications or changes to the existing supply base will be required. As a result of the forgoing, it is proposed that the supply base and associated activities not be considered within the scope of the Project to be assessed should a federal EA be required.

Husky has a third party contracted to transport supplies (and sometimes personnel) from the supply base to the *SeaRose FPSO* and any MODUs employed by Husky. Depending on location of the exploration activity and operating conditions, one to three offshore supply vessels may be required. During drilling activities, the vessel responsible for transporting supplies will require one additional trip per week from the supply base to the MODU. One offshore supply vessel is always on standby with the MODU if it is operating outside the White Rose Field. Offshore supply vessels follow established vessel traffic lanes to the field. Once in the vicinity of the field, the vessel will select the route most appropriate for reaching the destination. Offshore supply vessel transit within the Project Area is considered to be within the scope of the Project to be assessed; however, due to the routine and ongoing nature of offshore supply vessel activity, and existing regulatory regime and best management practices, is it proposed that offshore supply vessel transit outside the Project Area not be considered within the Project scope should a federal EA be required.

Drilling activities will require helicopter support for crew transfer and light supply transport. During drilling activities, it is anticipated that an average of five trips per week from St. John's to the MODU will be required. Helicopter support will also be used in the event that emergency

medical evacuation from the MODU is necessary during drilling activities. Helicopter operations fall under the jurisdiction of Transport Canada Civil Aviation. Helicopters file flight plans and follow set flight paths to and between the fields. Helicopter transit within the Project Area is considered to be within the scope of the Project; however, due to the routine and ongoing nature of helicopter activity, and existing regulatory regime and best management practices, it is proposed that helicopter transit outside the Project Area not be considered within the Project scope should a federal EA be required.

2.5 Project Schedule

Project planning is currently ongoing. Stakeholder and regulator engagement has been initiated and will continue throughout the life of the Project as required. Exploration drilling could occur any time within the term of the licences (2018 to 2025); well testing (dependent upon drilling results) could also occur at any time during the temporal scope of this EA. Abandonment or suspension activities will be conducted either following drilling and/or well testing activities. The temporal scope of the EA accommodates drilling in EL 1121, EL 1134 and any leases acquired by Husky (as operator) during the 2016 Call for Bid process for the full term of each licence (period 1 and period 2).

It is currently anticipated that exploration drilling activities would commence in Q1 2018, and continue intermittently the full term of each licence (period 1 and period 2). Drilling activities will not be continuous over the eight years and will be, in part, determined by rig availability and previous years' results. Drilling may occur year-round if conducted using a semi-submersible or drill ship and during the ice-free season only if a jack-up rig was used.

2.6 Accidental Events and Emergency Response

To properly assess the effects of a drilling program, a range of potential spill scenarios is typically required to delineate the Study Area; these scenarios usually involve blowouts, batch spills, and vessel spills. The EA for Husky's Delineation/Exploration Drilling Program 2008-2017 (LGL 2007) modelled these hydrocarbon spill scenarios from one location on the Grand Banks and from one location in deeper water, near the Flemish Pass.

More recently, the WREP EA (Husky 2012) used worst-case accidental event scenarios in its effects assessment. Subsea and surface blowout rates were the highest modelled in the Newfoundland offshore. Trajectories were run for 120 days (estimated time to drill a blowout relief well) or until the oil evaporated and dispersed from the surface, or the average oil concentration on the surface dropped below 1 gram per 25 m^2 (this level of contamination of highly weathered crude is considered innocuous to wildlife (French-McCay 2004)). The boundaries of the WREP Study Area were determined by the oil spill trajectory model. The same spill model results used in the WREP have been proposed for the current drilling Project; therefore, the same Study Area used in the WREP is proposed for this potential EA (Figure 2-1).

In addition to highly applicable spill modelling from the WREP EA, several other EAs have used hydrocarbon spill modelling results from previous assessments. Of the total 18 oil spill models conducted in the Jeanne d'Arc and Flemish Pass, 14 have been conducted for exploration drilling (Figure 2-2). Husky asserts that the size of the study area used in the WREP EA is sufficient to accommodate the area potentially affected by a spill within area potentially affected by a spill within Husky's ELs (current or acquired through the 2016 Call for Bid process) in the Project Area indicated within Figure 2-1. Therefore, the results of the previously modelled oil spill scenarios are applicable to the Project.

Whole mud spills of SBMs have also been modelled for the WREP (AMEC 2012) and for the Hebron project (ExxonMobil Canada Properties 2011); these results will be applied to this Project.

Husky has a robust emergency response program. The Incident Coordination Plan - EC-M-99-X-PR-00003-001 outlines the necessary resources, personnel, logistics, and actions to implement a prompt, coordinated, and rational response to any emergency. It offers an efficient and balanced approach to dealing with the issues resulting directly from an emergency. In the event of an emergency, personnel are mobilized onshore as soon as possible to provide the necessary support required by an emergency site.

Husky has instituted a spill prevention program with an intention of zero spills into the marine environment. Any unintentional discharge (hydrocarbon or otherwise) is considered to be an oil spill requiring an appropriate level of response, potentially including activation of the Oil Spill Response Procedure - East Coast Oil Spill Response Plan (EC-M-99-X-PR-00125-001). This document details the response actions to be taken by Husky in the event of an oil spill while operating offshore Newfoundland and Labrador. These procedures are responsive to regulatory requirements for oil spill contingency planning and will be applied to exploration drilling activities.

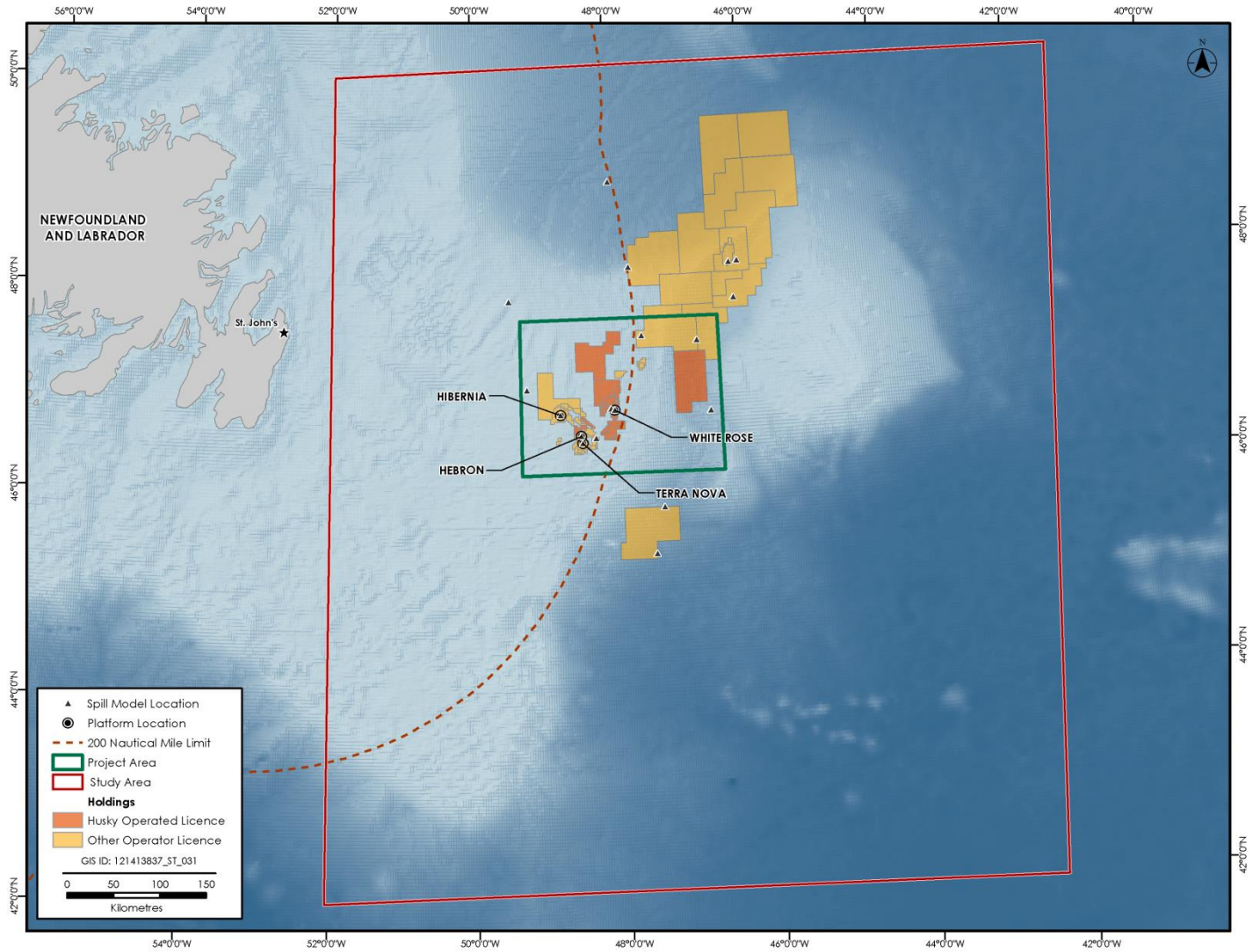


Figure 2-2 Location of Oil Spill Models Conducted in the Jeanne d'Arc-Flemish Pass Region to Date

3.0 ENVIRONMENTAL SETTING

3.1 Previous Studies

Environmental assessment of Newfoundland offshore oil and gas activities started approximately 35 years ago. Husky alone has conducted six EAs of drilling activities. Key environmental studies, relevant to this EA include:

- Eastern Newfoundland Strategic Environmental Assessment (AMEC 2014)
- White Rose Extension Project Environmental Assessment (Husky 2012)
- StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016 (LGL 2008)
- Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008-2017, Environmental Assessment (LGL 2007)
- Husky White Rose Development Project: New Drill Centre Construction & Operations Program Environmental Assessment (LGL 2006)
- Husky Lewis Hill Prospect Exploration Drilling Program Environmental Assessment (LGL 2003)
- White Rose Oilfield Comprehensive Study (Husky Oil 2000)
- Suncor Energy's Eastern Newfoundland Offshore Area 2D/3D/4D Seismic Program, 2014-2024 (Suncor Energy 2013)
- Hebron Project Comprehensive Study Report (ExxonMobil Canada Properties 2011)
- Orphan Basin Exploration Drilling Program Environmental Assessment (LGL 2005)
- Flemish Pass Drilling Environmental Assessment (JWEL 2002a)
- Environmental Assessment of Exploration Drilling in Annieopsquotch (EL 1052), Bonnawinkie (EL 1056) and Gambo (EL 1048) Leases (JWEL 2002b)

The information from the above reports and other relevant studies will be reviewed and referenced as part of the current EIS. While none of the lands have been subject to a regional study as described in section 73 to 77 of CEAA 2012, the C-NLOPB has conducted a Strategic Environmental Assessment (AMEC 2014). Sufficient data are available to characterize the existing environment in the Project and Study Areas, and no new field work is planned to support the EIS.

3.2 Physical Environment

The geology and topography of the Study Area (see Figure 2-1) are highly variable. Mesozoic rocks comprise the majority of the Study Area as a result of rifting and heating of the continental crust and lithosphere. The surficial geology of the Study Area ranges from fine grain sand, mud, and clay, to coarse boulders and bedrock.

Water depths on the Grand Banks average 75 m, and extend out to the 200 m contour. The shelf break off the outer Grand Banks begins at approximately 240 m below sea level, as it descends

into the Flemish Pass. The Flemish Pass is a mid-slope basin that is bordered by the Grand Banks and the Flemish Cap, with depths ranging between 1,000 and 1,500 m (Suncor Energy 2013; AMEC 2014).

Eastern offshore Newfoundland (including the Flemish Pass) has a climate that is characteristic of many marine environments, with typically cooler summers and warmer winters with increased precipitation compared to continental climates (JWEL 2002a; LGL Limited 2008; Suncor Energy 2013). Eastern offshore Newfoundland typically has intense mid-latitude low-pressure systems in the fall and winter, tropical storm systems in the late summer and into the fall, and sea ice and icebergs during the winter and spring (Husky 2012).

In winter, spring, and fall, the dominant winds in the area are westerly and in summer, southwesterly, with winds being more intense in the winter months than summer (JWEL 2002a). Winter storms are more intense and frequent than those in the summer.

Rainfall is most likely in autumn, with moderate to heavy rainfall occurring most frequently from September to January. Snow is most likely to occur in January through March, while moderate to heavy snowfall is most likely to occur in January and February. Fog frequently occurs in the offshore area, with the foggiest period occurring between May and July. In July, visibility is often reduced to less than 1 km (ExxonMobil Canada Properties 2009, in Husky 2012).

The Study Area is located within an open ocean environment, with water circulation influenced primarily by the Labrador Current. The offshore component of the Labrador Current flows through both the Grand Banks and the Flemish Pass, and averages between 21 to 28 cm/s (Gregory 2004, in AMEC 2014).

Air quality within the Study Area is anticipated to be good, with only occasional exposure to exhaust products from vessel traffic, helicopters, and existing offshore oil production facilities at White Rose, Terra Nova, and Hibernia.

3.3 Biological Environment

Offshore Newfoundland and Labrador supports a wide variety of marine species and biological diversity. Extensive biology survey work has been conducted within the Study Area by government, academia, and industry. Commercially important fish species that exist within the Study Area include Atlantic and Greenland halibut, yellowtail and witch flounder, roughhead and roundnose grenadier, redfish, skate, capelin, and mackerel (JWEL 2002a; Suncor Energy 2013; AMEC 2014). There are also NAFO quotas for white hake (in 3NO) and squid (NAFO Subareas 3+4) (NAFO 2015). American plaice and Atlantic cod were historically abundant within the Study Area, but have become uncommon and the moratoria on commercial fishing of these species remain. Other species under moratoria include redfish (in 3LN) and witch flounder (in 3NO). Other fish species occurring within the Study Area include sculpin species, Arctic cod, sand lance, and alligatorfish (Husky 2012).

The Study Area is known to support a range of benthic species, including various species of anemones, clams, polychaete worms, crabs, hydroids, and corals (Husky 2012). Benthic invertebrate species that are commercially important include rock crab, sea scallop, cockle, surf clam, snow crab, and northern shrimp (Suncor Energy 2013). Commercial fish surveys during the environmental effects monitoring programs found northern shrimp to be the most abundant epibenthic species, followed by sea urchin and sand dollar (Husky 2009, in Husky 2012). As is the case on the Grand Banks, sampling in the Flemish Pass found marine polychaete worms to be the most abundant benthic species. Clam species have also been collected in the Flemish Pass between 895 and 1,500 m (Imperial Oil, 1976, in JWEL 2002a).

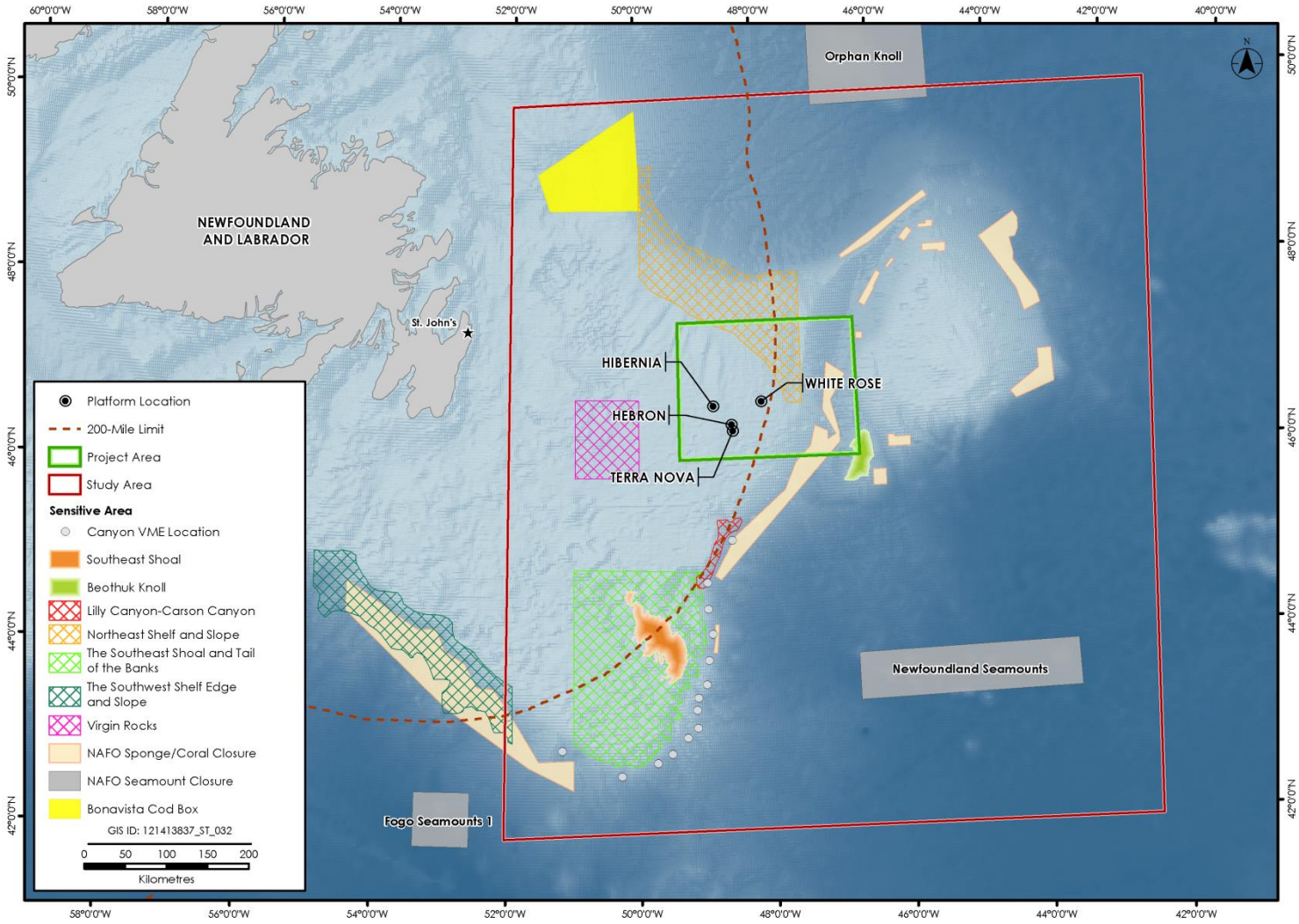
Deepwater corals and sponges located within the Study Area include stony corals, black wire and gorgonian corals, soft corals, sea pens, and sponges. These organisms help increase habitat complexity, and provide habitat to a variety of juvenile fish and invertebrate species. The slopes of the Flemish Cap are important for sea pens, large gorgonians (also along the northern Flemish Pass), and black corals (Knudby et al. 2013, in AMEC 2014). The Flemish Cap and Flemish Pass are also important for sponges (NAFO 2011, in AMEC 2014). NAFO has established protected areas for corals and sponges that prohibit bottom trawling activities (NAFO 2011).

Approximately 20 species of marine mammals are known to occur within the Study Area, and include whales, dolphins, porpoises, and seals. Many mammal species occur seasonally to feed in the area, primarily occurring near shelf breaks where ocean productivity is highest. This includes areas on the shelf edge of the Grand Banks, where it descends into the Flemish Pass. Two species of sea turtles, the leatherback turtle and the Atlantic loggerhead turtle, have been documented in the Study Area during the summer and fall months.

The Grand Banks and Flemish Pass provide important habitat for millions of marine birds, with over 60 species reported. Approximately 19 of these species are pelagic and could occur in the Project Area. Such species include gannets, phalaropes, gulls, petrels, alcids, and shearwaters, (AMEC 2014). Many migratory birds use the Study Area in summer to forage and breed; the peak seabird density is typically from July to September (JWEL 2002a; Lock et al. 1994, in LGL Limited 2008), with species leaving in the fall to migrate south for the winter (Fifield et al. 2009, in AMEC 2014).

There are approximately 22 marine fish, 7 mammal, 2 sea turtle and 1 marine bird species of conservation interest (i.e., species listed by SARA and/or the Committee on the Status of Endangered Wildlife in Canada) that have the potential to occur in the vicinity of the Project.

Fisheries and Oceans Canada (DFO) has identified Ecologically and Biologically Significant Areas within offshore Newfoundland (DFO 2004) (Figure 3-1), but there are no designated Marine Protected Areas within the Study Area. The locations of a number of NAFO-identified Vulnerable Marine Ecosystems are also illustrated in Figure 3-1. These areas are designated to protect the habitat of deepwater corals (e.g., large gorgonians, black corals) and sponges (NAFO 2011).



Source: adapted from Husky Energy 2012; updated with data from NAFO 2015.

Figure 3-1 Special Areas in and Near the Study Area

3.4 Socio-economic Setting

The Study Area has a number of users, including fishers, marine shipping, marine research, other oil and gas operations, and Department of National Defence (DND).

The Government of Canada has jurisdiction over commercial fishing activities for sedentary and non-sedentary species within its 200 nm EEZ and sedentary species and commercial fisheries up to the extent of the defined continental shelf. Beyond the EEZ, NAFO has jurisdiction over commercial fisheries for non-sedentary species, and to designate protected areas.

Currently, Miawpukek First Nation, Qalipu Mi'kmaq First Nation Band, Nunatukavut Community Council, Innu Nation, and Nunatsiavut Government hold communal commercial fishing licences within the Study Area, including the NAFO Division 3L (D. Ball, pers. comm.). These licences are issued under *Aboriginal Communal Fishing Licences Regulations* of the *Fisheries Act*. Although the licences are issued, the Aboriginal groups may not execute these fisheries, either due to moratoria for some species, or due to trading licences in 3L for licences off Labrador. There are no food, social, and ceremonial fisheries in 3L. The closet Aboriginal reserve to the Project is Conne River, approximately 900 km west of the Project Area.

The Project Area is within NAFO Area 3L and the proposed Study Area is within NAFO Areas 3KLMNO. Key fisheries for the NAFO Division 3L are snow crab and shrimp. Other commercial fish species that occur in the offshore area include surf clam, cockles, capelin, Atlantic halibut, Greenland halibut (turbot), yellowtail flounder, large pelagic species such as swordfish, and various tunas and sharks. The peak harvesting months in the offshore area are April to September.

Fish, Food and Allied Workers (FFAW)-Unifor conducts annual industry-DFO collaborative post-season trap surveys for snow crab in NAFO Divisions 2J3KLOPs4R after the commercial snow crab fishery has closed. Each year approximately 1,500 stations are sampled in all Crab Management Areas. DFO also conducts annual research studies. Parts of the Study Area overlap with DFO research surveys in 3K, 3L, 3N and/or 3O. The 3LNO spring survey is typically conducted in May to June, while the fall survey is typically conducted from early October to mid-December (Husky 2012).

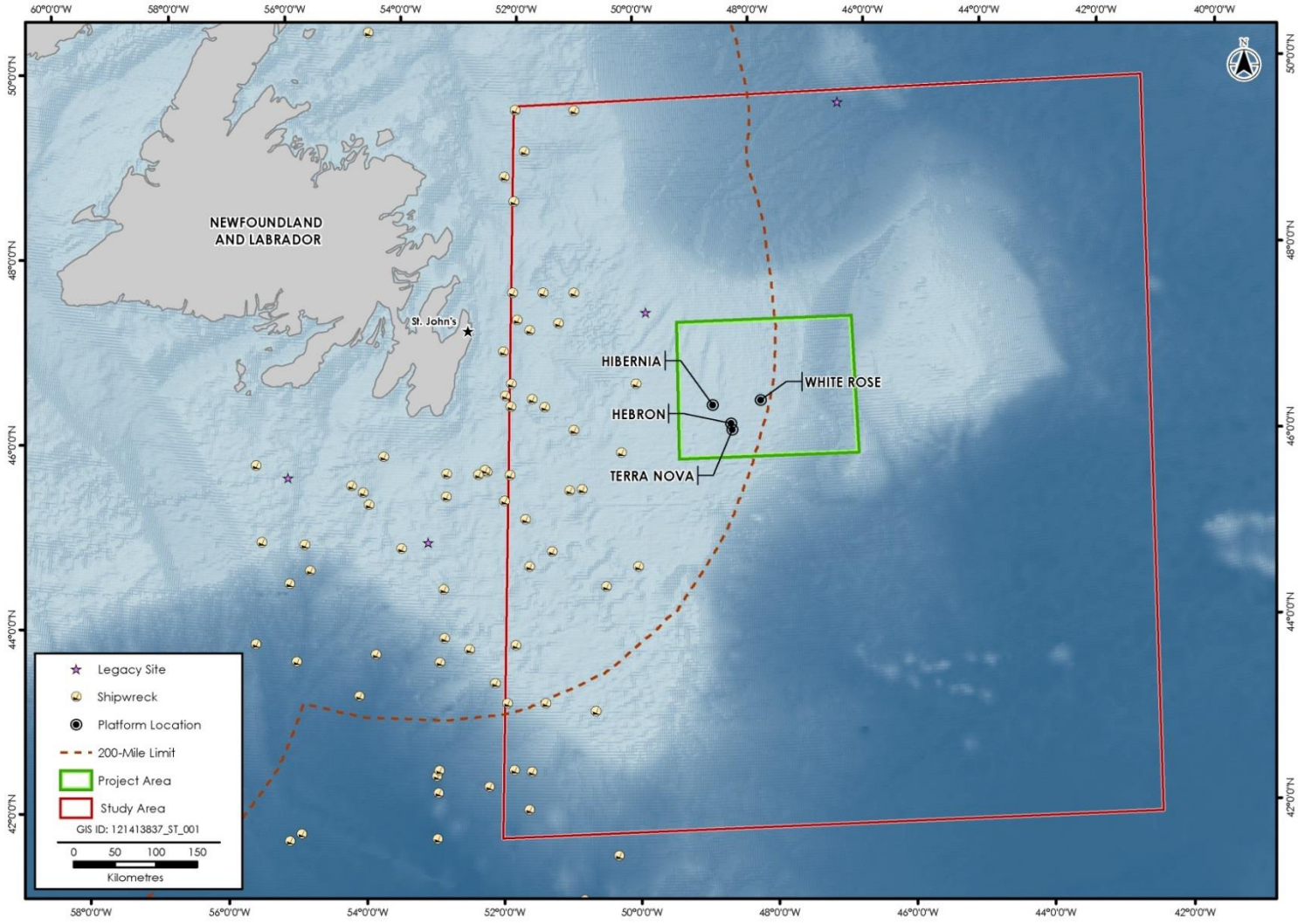
Internationally recognized ship transit corridors occur through the Study Area and corners of the Project Area, which are monitored by the Canadian Coast Guard within the 200 nm EEZ.

Offshore oil and gas production activities have been occurring off the coast of Newfoundland and Labrador for approximately 20 years; exploration has occurred for a much longer period. There are currently three producing fields within the Jeanne d'Arc Basin: Hibernia (Hibernia Management and Development Company Limited), Terra Nova (Suncor Energy Inc.), and White Rose (Husky Energy Inc.). Hebron (ExxonMobil Canada Properties), the newest production field, is set to begin production by the end of 2017. In addition to production operations, oil and gas

exploration is very active in the Newfoundland offshore. The C-NLOPB moved into a scheduled land tenure system in 2013, dividing offshore Newfoundland and Labrador into eight regions.

DND legacy sites exist across Canada's coastline where unexploded ordnance (UXO) may remain, and there are 1,100 known UXO sites that exist off Canada's east coast (AMEC 2014). There are 32 shipwrecks and two legacy sites within the Study Area; there are none within the Project Area (Figure 3-2).

There are both active and inactive marine subsea cables that occur within the Study Area, connecting North America to the United Kingdom and Europe. There is the potential for more marine cables to be constructed within the Study Area over the life of the Project.



Source: DND 2015

Figure 3-2 Legacy and Shipwreck Sites in Offshore Newfoundland

4.0 CONSULTATION AND ENGAGEMENT

As part of the planning for Project activities offshore, Husky is developing a consultation plan to establish ongoing communication with relevant stakeholders and to identify any environmental or socio-economic concerns that can be reduced or avoided.

4.1 Aboriginal Engagement

DFO has identified five Aboriginal groups that hold communal commercial fishing licences in the Study Area, including NAFO Division 3L: Miawpukek First Nation; Qalipu Mi'kmaq First Nation Band; Nunatukavut Community Council; Innu Nation; and Nunatsiavut Government (see Section 3.4). Husky plans to engage with each of these Aboriginal groups in the context of potential interaction between the Project and their commercial fishing interest. Engagement has been initiated through letters sent to each of the five First Nations, notifying them of the project and to determine any interest they may have in the Project. To date, no comments have been received from any Aboriginal groups.

4.2 Stakeholder and Community Engagement

Husky understands the importance of meaningful engagement with federal, provincial, and municipal stakeholder groups, including regulatory agencies, the public, and other interested parties. Husky has identified a range of stakeholders who may have an interest in the Project, and who might need or want to be consulted on Project activities. These identified stakeholders include, but are not limited to:

- C-NLOPB
- CEA Agency
- Government of Canada (various departments)
- offshore fishing industry (Ocean Choice International, Groundfish Enterprise Allocation Council, Association of Seafood Producers, Canadian Association of Prawn Producers)
- FFAW-Unifor
- One Ocean
- local environmental non-governmental organization offices (e.g., Nature Newfoundland and Labrador)

To date, Husky has met with One Ocean, Ocean Choice International, Environment Canada and Climate Change, and DFO representatives in St. John's to present with a project summary and to initiate consultations surrounding the Project. Arrangements to engage all other stakeholders are ongoing. Concerns and comments raised during consultation with DFO, Environment and Climate Change Canada, and Ocean Choice International and One Ocean are provided in Table 4.1.

Table 4.1 Stakeholder Concerns and Comments Raised to Date

Stakeholder	Concern/Comment
DFO	• quantifying cumulative effects will be an important aspect of the EA • use available EAs and update with EEM data • meeting regulations, standards, audits and inspections, etc. are important mitigation measures to be included • important that discussion on species at risk be up to date (defining critical habitat for wolffish is in the works) • would the Flemish Pass drill cuttings be different? • seems reasonable to use existing oil spill modelling/new drill cuttings modelling information • Environment and Climate Change Canada will now be responsible for all Section 36 (deleterious substances) issues
Environment and Climate Change Canada	• do the 10 wells include delineation? • what is the time frame within which a well had to be drilled? • what oil type surrogate was used in the model?
Ocean Choice International and One Ocean	• what is the extent of the well abandonment (i.e., above or below seafloor)? • inability to forecast which fisheries will be undertaken in Project Area due to ongoing and future changes (e.g., anticipated changes to the groundfish quota not just for cod) • OCI has been consolidating data they have collected for the past three decades • have there been any changes or improvements on BOPs in NL.? • changing environmental conditions are affecting use of depth and temperature to determine fishing area • drilling is not an issue for the offshore fisheries; constant/ consistent noise does not affect the fish

5.0 POTENTIAL PROJECT-RELATED CHANGES TO THE ENVIRONMENT AND SCOPING CONSIDERATIONS

5.1 Potential Project-related Changes to the Environment

The following are potential interactions with the environment resulting from routine Project activities:

- installation and presence of physical structures (e.g., wellheads, MODU)
- underwater noise from VSP survey, helicopters, offshore supply vessels, and drilling activities
- lights and flare
- drilling waste discharge (muds, cuttings) and atmospheric emissions (including flaring during testing)

An overview of the potential environmental interactions with routine Project activities that may result in changes to the environmental components identified in CEAA, 2012 are provided in Table 5.1.

Table 5.1 Potential Environmental Interactions with Routine Project Activities

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	Routine Project activities may result in changes affecting fish, fish habitat, aquatic species as defined under SARA, marine mammals, and other aquatic species, including the following interactions with the environment: • sensory disturbance to aquatic species from underwater noise emissions associated with drilling and VSP activities • localized degradation and disturbance to the benthic environment (including benthic species) due to seabed deposition at drill site(s) (i.e., drill mud/cuttings, cement) include smothering and mortality of benthic species • localized effects on marine water quality due to discharges to the ocean (e.g., waste water, drill mud/cuttings) • potential injury or mortality to marine mammal(s) from vessel collisions
Migratory Birds	5(1)(a)(iii)	Routine Project activities may result in changes affecting migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, due to the following interactions with the environment: • attraction of migratory birds to the lighting (including flares) and discharges (e.g., food wastes) • mortality or stranding of migratory birds

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Project Activities Occurring on Federal Lands	5(1)(b)(i)	Routine Project activities may result in changes to the environment that would occur in federal waters as a result of the Project Area being located within Canada's EEZ and thus within federal waters under the jurisdiction of the Government of Canada. These potential effects occurring in federal waters are described within this table
Transboundary Issues	5(1)(b)(ii)	Routine Project activities will result in emissions of greenhouse gasses
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	Routine Project activities may result in the following changes to the environment that may affect commercial fishing activities, including those carried out under communal commercial licences in and around the Project Area: • establishment of a safety zone, as required by the C-NLOPB, and associated spatial and temporal restrictions on commercial fish harvesting activity • the Project is expected to have economic benefits, including economic and contracting opportunities • routine Project activities are not expected to result in any changes to the environment that would have an effect on the health conditions of Aboriginal or non-Aboriginal peoples
Physical and Cultural Heritage, or Resources of Historical, Archaeological, Paleontological, or Architectural Significance	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	Given the location of the Project offshore, routine Project activities are not anticipated to result in any changes to the environment that would have an effect on physical and cultural heritage areas or resources. Information gathered during 3D seismic surveys, geotechnical and geohazard surveys, and pre-drill ROV site surveys in the Project Area will confirm the absence of cultural heritage resources on the seabed before any seabed disturbance takes place.
Current Use of Lands and Resources for Traditional Purposes by Aboriginal Groups	5(1)(c)(iii)	There are a number of communal commercial licences issued for fishing zones within NAFO Area 3L. Routine Project activities may result in the following changes to the environment that may affect commercial fishing activities, including those carried out under communal commercial licences in and around the Project Area: • establishment of a safety zone, as required by the C-NLOPB, and associated spatial and temporal restrictions on commercial fish harvesting activity • The Project is also expected to have economic benefits, including economic and contracting opportunities

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a Duty or Function in Support of the Project	5(2)(a) 5(1)(b)(i)	Routine Project activities authorized by the C-NLOPB have the potential to result in directly related or necessarily incidental changes to the atmospheric environment due to the following interactions with the environment: • release of air emissions • generation of noise

5.2 Non-routine Project Activities

In addition to assessment of environmental effects from routine Project activities, environmental effects from non-routine Project activities such as accidents and malfunctions have also been considered (Table 5.2). Potential accidental events that can occur during exploration drilling include blowouts (uncontrolled release of hydrocarbons during drilling) and platform and vessel leaks, as well as spills and releases (e.g., hydraulic fluid, drilling mud, and diesel). Collectively, these accidental releases are referred to as "spills".

Table 5.2 Potential Environmental Interactions with Accidents and Malfunctions during Project Activities

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	An accidental spill or release during Project activities could result in changes to fish, fish habitat, aquatic species as defined in SARA, marine mammals, and other aquatic species, including: • reduced availability and quality of habitat • degradation and reduction in marine water quality • injury, mortality and/or reduced health for fish and other aquatic species
Migratory Birds	5(1)(a)(iii)	An accidental spill or release during Project activities could result in changes to migratory birds, as defined under the *Migratory Birds Convention Act, 1994*, including injury, mortality, and/or reduced health for migratory bird species.

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Project Activities Occurring on Federal Lands	5(1)(b)(i)	An accidental spill or release during Project activities could potentially result in changes to the environment that would occur in federal waters as a result of the Project Area being located within Canada's EEZ and thus within federal waters under the jurisdiction of the Government of Canada. These potential effects occurring in federal waters are described within this table
Transboundary Issues	5(1)(b)(ii)	An accidental spill may result in transboundary effects outside of Newfoundland and Labrador or Canadian offshore areas. In particular, a spill may enter international waters, which fall outside the Canadian EEZ. Spill-related effects in international waters could include adverse effects to birds, fish, fish habitat, and commercial fisheries
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	An accidental spill or release during Project activities could result in the following changes to the environment that may have an effect on commercial fisheries, including Aboriginal communal fishing licences: • contamination-related closure of commercial fishing areas, and associated restrictions on commercial fish harvesting activity • reduced catchability associated with damage to fishing gear (e.g., fouling) • changes in population size and health of individuals among commercial fish species, and associated loss of income through reduced catch value
Physical and Cultural Heritage, or Resources of Historical, Archaeological, Paleontological, or Architectural Significance	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	Given the location of the Project offshore, non-routine Project activities are not expected to result in changes to resources of Historical, Archeological, Paleontological, or Architectural significance. Information gathered during 3D seismic surveys, geotechnical and geohazard surveys, and pre-drill ROV site surveys in the Project Area will confirm the absence of cultural heritage resources on the seabed before any seabed disturbance takes place
Current Use of Lands and Resources for Traditional Purposes	5(1)(c)(iii)	There are a number of communal commercial licences issued for fishing zones within NAFO Area 3L. An accidental spill or release during Project activities could result in the following changes to the environment that may have an effect on commercial fisheries, including Aboriginal communal licences: • contamination-related closure of commercial fishing areas, and associated restrictions on commercial fish harvesting activity • reduced catchability associated with damage to fishing gear (e.g., fouling) • changes in population size and health of individuals among commercial fish species, and associated loss of income through reduced catch value

Environmental Component of Concern	Relevant Section of CEAA, 2012	Potential Environmental Interactions
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a Duty or Function in Support of the Project	5(2)(a) 5(1)(b)(i)	An accidental fire occurring as a result of Project activities authorized by the C-NLOPB could potentially result in temporary and localized changes to air quality.

Preventative measures including appropriate management systems and equipment (e.g., well casing, BOP) will be in place throughout the Project to prevent incidents from occurring and to maintain control and safety. In addition to the preventative measures, response plans will be in place to implement effective response in the unlikely event that an incident should occur. The EIS will provide additional details regarding these preventative, contingency, and emergency response measures that are designed to prevent accidents and malfunctions, and to mitigate any resulting impacts to human health and the environment.

5.3 Scoping Considerations

The proposed environmental components to be assessed in the EIS are described in Table 5.3. This scoping has been based on the interactions discussed above as well as guidance from previously completed C-NLOPB scoping documents, Strategic Environmental Assessments, and project-specific EAs of offshore exploration projects. The selection of environmental components also considers relevant regulations and guidelines for routine exploration-related activities.

Table 5.3 Proposed Environmental Components to be Assessed in the Environmental Impact Statement

Environmental Component	Basis for Selection
Fish and Fish Habitat	Proposed emphasis on the Study Area's most important past and present commercial species such as snow crab, northern shrimp, Greenland halibut, Atlantic cod, and SARA species. While it is recognized that there are many other commercial or prey fish species, it is Husky's opinion that this range of species captures relevant issues concerning offshore drilling activities.
Marine Birds	Proposed emphasis on those species most sensitive to disruption or disturbance due to offshore oil and gas activity and those species listed under the *Migratory Birds Convention Act, 1994*.

Environmental Component	Basis for Selection
Marine Mammals and Sea Turtles	Proposed emphasis on species that are sensitive to disturbance such as low frequency sound (e.g., baleen whales) and SARA species (e.g., blue whale). Marine mammals such as whales and seals are important both ecologically and economically as whale watching has become a large tourism activity for Newfoundland and Labrador.
Commercial Fisheries and Other Ocean Users	Fisheries include consideration of commercial and Aboriginal fisheries (including commercially important fish species) that could be affected by the Project. Fisheries are proposed to be included due to their cultural and economic importance and their potential interaction with the Project.
Special Areas	Special Areas includes consideration of areas that have been designated of special interest due to their ecological and/or conservation sensitivities and that could be affected by Project activities. Routine Project activities may not interact with these Special Areas but potential effects from accidental spills will be assessed.

The selection of proposed environmental components considers that the onshore activities (i.e., onshore supply base) will occur at an existing, well-established facility that is currently servicing Husky and other offshore operations. The onshore supply base has been approved through the C-NLOPB and federal and provincial regulators, and is compatible with proposed Project servicing and supply requirements. Husky has been using the supply base since it began operations on the Grand Banks in 2002. It is proposed that the scope of the EIS be limited to offshore components should a federal EA be required. Logistical support from offshore supply vessels and helicopters is also well established for the offshore Newfoundland oil and gas industry. Therefore, it is proposed that the scope of the EIS be limited to offshore supply vessel and helicopter transit within the Project Area. The onshore supply base will be operated by a third party using existing facilities and outside of the care and control of Husky. There are not likely to be any material incremental environmental effects as defined under section 5 of CEAA, 2012 from operation of the onshore supply base while undertaking activities in support of the Husky drilling operations.

6.0 REFERENCES

6.1 Personal Communications

Ball, D., A/Resource Manager, Fisheries and Aquaculture Management Branch, Conservation and Protection, Resource Management and Aboriginal Fisheries, Fisheries and Oceans Canada, St. John's, NL.

6.2 Literature Cited

AMEC Environment & Infrastructure. 2012a. Environmental Impact Assessment White Rose Extension Project Drill Cuttings and WBM Operational Release Modelling. Prepared for Stantec Consulting Ltd., St. John's, NL.

AMEC Environment & Infrastructure. 2012b. Environmental Impact Assessment White Rose Extension Project SBM Accidental Release and Dispersion Modelling. Prepared for Stantec Consulting Ltd., St. John's, NL.

AMEC Environment and Infrastructure. 2014. Eastern Newfoundland Strategic Environmental Assessment. Final Report, 2014. Available at: http://www.cnlopb.ca/sea/eastern.php. Accessed March 16, 2016.

Amec Foster Wheeler Environment & Infrastructure. 2016. White Rose Extension Project, Drill Cuttings Modelling Update. Prepared for Husky Energy, St. John's, NL.

C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board) and Canada-Nova Scotia Offshore Petroleum Board. 2011. Drilling and Production Guidelines. 124 pp.

DeBlois, E.M., E. Tracy, G.G. Janes, R.D. Crowley, T.A. Wells, U.P. Williams, M.D. Paine, A. Mathieu and B.W. Kilgour. 2014a. Environmental Effects Monitoring at the Terra Nova offshore oil development (Newfoundland, Canada): Program design and overview. Deep-Sea Research II, 110: 4-12.

DeBlois, E.M., M.D. Paine, B.W. Kilgour, E. Tracy, R.D. Crowley, U.P. Williams and G.G. Janes. 2014b. Alterations in bottom sediment physical and chemical characteristics at the Terra Nova offshore oil development over ten years of drilling on the Grand Banks of Newfoundland, Canada. Deep-Sea Research II, 110: 13-25.

DeBlois, E.M., J.W. Kiceniuk, M.D. Paine, B.W. Kilgour, E. Tracy, R.D. Crowley, U.P. Williams and G.G. Janes. 2014c. Examination of body burden and taint for Iceland Scallop (*Chlamys islandica*) and American plaice (*Hippoglossoides platessoides*) near the Terra Nova offshore oil development over ten years of drilling on the Grand Banks of Newfoundland, Canada. Deep-Sea Research II, 110: 65-83.

DFO (Fisheries and Oceans Canada). 2004. Identification of Ecologically and Biologically Significant Areas. Canadian Scientific Advisory Secretariat Ecosystem Status Report, 2004/006: 15 pp.

DND (Department of National Defence). 2015. Response to Canada-Newfoundland and Labrador Offshore Petroleum Board Request for Comments on the Project Description for the Seitel Canada Ltd. (Seitel) East Coast Offshore Seismic Program, 2016 to 2025 (response included figure and table of coordinates of legacy sites and shipwrecks).

Environment and Climate Change Canada. 2016. National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada. Available at: https://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=662F9C56-1

ExxonMobil Canada Properties. 2009. Hebron Project Description. Report prepared for the Canada-Newfoundland and Labrador Offshore Petroleum Board, St. John's, NL.

ExxonMobil Canada Properties. 2011. Hebron Project Comprehensive Study Report. Submitted to the Canada-Newfoundland and Labrador Offshore Petroleum Board, St. John's, NL.

French-McCay, D.P. 2004. Oil spill impact modeling: Development and validation. Environmental Toxicology and Chemistry, 23(10) 2441-2456.

Husky Energy. 2009. White Rose Environmental Effects Monitoring Program. Prepared by Jacques Whitford Limited for Husky Energy, St. John's, NL.

Husky Energy. 2012. Husky Energy White Rose Extension Project Environmental Assessment. Prepared by Stantec Consulting Ltd., St. John's, NL, for Husky Energy. St. John's, NL.

Husky Energy. 2013. Husky Energy White Rose Extension Project *Canadian Environmental Assessment Act* Screening Report. Prepared by the Canada-Newfoundland and Labrador Offshore Petroleum Board, St. John's, NL, for Husky Oil Operations Limited, St. John's, NL. Available online at: http://www.cnlopb.ca/pdfs/whiterose/wrsr.pdf

Husky Oil Operations Limited. 2000. White Rose Oilfield Comprehensive Study. Submitted by Husky Oil Operations Limited, St. John's, NL.

International Association of Oil and Gas Producers. 2016. Environmental Fate and Effects of Ocean Discharge of Drill Cuttings and Associated Drilling Fluids from Offshore Oil and Gas Operations. Report 543: 143 pp. (including appendices).

JWEL (Jacques Whitford Environment Limited). 2002a. Flemish Pass Drilling Environmental Assessment. Prepared for Petro-Canada, St. John's, NL. ix + 198 pp. + Appendices.

JWEL (Jacques Whitford Environment Limited). 2002b. Environmental Assessment of Exploration Drilling in Annieopsquotch (EL 1052), Bonnawinkie (EL 1056) and Gambo (EL 1048) Leases. Prepared for EnCana Corporation, Halifax, NS. vii + 153 pp. + Appendices.

JASCO Applied Sciences. 2012. Underwater Sound Propagation Assessment for the Environmental Assessment of the White Rose Extension Project. Report P001162-001 by JASCO Applied Sciences, Dartmouth, NS, for Stantec Consulting Ltd., St. John's, NL.

LGL Limited. 2003. Husky Lewis Hill prospect exploration drilling program environmental assessment. LGL Rep. SA746. Rep. by LGL Limited, St. John's, NL, Oceans Limited, St. John's, NL, PAL Environmental Services, St. John's, NL, and SL Ross Environmental Research Limited, Ottawa, ON for Husky Oil Operations Limited, St. John's, NL. 324 pp. + Appendices.

LGL Limited. 2005. Orphan Basin exploration drilling program environmental assessment. LGL Rep. SA825. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates, Inc., St. John's, NL, SL Ross Environmental Research Limited, Ottawa, ON, Oceans Limited, St. John's, NL, Lorax Environmental, Vancouver, BC, and PAL Environmental Services, St. John's, NL, for Chevron Canada Limited, Calgary, AB, ExxonMobil Canada Ltd., St. John's, NL, Imperial Oil Resources Ventures Limited, Calgary, AB and Shell Canada Limited. 353 pp.

LGL Limited. 2006. Husky White Rose Development Project: New Drill Centre Construction & Operations Program Environmental Assessment. LGL Rep. SA883. Rep. by LGL Limited, St. John's, NL, for Husky Energy Inc., Calgary, AB. 299 pp. + Appendices.

LGL Limited. 2007. Husky Delineation/Exploration Drilling Program for Jeanne d'Arc Basin Are, 2008-2017, Environmental Assessment. LGL Rep. SA935. Prepared by LGL, St. John's, NL, in association with Canning & Pitt Associates Inc., Oceans Ltd., and PAL Environmental Services. Prepared for Husky Energy Inc., Calgary, AB. 231 pp. + Appendices.

LGL Limited. 2008. Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016. LGL Rep. SA947b. Rep. by LGL Limited, Canning & Pitt Associates Inc., and Oceans Ltd., St. John's, NL, for StatoilHydro Canada Ltd., St. John's, NL. 292 pp. + Appendices.

NAFO (Northwest Atlantic Fisheries Organization). 2011. SC WG on the Ecosystem Approach to Fisheries Management – December 2011. Report of the 4th Meeting of the NAFO Scientific Council Working Group on Ecosystem Approaches to Fisheries Management (WGEAFM) NAFO Headquarters, Dartmouth, Canada, 30 November -10 December 2011. 126 pp.

NAFO (Northwest Atlantic Fisheries Organization). 2015. Conservation and Enforcement Measures 2015. NAFO/FC Doc. 15/01: x + 180 pp. (including appendices).

National Energy Board, Canada-Newfoundland and Labrador Offshore Petroleum Board and Canada-Nova Scotia Offshore Petroleum Board. 2010. Offshore Waste Treatment Guidelines. vi + 28 pp.

Neff, J., K. Lee, E.M. DeBlois and G.G. Janes. 2014. Environmental effects of offshore drilling in a cold ocean ecosystem: A 10-year monitoring program at the Terra Nova offshore oil development off the Canadian east coast. Deep-Sea Research II, 110: 1-3.

Paine, M.D., E.M. DeBlois, B.W. Kilgour, E. Tracy, P. Pocklington, R. Crowley, U. Williams and G.G. Janes. 2014a. Effects of the Terra Nova offshore oil development on benthic macro-invertebrates over 10 years of development drilling on the Grand Banks of Newfoundland, Canada. Deep-Sea Research II, 110: 38-64.

Paine, M.D., M.A. Skinner, B.W. Kilgour, E.M. DeBlois and E. Tracy. 2014b. Repeated-measures regression designs and analysis for environmental effects monitoring programs. Deep-Sea Research II, 110: 84-91.

Richardson, W.J., C.R. Greene, Jr., C.I. Malme and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, San Diego, CA. 576 pp.

Suncor Energy. 2013. Environmental Assessment of Suncor Energy's Eastern Newfoundland Offshore Area 2D/3D/4D Seismic Program 2014-2024. LGL Rep. SA1233. Rep. by LGL Limited, St. John's, NL, for Suncor Energy, St. John's, NL. 210 pp. + Appendices.

Whiteway, S.A., M.D. Paine, T.A. Wells, E.M. DeBlois, B.W. Kilgour, E.J. Tracy, R.D. Crowley, U.P. Williams and G.G. Janes. 2014. Toxicity assessment in marine sediment for the Terra Nova environmental effects monitoring program (1997-2010). Deep-Sea Research II, 110: 26-37.