NEXEN ENERGY ULC
FLEMISH PASS EXPLORATION DRILLING PROJECT (2018-2028)

Project Description Summary

Pursuant to the Requirements of the *Canadian Environmental Assessment Act*, 2012

FINAL REPORT

Submitted by:

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1 INTRODUCTION

***Project Name*: Nexen Energy ULC Flemish Pass Exploration Drilling Project (2018-2028)**

Nexen Energy ULC (Nexen) is planning to conduct a program of petroleum exploration drilling and associated activities in the eastern portion of the Canada-Newfoundland and Labrador (NL) Offshore Area over the period 2018 to 2028 (hereinafter also referred to as the Project). The proposed Project requires review under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

This document comprises a *Project Description Summary* under *CEAA 2012.* It has been prepared and submitted by Nexen (as Proponent) for review by the Canadian Environmental Assessment Agency and other relevant departments, agencies, organizations and the public to help inform a governmental decision regarding whether a federal environmental assessment (EA) of the Project is required. Additional information and further detail is provided in the accompanying *Project Description* document.

1.1 Project Overview and Background

Nexen's current offshore interests in Atlantic Canada include two existing Exploration Licences (ELs) off Eastern Newfoundland (EL 1144 and EL 1150) which were issued by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB, or "the Board") effective January 15, 2015 and January 15, 2016, respectively. Nexen is currently the sole interest holder in EL 1144 and EL 1150. (Figure 1.1).

The purpose of this Project is to explore prospective oil and gas targets within these ELs in order to determine the potential presence of hydrocarbons in these areas. It is currently planned that the Project will involve drilling between one and possibly up to five wells on each of these ELs, and it may therefore comprise the drilling of up to 10 wells within the Project Area over its duration. The specific number, location and type (exploration or appraisal) of these wells will be determined as Project planning activities continue based on available geophysical survey data, information from previously drilled wells and other applicable information. It is also anticipated that the Project may include associated VSP surveys, well testing, eventual well decommissioning and abandonment or suspension activities, and associated supply and service activities required to support drilling activities. Any Project-related onshore support activities are expected to take place at existing onshore supply facilities that are owned and operated by third-party contractors, have been previously approved under applicable regulatory processes, and that provide services to multiple offshore operators.

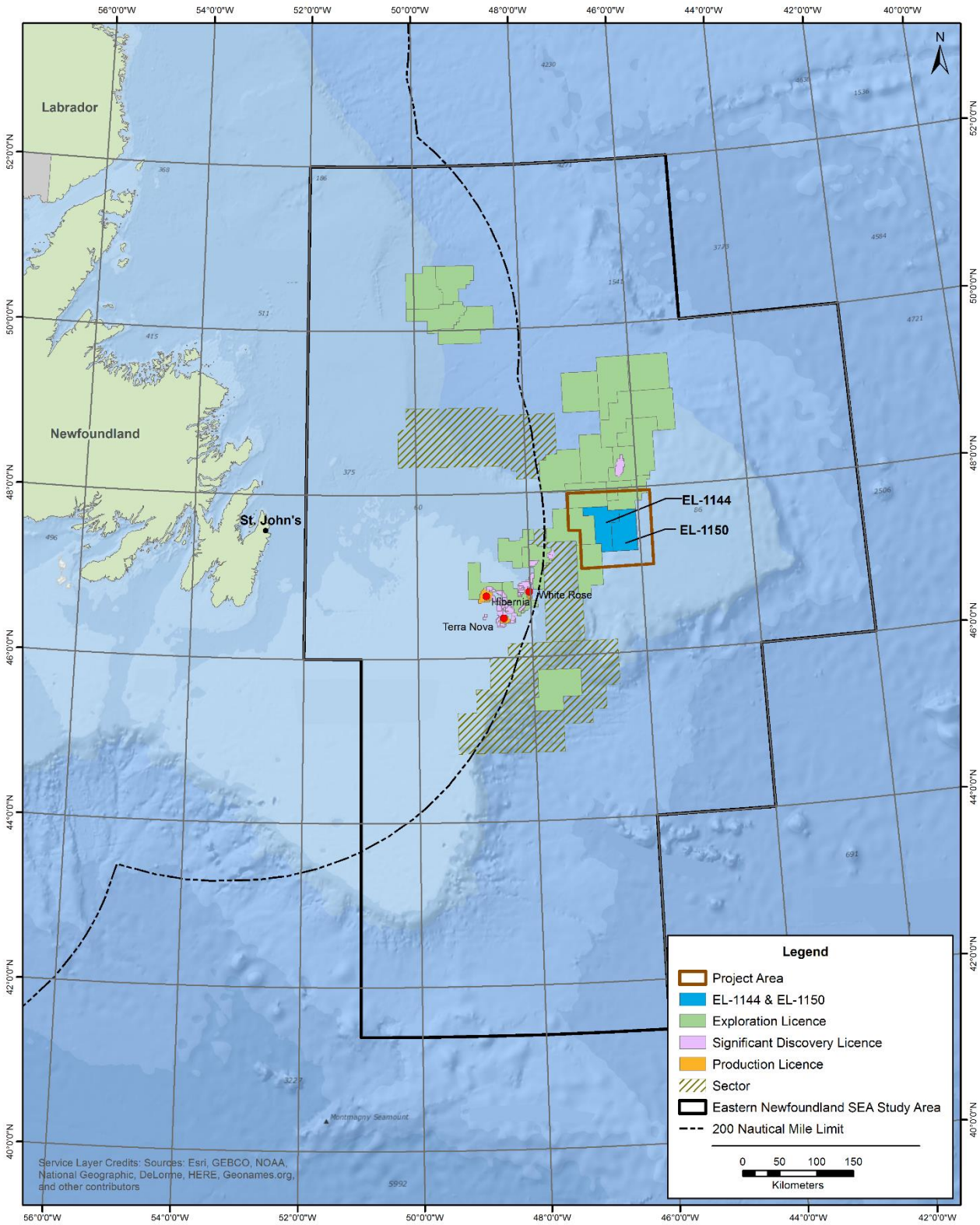
Drilling operations could begin as early as 2018 pending the receipt of required regulatory and corporate approvals, the availability of suitable drilling units, the identification of appropriate drilling targets, and other technical, logistical and commercial considerations.

Offshore exploratory wells in the first drilling program on either of the ELs that comprise the proposed Project Area are a designated project and require the submission of a Project Description under *CEAA 2012.* Table 1.1 lists the ELs on which drilling may occur.

Table 1.1 Nexen Exploration Licences Where Drilling Activity May Occur

Licence Number	Interest Holder (% ownership)	Expiry Period I Period II	Drilling Activity
EL 1144	Nexen (100%)	January 15, 2022 January 15, 2025	No drilling has occurred
EL 1150	Nexen (100%)	January 15, 2023 January 15, 2026	No drilling has occurred

Figure 1.1 Nexen Energy ULC Flemish Pass Exploration Drilling Project (2018-2028)



1.2 Proponent Information

Nexen is an upstream oil and gas company that is responsible for managing its energy resources in Canada and providing management services and oversight to its affiliates including in the UK North Sea, offshore West Africa, and the United States ("manages"). A wholly-owned subsidiary of CNOOC Limited, Nexen manages three principal lines of businesses: 1) Conventional oil and gas, 2) Oil sands, and 3) Shale gas / oil. Although Nexen manages onshore production in several areas around the world, the largest component of the conventional business it manages occurs offshore, with approximately half of the production coming from offshore facilities in the UK North Sea, West Africa, and the Gulf of Mexico. The company is also a significant player in Canada's oil sands industry, and produces shale gas in northeastern British Columbia while also managing working interests in several shale projects in the United States. Further information on Nexen can be found at *www.nexencnoocltd.com*

Health, Safety and Environmental protection are core values at Nexen and the success of every activity undertaken by Nexen is measured on the ability to execute work safely each and every day. Nexen's business objectives are to operate safely and responsibly without causing harm to employees, contractors, joint venture partners or the communities in which we operate and to minimize the Company's environmental impacts. Nexen is committed to promoting a culture of Safety First; striving for best-in-class health, safety and environmental performance; pursuing a goal of no harm to people; and, minimizing our impact on the environment. Nexen has a variety of environmental policies, plans and procedures in place that pertain to its activities, including associated environmental management systems and other processes to ensure the effective and efficient implementation and monitoring of these. This includes general policies, principles and corporate systems that relate to its overall operations worldwide, and/or which relate to its activities in a particular jurisdiction or operating environment or on a project-specific basis.

The principal Nexen contacts concerning this Project and its Environmental Assessment (EA) review are as follows:

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General Manager, Newfoundland Region
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Erin Thomson, P.Eng.
Environmental and Regulatory Affairs
Nexen Energy ULC
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1.3 Regulatory Context

The proposed Project requires review pursuant to the requirements of *CEAA 2012*, as it has been determined to constitute a "designated project" under the associated *Regulations Designating Physical Activities*. These *Regulations* specify that "The drilling, testing and abandonment of offshore

exploratory wells in the first drilling program in an area set out in one or more exploration licences issued in accordance with the *Canada–Newfoundland and Labrador Atlantic Accord Implementation Act* or the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*" are a designated project under *CEAA 2012*. Moreover, the proposed Project involves environmental components, issues and requirements that fall within areas of federal jurisdiction. This includes, for example, the fact that Project activities are planned to take place within an offshore marine environment, which, as federal waters, are considered "federal lands" under *CEAA 2012*. The Project also has the potential to affect environmental components such as fish and fish habitat, marine / migratory birds, and marine mammals and sea turtles that fall under federal jurisdiction, and a number of associated permits, authorizations and/or compliance may be required. No federal funding has been or will be requested or received by Nexen from any federal authority to support this Project.

The C-NLOPB is responsible, on behalf of the Governments of Canada and Newfoundland and Labrador, for petroleum resource management in the Canada – NL Offshore Area. The *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* (the *Accord Acts*), administered by the C-NLOPB, provide for joint management of the Canada – NL Offshore Area and govern all oil and gas activities in the region. The Board's responsibilities under the *Accord Acts* include: the issuance and administration of petroleum and exploration and development rights; administration of statutory requirements regulating offshore exploration, development and production; and approval of Canada-NL benefits and development plans. The Board's regulatory role also includes the issuance of a number of authorizations and approvals related to offshore oil and gas exploration and development activities in this area. In addition to any EA requirements under *CEAA 2012*, the C-NLOPB also requires that project-specific EAs be completed in relation to certain types of petroleum activities in the Canada-NL Offshore Area. It is anticipated that any required EA review for this Project under *CEAA 2012* will therefore involve C-NLOPB participation, and that any Environmental Impact Statement (EIS) completed under *CEAA 2012* will also address the C-NLOPB's EA requirements.

A number of other federal and provincial government departments and agencies may also have regulatory responsibilities, information and advice and/or other interests regarding the proposed Project and its environmental setting and potential effects, pursuant to their associated legislation and mandates. Other legislation and associated regulations that are or may be relevant to the Project and its EA therefore include the:

- The *Accord Acts* and associated *Regulations* and Guidelines (as discussed above);
- *Fisheries Act*;
- *Canadian Environmental Protection Act*;
- *Oceans Act*;
- *Navigation Protection Act*;
- *Canada Shipping Act*;
- *Migratory Birds Convention Act*; and the
- *Species at Risk Act* (Canada) and *Endangered Species Act* (NL).

Given the nature, scope and location of the proposed Project, which will occur in the marine environment offshore eastern Newfoundland and will not involve the development and use of any new on-land or near shore infrastructure, it is not anticipated that provincial environmental regulatory (including EA) requirements will be triggered for this Project. This will be confirmed through

discussions with relevant provincial government departments and agencies as Project planning and regulatory reviews progress.

2 PROJECT DESCRIPTION

The following sections provide a summary description of the proposed Project, including its planned location, equipment, activities and schedule, as well as various associated environmental planning and management considerations.

2.1 Project Location

The Project will take place in a marine area offshore eastern Newfoundland, the western edge of which is over 400 km east of St. John's NL. The Project Area (Figures 2.1 and 2.2) covers approximately 10,634 km^2 and incorporates ELs 1144 and 1150 in the Flemish Pass region where Nexen may conduct exploration drilling activities between 2018 and 2028, and for which Nexen is currently the sole shareholder and is therefore operator (Tables 2.1 and 2.2).

Current Project plans would involve drilling between one and five wells on each of the ELs, up to a maximum of 10 wells (exploration or appraisal), with specific wellsite numbers, types and locations being determined as Project planning activities continue. The Project Area also includes a 20 km buffer area surrounding those licences to (conservatively) accommodate the location and extent of ancillary activities that may be carried out in support of such drilling activities. These may include, for example, any Project components or activities that are required to extend beyond the immediate boundaries of the ELs themselves, such as the required temporary presence and movement of the drill rig(s) or support vessels and aircraft during initial mobilization and set up or eventual demobilization from the drill site, as well as any required non-drilling activities that could conceivably extend to outside the EL (such as any planned walk-away VSP, see Section 2.3). All drilling operations carried out as part of the scope of this Project will, however, be conducted within the defined boundaries of EL 1144 and EL 1150.

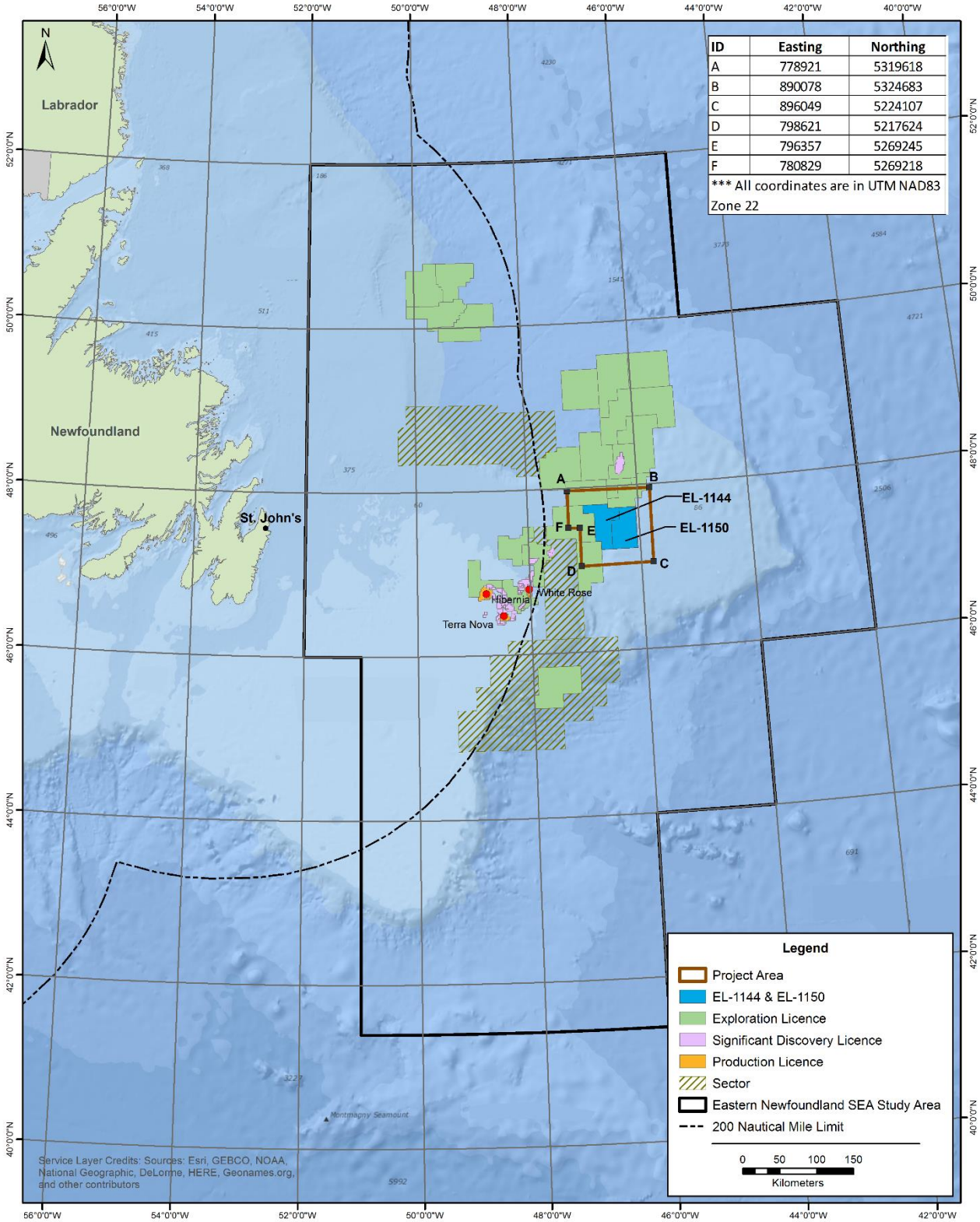
Table 2.1 Nexen Exploration Licences off Eastern Newfoundland

Exploration License	Approximate Distance from St. John's NL	Licence Area (hectares)	Approximate Water Depth (m)	
			Max	Min
EL-1144	430 km	163,008	1,200	650
EL-1150	467 km	169,578	1,185	330

Table 2.2 Project Area Corner Point Coordinates

Point	Latitude	Longitude	Easting	Northing
A	47° 58' 8.5" N	47° 15' 46.3" W	778921	5319618
B	47° 57' 23.1" N	45° 46' 27.9" W	890078	5324683
C	47° 3' 5.7" N	45° 47' 6.1" W	896049	5224107
D	47° 2' 40.6" N	47° 4' 7.0" W	798621	5217624
E	47° 30' 32.5" N	47° 3' 50.7" W	796357	5269245
F	47° 30' 56.4" N	47° 16' 11.5" W	780829	5269218
Note: UTM Coordinates in NAD83 UTM Zone 22N.				

Figure 2.1 Project Area and Associated Exploration Licences



ID	Easting	Northing
A	778921	5319618
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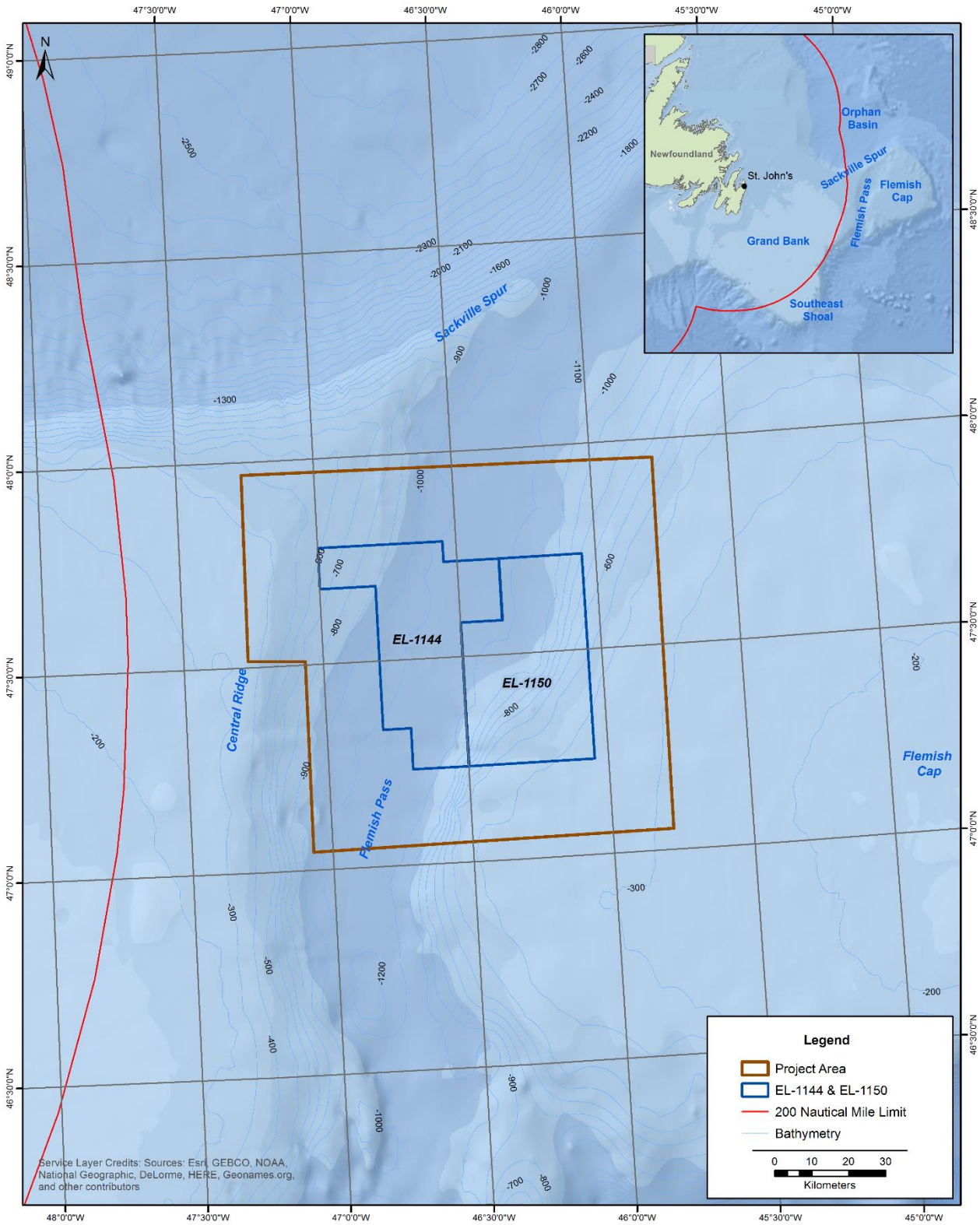
C	896049	5224107
D	798621	5217624
E	796357	5269245
F	780829	5269218

*** All coordinates are in UTM NAD83 Zone 22

Figure 2.2 Project Area and Associated Exploration Licences (Zoomed in Version)



As also illustrated in Figure 2.1, the Project Area is located entirely within the Study Area for the "Eastern Newfoundland Strategic Environmental Assessment (SEA)" completed for the C-NLOPB in August 2014 (Amec 2014)[1].

2.2 Project Timing and Schedule

The planned temporal scope of this Project, which covers an 11 year period from 2018 to 2028, has been defined so as to encompass the terms of the existing ELs identified previously (within which EA and other associated regulatory approvals must be obtained and drilling planned and commenced), as well as any possible approved extensions to these ELs, and the associated stages of well drilling, testing and decommissioning and abandonment or suspension as required.

Detailed planning and procurement processes for the Project will commence in 2017 and continue throughout the life of the Project. Pending the receipt of applicable regulatory and corporate approvals, the identification of suitable drilling targets and other technical, logistical and commercial considerations, exploration drilling could commence on one or both of these ELs as early as 2018. Upon completion of these first well(s) and based on its results, additional wellsite locations may be identified. It is currently anticipated that up to five wells (exploration and possibly appraisal) may be drilled over the term of each of the ELs, for a total of up to 10 wells being drilled as part of the scope of the Project. It is expected that each well will require approximately 75 to 115 days for drilling and testing, which will be followed by well decommissioning and abandonment or suspension. There may at times be two drilling units working in different parts of the Project Area simultaneously.

2.3 Project Components and Activities

The primary components and activities that will be associated with the proposed Project include the following:

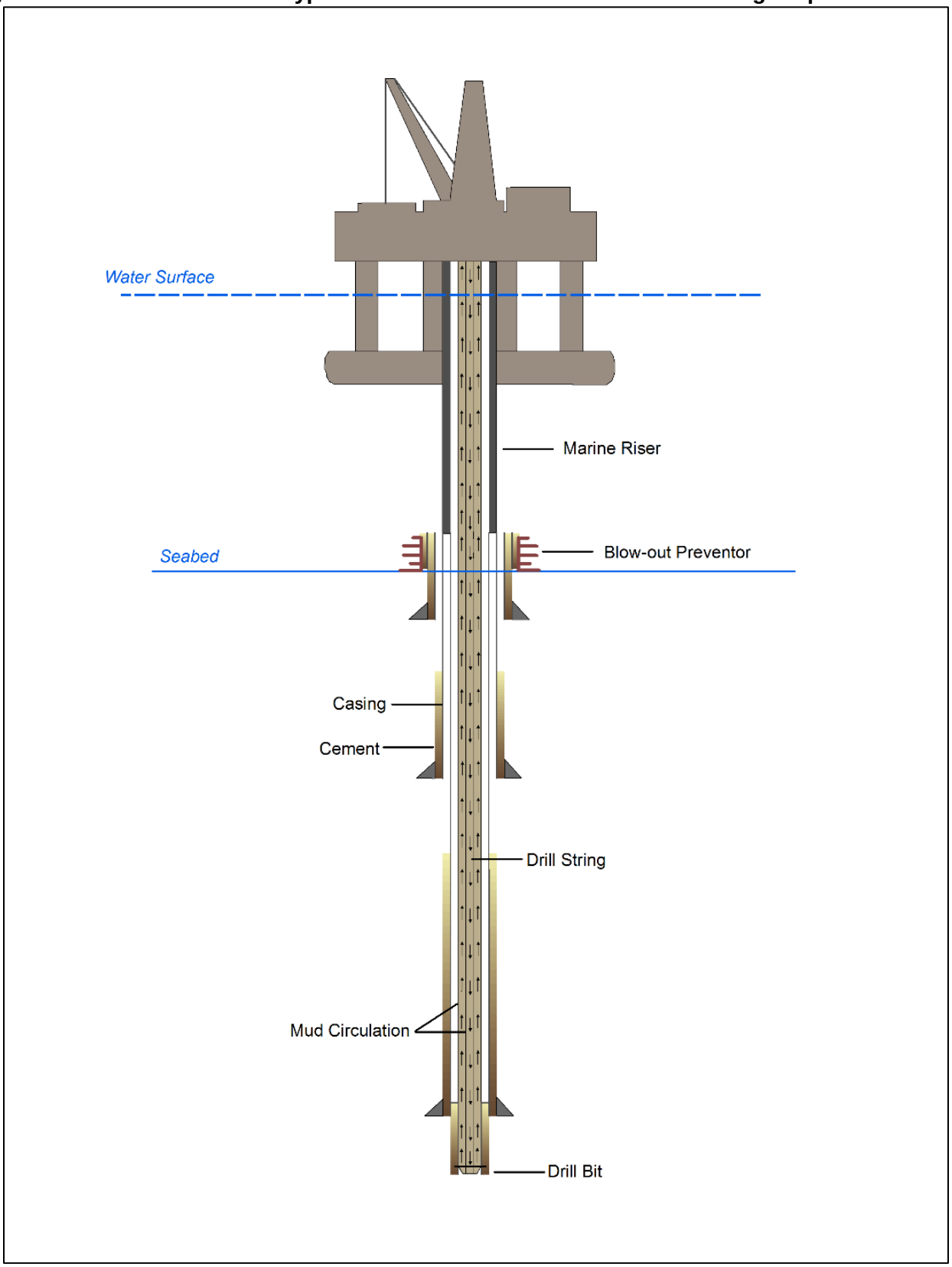
a) Drilling;
b) VSP;
c) Well Evaluation and Testing;
d) Well Decommissioning and Abandonment or Suspension; and
e) Supply and Servicing.

2.3.1 Drilling

As indicated previously, the scope of the Project may involve the drilling of up to 10 wells (exploration or Appraisal) over its 11 year duration. Specific wellsite types and locations will be selected as Project planning and design activities move forward. A number of drilling unit options are being considered for this Project. Wells may be drilled using either a harsh environment semi-submersible drilling unit or a harsh environment drill ship, and it is again possible that at times there will be two drilling units involved in Project-related drilling activities in different parts of the Project Area simultaneously. Any drilling unit proposed to be operated off Newfoundland and Labrador must first be evaluated and granted an Operations Authorization by the C-NLOPB. Figure 2.3 provides a generalized schematic of a typical offshore well.

[1] Amec Environment and Infrastructure. (2014). Eastern Newfoundland Strategic Environmental Assessment (SEA). Prepared for the Canada-Newfoundland and Labrador Offshore Petroleum Board (August 2014).

Figure 2.3 Schematic of a Typical Offshore Well and Associated Drilling Sequence



NOTE: For general illustration only, Drilling unit and well components not to scale. (Additional intermediate casing strings / liners may be installed, depending on well specific conditions and detailed well design)

2.3.2 Vertical Seismic Profiling

A VSP (which is also referred to as a “check-shot” survey) is often undertaken following completion of drilling to obtain accurate time-to-depth ties to correlate seismic data to well depth. The VSP is undertaken by placing a string of receiver (geophones) down the well at pre-determined depths, with a seismic source (usually mid-sized airguns) suspended from the drilling unit. Walk-away VSP surveys may also be undertaken, which involve placing a sound source on a vessel which then moves away while firing the seismic source at pre-determined distances from the borehole receiver. The check-shots are recorded at multiple intervals down the well, and the resulting information assists in determining and confirming the depth of the drilled well and for reconciling drilling information with that obtained through seismic survey work. VSP surveys are typically short-term activities (usually several days duration), with seismic source firing often limited to just a few hours.

2.3.3 Well Evaluation and Testing

If there is an indication of significant hydrocarbons being found during an exploration drilling program, a well flow test may be conducted to sample and identify formation fluids (which may contain hydrocarbons and/or water) and to measure produced flow rates. During such testing, produced fluid is flowed back to the drilling unit, where hydrocarbons are separated from any produced water and samples are collected and analysed. Produced hydrocarbons and some produced water are flared using high-efficiency burners supplied by a third party company. If there is a significant amount of produced water, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge. The duration of any such well testing is dependent upon various factors and is typically in the order of several days, although this may be of longer duration depending on the particular characteristics of the hydrocarbons found and the analysis being undertaken. If required as part of this Project, flaring activities will be kept to a minimum.

2.3.4 Well Decommissioning and Abandonment or Suspension

These activities involve the isolation of the well bore by placing cement plugs, potentially in combination with mechanical devices, at various depths, with the casing then being cut and removed just below the surface of the seafloor and all equipment removed. Wellheads are often removed from the seafloor using a mechanical casing / wellhead cutting device. An ROV or other equipment is then used to inspect the seabed to ensure that no equipment or obstructions remain in place. Well decommissioning and abandonment will be carried out as per Nexen’s standard internal procedures for same, as well as applicable industry practice and in compliance with relevant regulatory requirements. In the event that planned, conventional well abandonment techniques are ineffective for a particular well, alternative approaches may be required and will be investigated and implemented in consultation with relevant regulatory authorities and in compliance with applicable authorizations. Wells will be monitored and inspected in accordance with applicable regulatory requirements at the time of abandonment. In some circumstances, the well may not be abandoned but suspended for future re-entry.

2.3.5 Supply and Servicing

Supply vessels and helicopters are used to transport personnel, equipment and materials to and from a drilling rig during an offshore drilling initiative. Supply vessels typically make regular trips to the drilling unit throughout a drilling program, and a dedicated stand-by vessel will attend to the rig

throughout the drilling program. Personnel are usually transported to and from the drilling rig by supply vessel or helicopter, according to work schedules and rotations, workforce numbers, distances and other factors. It is expected that offshore supply vessel and aircraft (helicopter) services for the Project will be based in St. John's NL.

It is anticipated that with a single operating drilling unit there will be two to three return transits per week by the supply vessels during the course of the Project. In the case that two drilling units are operating at the same time, the number of offshore supply vessels could increase to between four to five trips weekly. It is also estimated that there would be one to three helicopter transits per day to the drilling unit, which would increase proportionally in the event that two rigs are being used simultaneously (i.e., two to six transits per day).

All drilling units and vessels that are used for this Project will meet the operational and environmental capabilities needed for the associated exploration activities, including for implementing relevant environmental mitigations and safety and emergency response procedures, and will be compliant with applicable legislation and regulations.

2.4 Potential Environmental Emissions and Their Management

The key potential environmental emissions and discharges associated with exploration drilling and associated activities in the marine environment include:

a) *Atmospheric Emissions*: Including noise, light and other atmospheric emissions (exhaust) from the operation of the drilling unit and other vessels and equipment, as well as emissions from the storage and flaring of hydrocarbons associated with well testing (if and as required). The primary air emissions, including greenhouse gases (GHGs), that would result from these Project activities include: 1) Drill rig, vessel and aircraft traffic (carbon monoxide (CO), nitrogen oxides (NOX), total suspended particulates (TSP), volatile organic compounds (VOCs), GHGs; and 2) Power generation (CO, NOX, TSP, VOCs, sulphur dioxide, GHGs). During any formation flow well testing there could also be short periods of flaring and associated emissions of associated gases (CO, NOX, VOCs, TSP, GHGs). Assuming that it could take in the range of 75-115 days to drill a well, including well testing activities, it is estimated that CO_2 equivalent emissions associated with active drilling and associated vessel traffic could be in the range of 5,000 to 20,000 tonnes CO_2 per well. It is currently anticipated that the number of wells drilled in each year of the Project could range from zero to three wells, which would result in total CO_2 emissions ranging from 0 to up to 60,000 tonnes CO_2 annually. It should be noted that these are preliminary estimates only, and an estimate of, and analysis regarding, potential Project-related GHG emissions will be calculated and discussed as relevant and required in the EIS.

b) *Underwater Noise*: Including the noise generated by the drilling unit and supply and standby vessels, as well as the sound energy from the source array for any associated VSP data collection.

c) *Drilling Fluids and Cuttings*: Drilling muds are fluids which lubricate and cool the drill bit and hole, circulate cuttings and carry them back to the surface, and help to maintain appropriate hydrostatic pressure in the well to overbalance formation pressure, providing the primary barrier for well control. These can be a water-based muds (WBMs) or synthetic-based muds

(SBMs). The primary component of WBMs is seawater, with other additives (primarily bentonite (clay), barite and potassium chloride) and approved chemicals also added as required to achieve and control the required mud properties. The initial "riserless" sections of the well bore are generally drilled using WBMs in which case the mud and cuttings are returned to the seabed as permitted by, and in accordance with, the *Offshore Waste Treatment Guidelines*. Once the conductor and surface hole sections are completed and the riser and BOP are installed, the deeper sections of the well bore are then typically drilled using SBMs, which are returned to the drilling unit via the riser. Once onboard the rig, drilled (rock) cuttings are removed from the drilling mud in successive separation stages. The fluids are reconditioned and reused until the well is abandoned, when the spent SBM is returned to shore for disposal. SBM-associated drill cuttings may be discharged at the drill site, in accordance with the *Offshore Waste Treatment Guidelines*.

d) *Drilling Cement*: Cement is pumped into the casing / wellbore annuli after the casing is installed. Prior to installation of the marine riser and BOP, any excess cement is discharged on the seabed surrounding the wellhead. Cement returned to the drilling unit will be transported back to shore and disposed of at an appropriate facility. During commissioning and testing of a cement unit, small volumes of cement may be discharged into the sea.

e) *Liquid Discharges*: These can include storage displacement, bilge, ballast, cooling, gray and black water and possibly other liquid materials. Allowable chemical properties for offshore disposal to the marine environment and associated reporting requirements are also specified in the *Offshore Waste Treatment Guidelines* and other regulations and guidelines.

f) *Solid Wastes*: Domestic waste materials will be generated primarily by Project-related personnel housed at accommodations on-board the drilling unit and support vessels.

The key regulatory guidance pertaining to emissions and offshore discharges, disposal and treatment for these types of offshore activities is contained in the *Offshore Waste Treatment Guidelines*. Offshore waste discharges for this Project will also be managed in strict compliance with these Guidelines, as well as the International Convention for the Prevention of Pollution from Ships (MARPOL). Nexen is committed to the establishment of safe and environmentally responsible procedures for the generation, storage, handling, transportation, treatment and disposal of all waste materials generated throughout the course of this Project. Nexen will reduce, reuse and recycle liquid and solid waste and reduce liquid and atmospheric emissions to the extent practicable and in accordance with applicable regulations. All onshore and offshore waste discharges will be managed and disposed of as per the Project's Environmental Protection Plan, Offshore Chemical Management Plan and the Waste Management Plan. Waste types and volumes will be documented as per relevant regulatory requirements.

2.5 Potential Accidental Events

During an offshore oil and gas exploration program, an accidental event or malfunction is an unlikely occurrence, for which there are multiple barriers and safety systems in place to prevent their occurrence or, if required, to respond to such an incident and address the potential environmental effects of same. Accidental events that may be associated with offshore drilling programs include potential well control incidents as well as other possible spills of hydrocarbons or other substances

from the drilling unit and/or associated vessel activities, which may vary considerably in terms of their nature, scale, duration and potential environmental consequences.

Oil spill prevention is a key focus of Nexen's plans and activities. Oil spill prevention, response and overall preparedness approaches for the Project will be further developed as the various regulatory review and approval processes move forward. Nexen will develop and implement a Project-specific Emergency Response Plan and Oil Spill Response Plan which will be submitted to the C-NLOPB as part of the OA application process.

Ice management is also a required activity that is part of normal offshore operations during the ice season offshore eastern Newfoundland. Should ice pose a threat to the drilling platform and/or other Project equipment, personnel or the environment, an emergency situation may be initiated. The established ice management process will be documented in Nexen's Ice Management Plan for Operations, and will be implemented in the case of an emergency situation. These include established procedures for iceberg towing and deflection, and if required, procedures for the safe disconnect and movement of the drilling unit while leaving the well in a safe condition.

3 ENVIRONMENTAL SETTING

The following sections provide a summary description of the existing biophysical and socioeconomic environments that overlap and may interact with the proposed Project.

3.1 Previous Environmental Assessments and Studies

Portions of the Canada-NL Offshore Area, including the proposed Project Area, have been subject to previous EAs and other environmental studies that would be relevant to this Project and any EIS that may be required for it. Offshore oil and gas exploration and development activities have been occurring off Newfoundland and Labrador for several decades, and the environmental studies and analysis that have been carried out in relation to these projects and activities over that period provide important and valuable sources of information on the existing environmental setting in the region, as well as the potential environmental issues and interactions that may be associated with these activities.

Of particular relevance to this Project and its EA review, in 2014 the C-NLOPB completed an SEA for the Eastern Newfoundland Offshore Area (Amec 2014)[2,] which involved identifying, reviewing and presenting regional environmental baseline information (physical, biological and socioeconomic), and completing a review and analysis of likely environmental issues and mitigation and planning approaches as input to future exploration licencing decisions by the C-NLOPB in this area. This SEA provides a key source of regional environmental information for the subsequent, project-specific EAs of individual proposed oil and gas exploration and development projects in this area, and will serve as such for any required EIS for this Project. It is Nexen's understanding that the Project will not take place on lands that have been subject to a regional study as described in Sections 73 to 77 of *CEAA* 2012. A large number of previous, project-specific EAs have also been completed or are in progress for proposed projects and activities off eastern Newfoundland, including parts of the proposed Project Area and in other adjacent regions. In addition, there have been numerous other environmental studies and surveys completed on relevant components of the existing biophysical and socioeconomic environments within and adjacent to the Project Area, which provide a useful and informative description and understanding of the existing environmental setting of the region. Nexen is of the view that the existing and available information that is provided through these past EAs and other environmental studies in the region provides adequate and appropriate environmental baseline information for the Project Area for EA purposes. As a result, no additional and dedicated environmental field work is considered to be required or is being planned in relation to this Project and any EIS that may eventually be required for it. Nexen recognizes that should an EA be required under *CEAA 2012*, the scope of the Project and its EA will be set by the Canadian Environmental Assessment Agency.

3.2 Physical Environment

The geology of the marine area off eastern Newfoundland is complex and dynamic, and the current bedrock and surficial characteristics of the Project Area and surrounding regions have been shaped by various natural and human factors and processes over time. The bathymetry of the Project Area

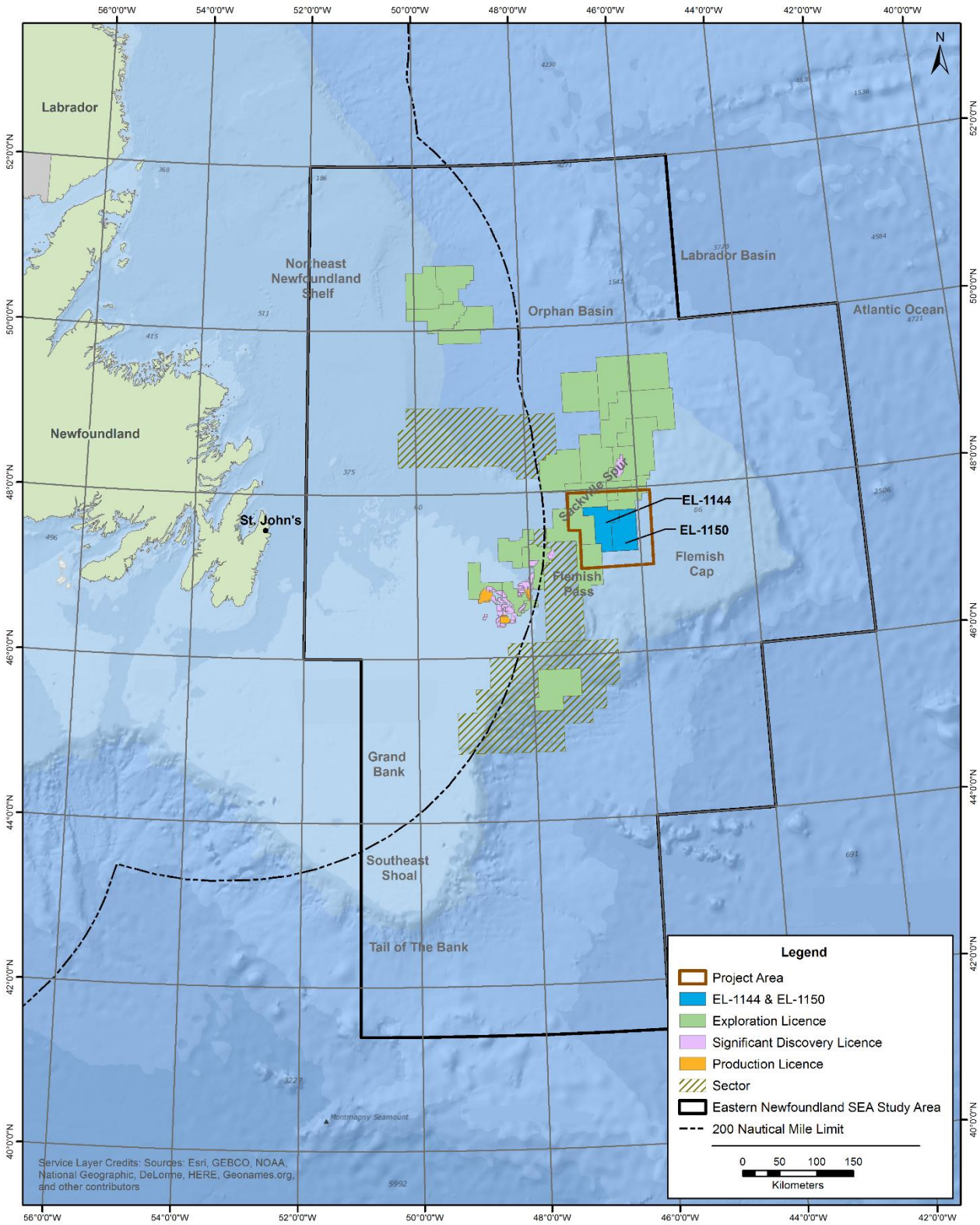
[2] Amec Environment and Infrastructure. (2014). Eastern Newfoundland Strategic Environmental Assessment (SEA). Prepared for the Canada-Newfoundland and Labrador Offshore Petroleum Board (August 2014).
NOTE: Also applies to all subsequent references to Amec (2014) in this Chapter

and surrounding regions is generally well known. The Flemish Pass itself has water depths of almost 1,300 m and on the Flemish Cap, a large bathymetric feature of about 50,000 km^2, depths rise back up to about 130 m (Figure 3.1, Amec 2014).

Existing and available climatological information for sites within and around the Project Area indicate that the prevailing winds over this region are from the west to northwest in winter and from the south and west in summer. Extreme wind gusts greater than 100 knots (51 m/s) have been measured in winter and in association with tropical and post-tropical weather systems (based on available climatology MSC50 data created by Oceanweather, see Amec 2014). Air temperatures are coolest in February and warmest in July. In the Flemish Cap area and surrounding region, the data again indicate that most of the observed precipitation events are in the form of rain or, in the winter, snow, while other precipitation types, such as mixed rain and snow, freezing rain, and hail, occur far less frequently. There is a year-round potential for thunderstorms and hail, with the highest frequency occurring in July (Amec 2014).

Water circulation in the region, which includes the continental shelf waters off Eastern Canada, is dominated by a generally southward flow of the cold Labrador Current and its two streams: 1) an inshore branch that flows along the coast on the continental shelf, and 2) an offshore branch that flows along the outer edge of the Grand Banks. Sea surface temperatures generally average about 3.4°C in February to 12.8°C to 16°C in the August / September period (Amec 2014). The proposed Project Area is, like the rest of the marine environment off eastern Newfoundland, subject to seasonal intrusions of sea ice and icebergs, as well as vessel icing during particular meteorological conditions. Sea ice and iceberg conditions may vary each year and by location, dependent upon fluctuation winter conditions over and seasonal wind patterns. The iceberg season traditionally lasts from January through August with occasional sightings into the Fall period (Amec 2014).

Figure 3.1 Regional Features



3.3 Biological Environment

Marine ecosystems are comprised of biological and physical elements that interact to form complex and variable patterns across a seascape. The Project Area and surrounding marine environments are known to be inhabited by a variety of marine biota, within which the presence, abundance and distribution of particular species varies considerably based on habitat characteristics (both abiotic and biotic) and variability across this rather large and diverse marine environment, which includes parts of the Flemish Cap and adjacent slope and deepwater habitats.

Within these areas and associated habitat types, a variety of fish species and assemblages occur with "shallow water" groups (e.g., yellowtail flounder, Atlantic cod, redfish and skates) giving way to "slope" assemblages (e.g., Greenland halibut, roughhead grenadier, wolffish) and finally to "deep slope-abyssal assemblages" (e.g., lanternfish, grenadiers, blue hake, dogfish). Within such depth zones, habitat complexity can also be a determining factor of species presence and prevalence. The Eastern Newfoundland SEA (Amec 2014) provides a detailed overview of marine fish and fish habitat that are known or likely to occur within the overall Project Area and surrounding environments, including relevant habitats, plankton, benthos, deep-water corals, and fish. Deep-sea corals, sea pens, and sponges are often of particular environmental interest due to the habitat-forming capacity aspects of these benthic invertebrates and their relative sensitivity to anthropogenic stressors. Existing and available information for corals, seamounts, and sponges in this region indicates that portions of the overall Project Area will overlap with several areas of known occurrence for these species. There are several associated fisheries closure zones within and adjacent to the Project Area, as described below. A range of other existing information sources and datasets related to fish and fish habitats (including benthos) within the Project Area are available for use in any future EIS if required.

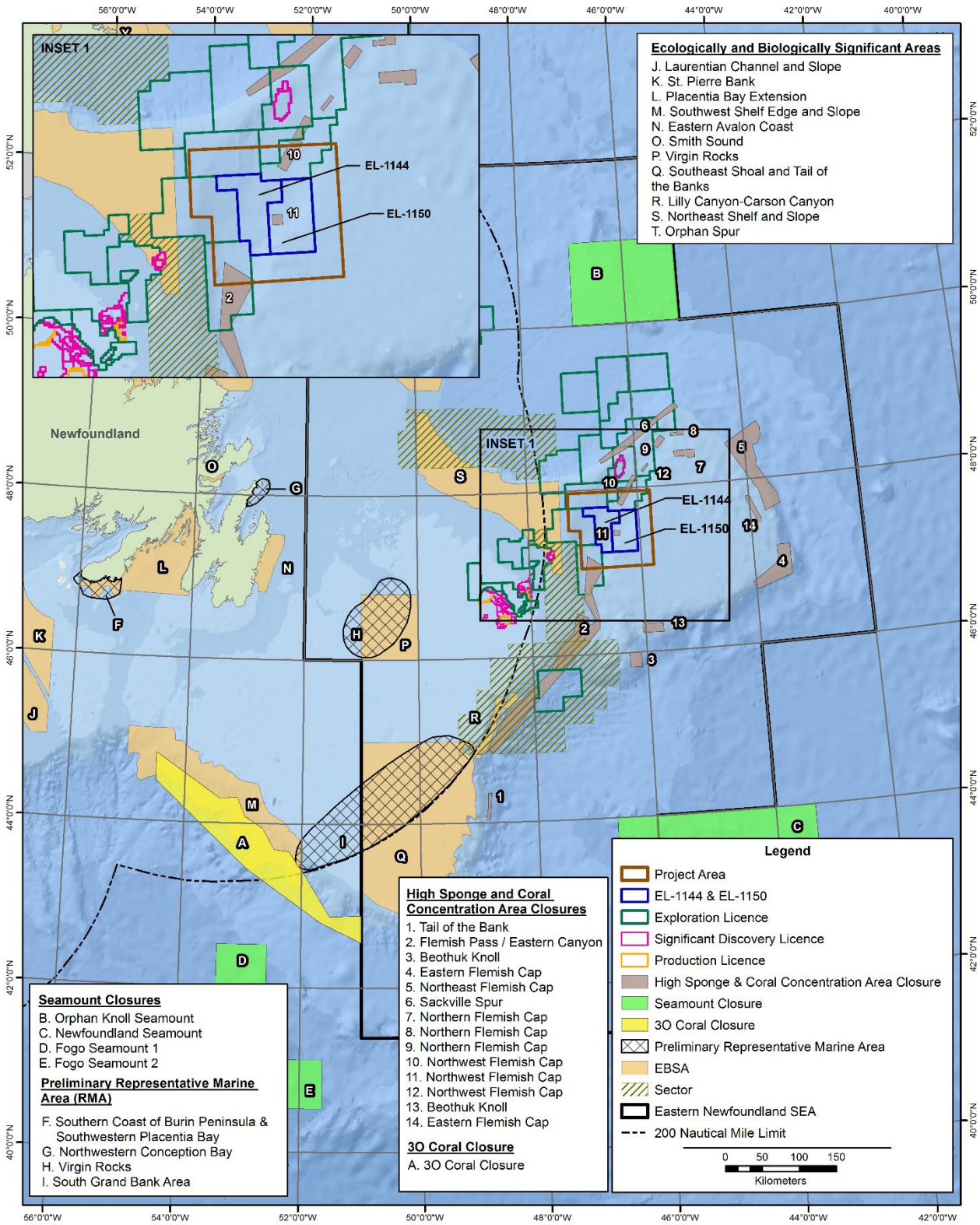
A variety of bird species also occur within the Project Area and in adjacent marine and coastal regions, including seabirds and other avifauna that inhabit the region at particular or extended periods for breeding, feeding, migration and other activities. Important habitats for birds have also been identified at locations along the coastline of eastern Newfoundland, well outside of the proposed Project Area. A variety of existing information sources are available related to the characteristics, presence and distribution of marine and migratory birds within and around the proposed Project Area. The Eastern Newfoundland SEA (Amec 2014), for example, includes a detailed overview of the presence, life histories, and spatial and temporal distributions of marine avifauna within and around the region. Other existing and available sources such as the current Eastern Canadian Seabirds at Sea (ECSAS) dataset, other available literature and datasets, and marine birds sightings data collected by Operators working in the area which provide additional information and insights on key species, times and locations for use in the EIS, should an EIS be determined to be required.

The waters off eastern Newfoundland support a diverse assemblage of marine fauna that also includes some 20 marine mammals and several sea turtle species, many of which are considered to be at risk or otherwise of special conservation concern. The Eastern Newfoundland SEA (Amec 2014) summarizes the distribution and abundance of marine mammals and sea turtles in the region, and describes these species' relevant life history characteristics. The existing and available information indicates that marine mammal (cetacean) species that are known or considered likely to occur within the area include a number of mysticetes (baleen whales), odontocetes (toothed whales and porpoises) and pinnipeds (seals), and several sea turtle species have also been observed. These differ considerably in their likelihood of presence and in the particular locations and habitat types that they utilize and the times at which they occur in or pass through the region. Key feeding grounds such

as the Grand Banks are of particular importance to marine mammals and turtles, and several Ecologically and Biologically Significant Areas (EBSAs, Figure 3.2) have been identified due in part to their known importance to a number of marine mammal species (Amec 2014).

A number of onland, marine and coastal areas within and off eastern Newfoundland have been designated as protected under provincial, federal and/or other legislation and processes, or have been formally identified through relevant forums and processes as being otherwise special or sensitive due to their ecological, historical and/or socio-cultural characteristics and importance. The planned marine exploration activities that comprise this Project will not occur within, or otherwise interact directly with, any of the existing provincial or federal Parks, Ecological Reserves, Wildlife Reserves, Marine Protected Areas, Migratory Birds Sanctuaries, Important Bird Areas (IBAs) or other locations that have been designated as protected on or around the Island of Newfoundland (Amec 2014). The Project Area, and particularly the ELs that comprise it, does overlap with a Fishery Closure Area (see Figure 3.2), for which there are no associated prohibitions of marine activities such as that being proposed as part of this Project.

Figure 3.2 Environmentally Special and Sensitive Areas off Eastern Newfoundland



3.4 Socioeconomic Environment

Fisheries are an important component of the socioeconomic environment of Newfoundland and Labrador and other parts of Canada, including the various communities and regions that extend along the coastline of eastern Newfoundland. Commercial fisheries in this region are extensive and diverse, with the Project Area overlapping a number of Northwest Atlantic Fisheries Organization (NAFO) Divisions (3L and 3M) and associated Unit Areas, and thus, fishing activities that involve a range of species, gear types and other characteristics at various times of the year. There are also several regulatory jurisdictions that pertain to marine fish and fisheries within and beyond the Project Area, with the Government of Canada having jurisdiction over fish stocks and fishing activities within the 200 nautical mile limit (Exclusive Economic Zone, EEZ) and for benthic invertebrates (such as crab) across the entire continental shelf, while NAFO manages groundfish activities and other resources beyond that 200 mile limit.

Commercial fisheries data are provided by Fisheries and Oceans Canada (DFO) Statistical Services in Ottawa, ON, including landings (weight and value) statistics and geospatial information illustrating the overall location and timing of fishing activity for fish landed in Canada (Figure 3.3). The available data indicate that key species that are fished in the region include snow crab, redfish, Northern shrimp, turbot / Greenland halibut, American plaice, yellowtail flounder, Atlantic halibut and others. Fishing activity occurs year-round, but is concentrated primarily in the May-July period. A number of Aboriginal groups hold commercial fishing licences that permit access to a variety of species and locations within NAFO 3KLMN. There are no known Aboriginal food, social, or ceremonial licences within the Project Area. The closest Aboriginal Reserve to the Project is Conne River, located on the south coast of Newfoundland several hundred kilometers west of the Project Area.

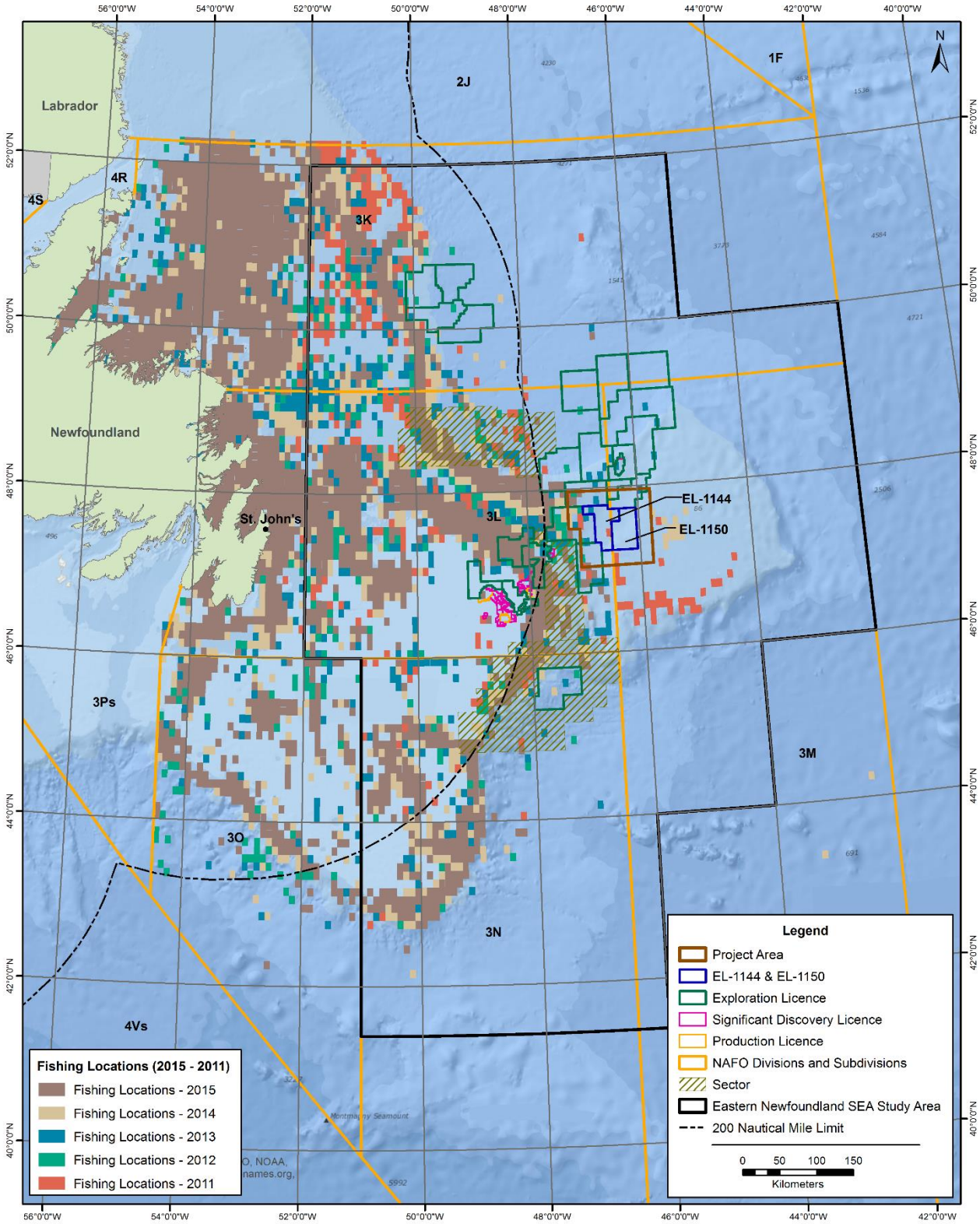
Various fisheries survey programs are also undertaken by government and/or industry, including DFO Multispecies Research Vessel (RV) Trawl Surveys, which comprise annual (spring and fall) standardized bottom-trawl surveys to collect information for managing and monitoring fish resources in the Newfoundland and Labrador Region. There is also an annual Industry - DFO Collaborative Post-season Trap Survey for snow crab in NAFO Divisions 2J3KLOPs4R, which is conducted using commercial and modified snow crab traps at established trap stations starting in late August or early September after the commercial snow crab season has ended.

A range of other human activities also take place on either a year-round or seasonal basis. General shipping traffic within and through the region includes marine tanker traffic and supply vessels associated with the existing offshore oil development and activities, as well as cargo ships, fishing vessel transits, and other vessel traffic. Naval training exercises also occur in the general area, which involve both surface vessels and submarines. There are also known and potential unexploded ordnance (UXO) sites in the Atlantic Ocean, which include shipwrecks and submarines as well as munitions dump sites, several of which occur within or near the Project Area (Amec 2014). A number of existing marine cable networks also cross through or near the Project Area.

The area off eastern Newfoundland is subject to considerable oil and gas exploration activity, including geophysical surveys and drilling programs, with many thousands of kilometers of seismic survey data collected and several hundred wells having been drilled to date. Offshore oil production activities have also been occurring since the 1990s, including several producing oilfields (Hibernia, Terra Nova, White Rose) and another (Hebron) that is currently under development. These offshore

oil and gas exploration and development activities include a variety of ancillary and supporting activities as well.

Figure 3.3 Commercial Fisheries Locations, All Species (2011-2015)



4 CONSULTATION AND ENGAGEMENT

Consultation and engagement are often considered to be the cornerstone of the EA process, and are a key component of Nexen's approach to the planning and implementation of its exploration programs and other business activities. A number of associated initiatives have been undertaken, are in progress, or are being planned in relation to the proposed Project, including discussions with relevant government departments and agencies, Aboriginal groups, stakeholder organizations and interested parties.

4.1 Governmental Consultation

A number of provincial and federal government departments and agencies may have regulatory responsibilities or other mandates and interests related to the Project and its potential environmental effects. As part of the planning and preparation of this Project Description, Nexen has met with a number of regulatory and other governmental organizations (Canadian Environmental Assessment Agency, C-NLOPB, NL Department of Natural Resources and NL Department of Municipal Affairs and Environment) and plans to meet with or otherwise provide Project information to various others, including:

- Fisheries and Oceans Canada;
- Environment and Climate Change Canada;
- Health Canada;
- Department of National Defence;
- Transport Canada;
- Natural Resources Canada; and the
- NL Department of Fisheries and Land Resources.

In addition to their direct involvement in the EA review process, Nexen will also continue to engage with relevant government departments and agencies as part of the planning and completion of any required EIS for the Project, as well as in any post-EA environmental permitting and overall environmental management initiatives during its eventual implementation.

4.2 Aboriginal Engagement

Nexen is committed to ensuring that applicable Aboriginal groups are appropriately informed and engaged regarding the company's on-going and planned activities, particularly where these groups are known to reside and/or undertake activities in areas where the company is planning to carry out its operations.

A number of Aboriginal groups reside in Newfoundland and Labrador, and Nexen is aware that fishing enterprises associated with several of these organizations undertake commercial fishing activity within NAFO 3KLMN off Eastern Newfoundland. This includes fishing activity by the: 1) Labrador Inuit (Nunatsiavut Government), 2) Labrador Innu (Innu Nation), 3) NunatuKavut Community Council, 4) Conne River Mi'kmaw (Miawpukek First Nation), and 5) the Qalipu Mi'kmaq First Nation Band. Nexen is not aware, however, that these (or any other) Aboriginal groups hold, claim or otherwise assert Aboriginal or Treaty rights within or near the proposed Project Area, pursuant to Section 35 of the

Canadian Constitution Act, 1982. Rather, it is Nexen's understanding that these organizations undertake fishing activity off eastern Newfoundland through commercial licences issued by the federal government under the *Fisheries Act* and its associated *Aboriginal Communal Fisheries Licencing Regulation,* as well as other government policies and strategies that are designed to involve Aboriginal people and communities in commercial fisheries in Canada.

As part of its planned engagement with relevant commercial fishing interests in and near the proposed Project Area during the EA process, Nexen will engage with each of the Aboriginal organizations that are known to be involved in the commercial fishery in the area. As part of the planning and preparation of this Project Description, the Company has contacted the following groups to provide information on the Project and to seek any initial input:

- Nunatsiavut Government;
- Innu Nation;
- NunatuKavut Community Council;
- Miawpukek First Nation;
- Qalipu Mi'kmaq First Nation Band; and the
- Mi'kmaq Alsumk Mowimsikik Koquey Association

This included writing to each Aboriginal group in early March 2017 to provide an initial notification of the proposed Project, and an opportunity for them to identify any questions or comments regarding the Project and its potential environmental effects for consideration in the EA, as well as inviting further information sharing and engagement as the EA review progresses. As of the time of finalization and submission of this Project Description, none of these groups had responded to Nexen. Nexen will follow up with each of these groups to confirm receipt of correspondence, request details related to their respective fishing licences off Eastern Newfoundland, and to identify a specific contact for future engagement.

4.3 Public and Stakeholder Consultation

During the preparation of this Project Description, Nexen has met with and/or otherwise contacted the following organizations:

- One Ocean;
- The Fish, Food and Allied Workers Union (FFAW-Unifor);
- Ocean Choice International; and the
- Association of Seafood Producers.

The meetings with each of the fisheries-related organizations involved providing a brief overview of the Project and subsequent discussion. Each organization indicated its overall familiarity with offshore oil and gas exploration programs such as those being proposed and familiarity with the relevant EA processes, as well as their intention to participate in and respond through the EA review for the Project. No additional or specific environmental issues or concerns were raised by any of the stakeholder groups contacted to date.

As part of its on-going and future Project planning, Nexen will continue to meet or otherwise communicate with these and other key stakeholders, including fishing industry representatives,

communities, environmental organizations and others to provide Project details and to identify and discuss any information, questions or concerns that these stakeholders may have.

Should an EIS be required for the Project under *CEAA* 2012, Nexen will design and implement a public and stakeholder consultation program that will provide various mechanisms and opportunities for persons and groups to receive and review information, as well as to provide information and perspectives related to the Project and its potential effects.

5 POTENTIAL PROJECT-RELATED ENVIRONMENTAL INTERACTIONS

The implementation and conduct of the proposed offshore oil and gas exploration activities that comprise this Project have the potential to interact with, and result in associated changes to, a number of environmental components.

5.1 Planned Project Components and Activities

Some of the key components and activities, and potential environmental disturbances or interactions, that may be associated with the proposed Project and which would be particularly relevant to any environmental effects analysis include those listed below:

a) The presence and movement of the drilling unit(s) and supporting vessels / aircraft and equipment;
b) Drilling activities and the associated discharge and deposition of drill cuttings / fluids;
c) Project-related noise into the atmospheric and marine environment (e.g., operation and movement of rigs / vessels, positioning systems, other equipment, VSP surveys);
d) Air emissions (exhausts, well testing / flaring) and lighting on Project vessels and equipment;
e) The generation of solid and liquid waste materials and their management; and
f) Eventual well decommissioning and abandonment or suspension activities.

Based on these elements, some potential environmental issues and interactions that may be associated with the proposed Project are identified below in Table 5.1.

Any potential environmental issues and interactions that may be associated with the proposed Project can be avoided or reduced through the use of good planning and sound operational practices and procedures, supported by standard mitigations that are well established and outlined in relevant regulatory procedures and guidelines. A summary of some of the standard mitigation measures that are often implemented in relation to offshore exploration drilling program off Newfoundland and Labrador is also provided in the Table below, for initial review and illustrative purposes. These mitigations have been routinely and successfully applied to similar oil and gas exploration programs off Newfoundland and Labrador and elsewhere in previous years. These and/or other planning and management measures, in combination with Nexen's own policies, principles and environmental management plans and procedures, will help to ensure that the Project is planned and completed in a manner that avoids or reduces potential environmental effects.

Table 5.1 Potential Environmental Interactions and Associated Mitigation

Potential Environmental Changes	Potential Mitigation Measures (For Illustration)
• Possible effects on water quality and the contamination, smothering or other alteration of marine habitats and benthic organisms due to physical disturbance of the substrate (and associated sedimentation), the discharge and deposition of drill cuttings and/or fluids, and other potential environmental emissions during planned	• Avoidance of known important and sensitive species and areas / times where possible in the planning and conduct of oil and gas activities. • Minimizing the amount of associated vessel and aircraft traffic, the use of existing and common travel routes where possible and the avoidance of low-level aircraft operations wherever possible. • Minimizing environmental discharges and emissions from planned operations and activities, including compliance with relevant regulations and standards. • Pre-drilling surveys of the sea bed to assess the potential

Potential Environmental Changes	Potential Mitigation Measures (For Illustration)
activities. • Possible temporary avoidance of areas by marine fish, birds, mammals and sea turtles due to underwater noise or other disturbances, which may alter their presence and abundance as well as disturbing movements / migration, feeding or other activities. • Possible attraction of marine fish, birds, mammals and sea turtles to drill rigs and vessels, with increased potential for injury, mortality, contamination or other interactions (e.g., collisions). • Potential effects on fisheries (landings and values) and other marine activities due to possible biophysical effects (including resource abundance, distribution or quality). • Interference with and possible reduced access to (safety zones) preferred fishing or other marine areas during Project activities in certain locations, with possible decreases in activity success, efficiency, value or enjoyment. • Potential damage to fishing gear, vessels of other equipment and infrastructure as a result of direct interactions with Project equipment, activities or environmental discharges. • Potential direct or indirect interactions with protected and sensitive areas in the marine environment, and associated impacts on their ecological integrity (ecological, aesthetic) and/or human use and value.	presence of sensitive benthic mico-habitats (such as corals). • Selection of non-toxic drilling fluids, including the use of WBMs wherever possible and technically feasible. • Treatment of operational discharges (such as sewage, deck drainage) prior to release in compliance with the *Offshore Waste Treatment Guidelines* and other applicable regulations and standards. • Installation and use of oil water separators to treat contained deck drainage, with collected oil stored and disposed of properly. • Minimizing the use of artificial lighting, where possible with due regard to safety and associated operational requirements. • Programs and protocols for the collection and release of marine birds that become stranded on offshore installations, including associated regulatory guidance and permit requirements. • Inspections of ship hulls, drilling units and equipment for alien invasive species and associated follow-up maintenance. Maximizing use of local vessels, drilling unit and equipment where possible. • Avoiding or minimizing flaring, and the use of high efficiency burners where flaring is required. • Appropriate handling, storage, transportation and on-shore disposal of solid and hazardous wastes. • Water contaminated with hydrocarbons generated during flow testing (within certain tolerances), can be atomized in the flare (using high efficiency burners) or shipped on-shore for disposal • Selection and screening of chemicals under the *Offshore Chemical Selection Guidelines for Drilling and Production Activities on Frontier Lands.* • The application of proactive design of well structures to facilitate the use of mechanical procedures during well decommissioning / abandonment / suspension activities where possible • Spill prevention plans and procedures, with associated and effective spill preparedness and response plans in place. • On-going information gathering and analysis regarding fishing areas and times and continued monitoring of fishing activity. • Establishment and communication of safety / no-fishing zones. • Active and continuous communications and coordination procedures. • Issuance of Notices to Mariners and other notifications / direct industry communications. • Educational and training initiatives for Project personnel. • Establishment, communication and implementation of a Fishing Gear Damage or Loss Compensation Program (as per the associated Guidelines).

Table 5.2 links each of the potential environmental interactions that may be associated with planned Project components and activities to the various environmental components and issues that are specified under *CEAA 2012*.

Table 5.2 Environmental Components / Issues and Potential Environmental Interactions Relevant to *CEAA* 2012 – Planned Project Components and Activities

Environmental Component / Issue	Relevant Section(s) of *CEAA* 2012	Potential Environmental Interactions / Changes (See Also Associated Mitigations Described Earlier)
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	• Disturbances (noise, lights, others) associated with the drill rig and vessel movements, resulting in possible avoidance or attraction by marine biota (fish, mammals, turtles). • Associated direct (injury or mortality) or indirect (alterations of key life history activities and requirements, such as migration, reproduction, communication, availability and quality of food sources) effects on marine biota • Possible effects on water quality and the contamination, smothering or other alteration of marine habitats and benthic organisms due to physical disturbance of the substrate, the discharge and deposition of drill cuttings and/or fluids, or other solid and liquid wastes.
Migratory Birds	5(1)(a)(iii)	• Attraction and disturbance / disorientation, potential injury or mortality • Possible health effects due to contamination of individuals and/or their habitats • Potential effects on prey species / food sources
Project Activities Occurring on Federal Lands	5(1)(b)(i)	• The proposed Project Area includes marine areas (federal lands) that are located on Canada's outer continental shelf. • Where planned Project components and activities occur on or near such federal lands, any resulting environmental effect described in this Project Description may affect existing environmental conditions on these lands.
Transboundary Issues	5(1)(b)(ii)	• Planned and routine Project activities that take place within the area of Canada's jurisdiction are not anticipated to result in environmental emissions or other direct interactions that will extend to the environment outside Newfoundland and Labrador or outside the marine waters under the jurisdiction of Canada. • Although the direct environmental zone of influence of any Project components and activities that occur within the area of Canada's jurisdiction are not expected to extend to other jurisdictions, the Project

Environmental Component / Issue	Relevant Section(s) of *CEAA* 2012	Potential Environmental Interactions / Changes (See Also Associated Mitigations Described Earlier)
		may, however, affect environmental components (such as migratory fish, aquatic species, or birds and air and water quality) that extend to and/or move both within and outside the areas under the jurisdiction of Canada.
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	• Potential effects on fisheries (landings and values) and other marine activities due to biophysical changes (resource availability, distributions, quality), access / interference, damage to equipment or other direct or indirect interactions. • Potential interactions with protected or special marine areas and possible associated effects on their human use and 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)	• No interactions or adverse effects are anticipated as a result of planned Project activities in this marine environment, which is located over 400 km offshore. (To be confirmed through pre-drilling well site surveys and associated mitigations).
Current Use of Lands and Resources for Traditional Purposes by Aboriginal Groups	5(1)(c)(iii)	• A number of Aboriginal groups are known to undertake commercial fishing activity off eastern Newfoundland, • Nexen is not aware that these (or any other) Aboriginal groups hold, claim or otherwise assert Aboriginal or Treaty rights within or near the proposed Project Area, nor undertake any traditional activities within or near the Project Area. • There are no documented food, social, or ceremonial licences within the Project Area. • There are therefore no anticipated interactions with or adverse effects on the current use of lands and resources for traditional purposes by Aboriginal groups as a result of planned Project activities..
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)	• None identified in addition to the potential environmental effects described above.

5.2 Potential Unplanned Events

Environmental incidents that may be associated with offshore drilling programs include potential well control events, as well as other possible spills of hydrocarbons or other substances from the drilling

unit and/or associated vessel activities, which may vary considerably in terms of their nature, scale, duration and potential environmental consequences.

Oil spill prevention is a key focus of Nexen's plans and activities and an integral component of all aspects of the planning and implementation of its offshore petroleum exploration and development activities. This includes the incorporation of multiple preventative measures as part of Project design and execution. Nexen's project and site-specific Oil Spill Response Plan will detail the equipment and procedures that will be implemented to effectively respond to such an incident.

Table 5.3 links the various potential environmental interactions that may be associated with unplanned Project components and activities to the environmental components and issues that are specified under *CEAA 2012*.

Table 5.3 Environmental Components / Issues and Potential Environmental Interactions Relevant to *CEAA* 2012 – Unplanned Project Components and Activities

Environmental Component / Issue	Relevant Section(s) of *CEAA* 2012	Potential Environmental Interactions / Changes (See Also Associated Mitigations Described Earlier)
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	• Changes in the presence, abundance, distribution and/or health of marine fish / other aquatic species as a result of exposure to accidental spills (including injury or mortality through physical exposure, ingestion, or effects on prey and habitats / water quality).
Migratory Birds	5(1)(a)(iii)	• Changes in the presence, abundance, distribution and/or health of marine birds as a result of exposure to accidental spills (including injury or mortality through physical exposure, ingestion, or effects on prey and important habitats).
Project Activities Occurring on Federal Lands	5(1)(b)(i)	• The proposed Project Area includes marine areas (federal lands) that are located within Canada's outer continental shelf. • Where Project components and activities and any associated unplanned events (such as an oil spill) occur on or near such federal lands, any associated environmental effects as described in this Project Description may affect existing environmental conditions on these lands.
Transboundary Issues	5(1)(b)(ii)	• An accidental event could result in transboundary effects by extending outside an area of Canada's jurisdiction, as well as by affecting environmental components (such as migratory fish, aquatic species, or birds and air and water quality) that extend and/or move both within and outside the areas under the jurisdiction of Canada. No land masses are anticipated to be affected. • Oil spill modelling and analyses (previous and possible additional studies) assess the nature and geographic extent of any such accidental event and

Environmental Component / Issue	Relevant Section(s) of *CEAA* 2012	Potential Environmental Interactions / Changes (See Also Associated Mitigations Described Earlier)
		its potential effects.
Health and Socio-Economic Conditions for Aboriginal and Non-Aboriginal People	5(1)(c)(i) 5(2)(b)(i)	• Potential effects of offshore oil spills or other unauthorized discharge on other marine activities (including fishing) equipment and resources and the resulting implications for users and their livelihoods and communities (resulting from loss of resources, taint / quality, loss of markets, gear damage). • Potential interactions with protected or special marine areas and associated effects on their human use and 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)	• No interactions or adverse effects are anticipated as a result of unplanned Project activities in this marine environment, which is located over 400 km offshore. • Oil spill modelling and analyses (previous and possible additional studies) assess the nature and geographic extent of any such accidental event and its potential effects.
Current Use of Lands and Resources for Traditional Purposes by Aboriginal Groups	5(1)(c)(iii)	• A number of Aboriginal groups are known to undertake commercial fishing activity off eastern Newfoundland. • Nexen is not aware that these (or any other) Aboriginal groups hold, claim or otherwise assert Aboriginal or Treaty rights within or near the proposed Project Area, nor undertake any traditional activities within or near the Project Area. • There are no documented food, social, or ceremonial licences within the Project Area. • Oil spill modelling and analyses (previous and possible additional studies) assess the nature and geographic extent of any such accidental event and its potential effects, including the potential for these effects to extend to or otherwise affect lands and resources that are currently used by an Aboriginal group for traditional purposes.
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)	• None identified in addition to the potential environmental effects described above

5.3 Environmental Assessment Scoping Considerations

The Project will involve the various components and activities described previously in Chapter 2, including the drilling of exploration and possibly appraisal wells, VSP surveys, well testing, eventual well decommissioning and abandonment or suspension, and relevant supply and service activities. Existing shore-based support facilities operated by third party contractors are planned to be used for the Project. It is therefore proposed that scope of the Project for EA purposes will comprise the planned offshore exploration activities within the Project Area itself, and will not include these ancillary support and supply facilities and activities nor any support vessel and aircraft transit to and from the Project Area from these supply bases. Nexen again recognizes that should an EA be required under *CEAA* 2012, the scope of the Project and its EA will be determined by the Canadian Environmental Assessment Agency.

Based on the initial information and analysis provided above, a preliminary list of potential Valued Components (VCs) upon which any eventual EIS will be focused is provided below:

a) Marine Fish and Fish Habitat (including Species at Risk) [3]

b) Marine and Migratory Birds (including Species at Risk);

c) Marine Mammals and Sea Turtles (including Species at Risk);

d) Special Areas;

e) Commercial Fisheries;

f) Indigenous Groups; and

g) Other Human Activities and Components.

Nexen recognizes that the scope of any EIS that may be required under *CEAA* 2012, including the final selection of VCs upon which it will focus, will be established by the Canadian Environmental Assessment Agency based upon the requirements of the Act and the results of the review processes described previously, including associated input from participating governmental, Aboriginal, stakeholder and public interests.

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[3] The Marine Fish and Fish Habitat VC would include relevant fish species as well as marine plants, plankton, algae, benthos and relevant components of their habitats (such as water and sediment), given the clear interrelationships between these environmental components. The consideration of Marine Fish and Fish Habitat within a single VC is in keeping with current and standard EA practice, and provides for a more comprehensive, holistic approach while at the same time reducing unnecessary repetition.