Husky Energy

White Rose Extension Project

Project Description

May 2012

Husky Energy SUNCOR ENERGY nalcor energy

Executive Summary

Husky Oil Operations Limited (Husky), on behalf of co-venturers Suncor Energy Inc. and Nalcor Energy – Oil and Gas Inc., is pleased to submit this Project Description for the White Rose Extension Project (WREP). Husky intends to develop the WREP to access known resources within the White Rose field, using existing infrastructure.

The White Rose field was originally developed using subsea wells in two subsea drill centres; the Central Drill Centre and the Southern Drill Centre. A third drill centre, the Northern Drill Centre, is used as an injection site for gas that is being stored for future use. In May 2010, production commenced from North Amethyst, the first of a number of potential subsea tie-ins to the main White Rose field.

The current focus of the WREP is on accessing the resources of West White Rose. Husky and its co-venturers are considering two development options to develop the WREP: a wellhead platform (WHP) development option plus up to three subsea drill centres; or a subsea drill centre development option plus up to three additional subsea drill centres. Both development options will be tied back to the existing *SeaRose* floating production, storage and offloading (*FPSO*) vessel.

The WHP will consist of a concrete gravity structure (CGS) with topsides consisting of drilling facilities, wellheads and support services such as accommodations for 120 to 130 persons, utilities, a flare boom and a helideck. The topsides will be constructed at an existing fabrication facility and is therefore not considered part of this Project Description. The primary function of the WHP is drilling. There will be no oil storage in the CGS. All well fluids will be transported via subsea flowlines to the *SeaRose FPSO* for processing, storage and offloading. The design of the WHP will account for the risks posed by icebergs, sea ice and the harsh environmental conditions found offshore Newfoundland and Labrador. The productive life of the WHP facility is currently planned to be 25 years.

The WHP development option will include entail constructing the CGS in a purpose-built graving dock. A review of potential onshore CGS construction sites on the island of Newfoundland was undertaken and Argentia was identified as the most suitable location for the construction of the CGS. Following construction of the CGS and mating of the topsides at a deep-water site in Placentia Bay, the WHP would be towed and situated in the western portion of the White Rose field.

Under the subsea development option for West White Rose (or any other future resource), it will be comprised of subsea well infrastructure placed in an excavated subsea drill centre for protection from iceberg scour. Subsea wells will be drilled from a semi-submersible drilling rig. The subsea drill centre will be tied back to the *SeaRose FPSO* via the existing subsea infrastructure.

The original White Rose field underwent an environmental assessment in 2000 pursuant to the *Canadian Environmental Assessment Act* as a Comprehensive Study. In 2007, a further environmental assessment was undertaken in regards to activities associated with construction of up to five additional subsea drill centres and associated flowlines under the *Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment Addendum*. These previous environmental assessments encompass the location, construction and operation of the

proposed subsea drill centres within the WREP. Therefore, much of this Project Description focuses on the WHP development option, which has not been previously assessed.

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Acronyms and Abbreviations

Term	Description
AMA	Argentia Management Authority Inc.
ARG	Argentia Remediation Group
CDC	Central Drill Centre
CEAA	*Canadian Environmental Assessment Act*
CGS	Concrete gravity structure
CMA	Census Metropolitan Area
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPAWS	Canadian Parks and Wilderness Society
DFO	Fisheries and Oceans Canada
EBSA	Ecologically and Biologically Significant Area
FEED	Front-end Engineering Design
FPSO	Floating production, storage and offloading vessel
GDP	Gross Domestic Product
HOIMS	Husky Operational Integrity Management System
km	kilometre
km^2	square kilometre
km/h	kilometre per hour
LLI	Long-lead items
m	metre
m^3	cubic metre
MODU	Semi-submersible drilling unit
NADC	North Amethyst Drill Centre
NAFO	Northwest Atlantic Fisheries Organization
NDC	Northern Drill Centre
NLDF	Newfoundland and Labrador Department of Finance
OWTG	Offshore Waste Treatment Guidelines
PWGSC	Public Works and Government Services Canada
ROV	Remotely operated vehicle
SDC	Southern Drill Centre
SEIS	Socio-economic Impact Statement
SARA	*Species at Risk Act*
SSIV	Subsea isolation valve
VEC	Valued Environmental Component

Term	Description
VBNC	Voisey's Bay Nickel Company Limited
WHP	Wellhead Platform
WREP	White Rose Extension Project

1.0 Introduction

Husky Oil Operations Limited (Husky), on behalf of the White Rose Extension Project (WREP) proponents, Husky, Suncor Energy Inc. (Suncor) and Nalcor Energy – Oil and Gas Inc. (Nalcor), is leading the development of the WREP.

The White Rose field and satellite extensions are located in the Jeanne d'Arc Basin, 350 km east of Newfoundland and Labrador in approximately 120 m of water (Figure 1-1). Initial development was through excavated subsea drill centres, with flexible flowlines bringing production to a centralized floating production platform, the *SeaRose* FPSO *(*floating production, storage and offloading) vessel. The White Rose field was originally developed using subsea wells in two subsea drill centres; the Central Drill Centre (CDC) and the Southern Drill Centre (SDC). A third drill centre, the Northern Drill Centre (NDC), is used as an injection site for gas that is being stored for future use.

Figure 1-1 Location of the White Rose Field

First oil from the White Rose field was produced in November 2005. Ownership interests in the White Rose field consist of Husky (72.5 percent) and Suncor (27.5 percent). In 2006, delineation and exploration drilling identified additional resources at North Amethyst and West White Rose. In 2007, Husky entered into an agreement with the province of Newfoundland and Labrador, in which the province, through Nalcor, acquired a 5 percent equity position in West White Rose and North Amethyst and areas outside the original White Rose field; Husky owns 68.875 percent, Suncor 26.125 percent and Nalcor 5 percent. The WREP is wholly contained within the White Rose field.

In May 2010, production commenced from North Amethyst, the first of a number of potential subsea tie-ins to the main White Rose field (Figure 1-2). The Canada-Newfoundland and Labrador Offshore Petroleum Board (the "C-NLOPB") approved the Development Application with the release of Decision Report 2008.03. Similar to White Rose, North Amethyst was developed using subsea wells in an excavated subsea drill centre, the North Amethyst Drill Centre (NADC), tied back to the *SeaRose FPSO* for production, storage and export to tanker.

Figure 1-2 Existing White Rose Field Layout

The current focus of the WREP is on the development of West White Rose, delineated in 2006. Future development opportunities for the WREP will be evaluated by Husky and its co-venturers. Husky and its co-venturers are evaluating options for development of the WREP resources, including subsea tiebacks, a well head platform (WHP), or a combination of both. All development options will be tied back to the existing *SeaRose FPSO*.

The original White Rose field underwent an environmental assessment in 2000 pursuant to the *Canadian Environmental Assessment Act* (the "CEAA") (S.C. 1992, c. 37) as a Comprehensive Study (Husky Oil 2000). In 2007, a further environmental assessment was undertaken on activities associated with construction of up to five additional subsea drill centres and associated flowlines under *Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment Addendum* (LGL 2007a). The environmental assessment (including the addendum and supporting documents) was released from the CEAA process with the Environmental Assessment Determination issued on May 25, 2007. The previous environmental

assessments encompass the location of the proposed subsea tiebacks and the way in which the construction and operation activities would be performed. Therefore, this Project Description focuses mainly on the WHP development option, which has not been previously assessed.

2.0 Development Options

Husky and its co-venturers are considering two development options to develop the WREP: a WHP development in the West White Rose pool plus up to three future subsea drill centres; or a subsea drill centre development in the West White Rose pool plus up to three additional future subsea drill centres. Primary infrastructure for both development options will be located within a 1 km radius circle centred on 724 080.00 E 5 187 208.00 N (NAD 83, Zone 22) within the White Rose pool (Figure 2-1). The exact location is subject to further refinement and will be determined during the front-end engineering design (FEED) process. The water depth in the area is between 115 and 120 m.

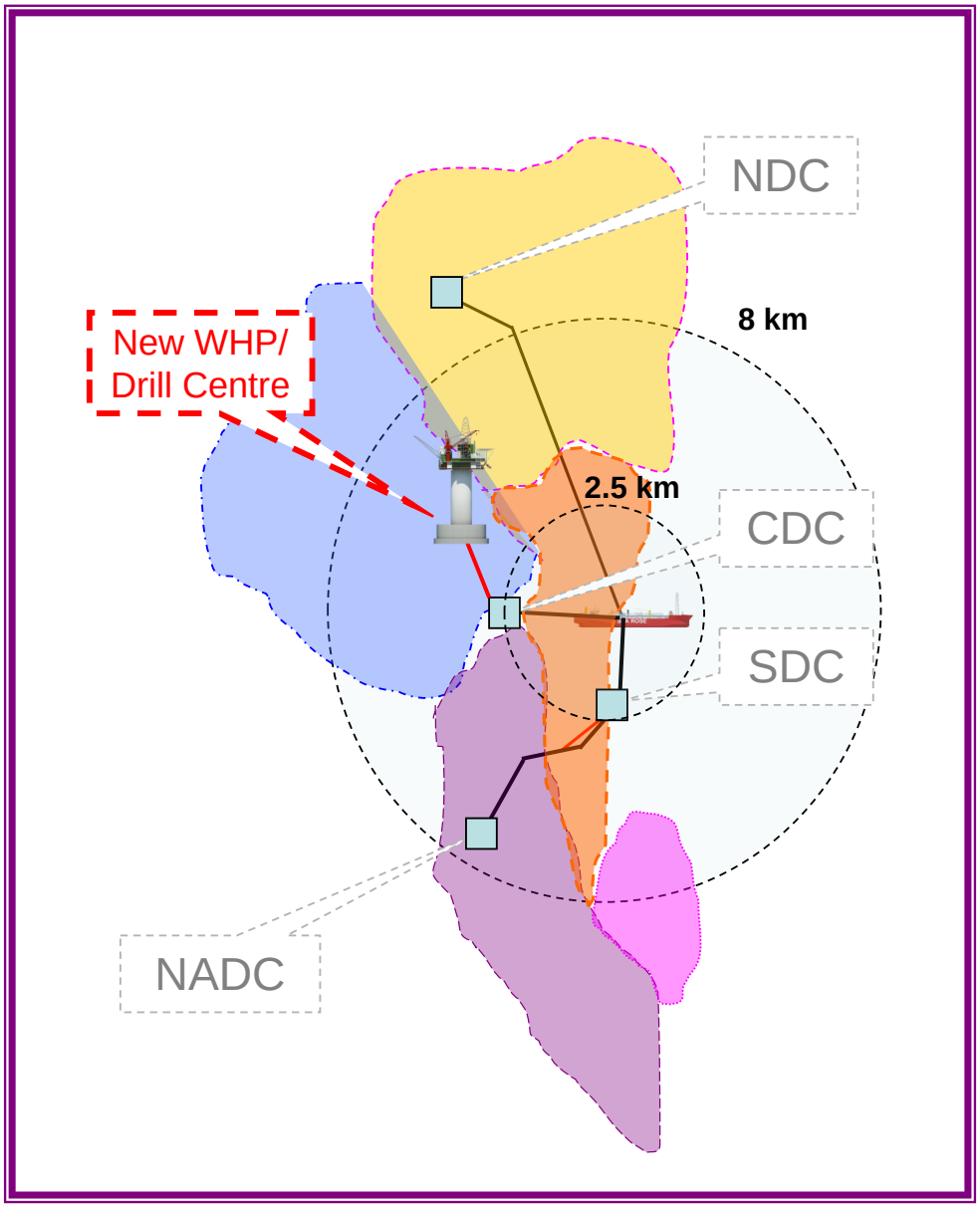


Figure 2-1 Location of Wellhead Platform/Subsea Drill Centre in Relation to Existing Infrastructure in the White Rose Area

2.1 Wellhead Platform

The WHP development option (Figure 2-2), will include engineering, procurement, construction, fabrication, installation, commissioning, development drilling, operations and maintenance, and decommissioning activities.

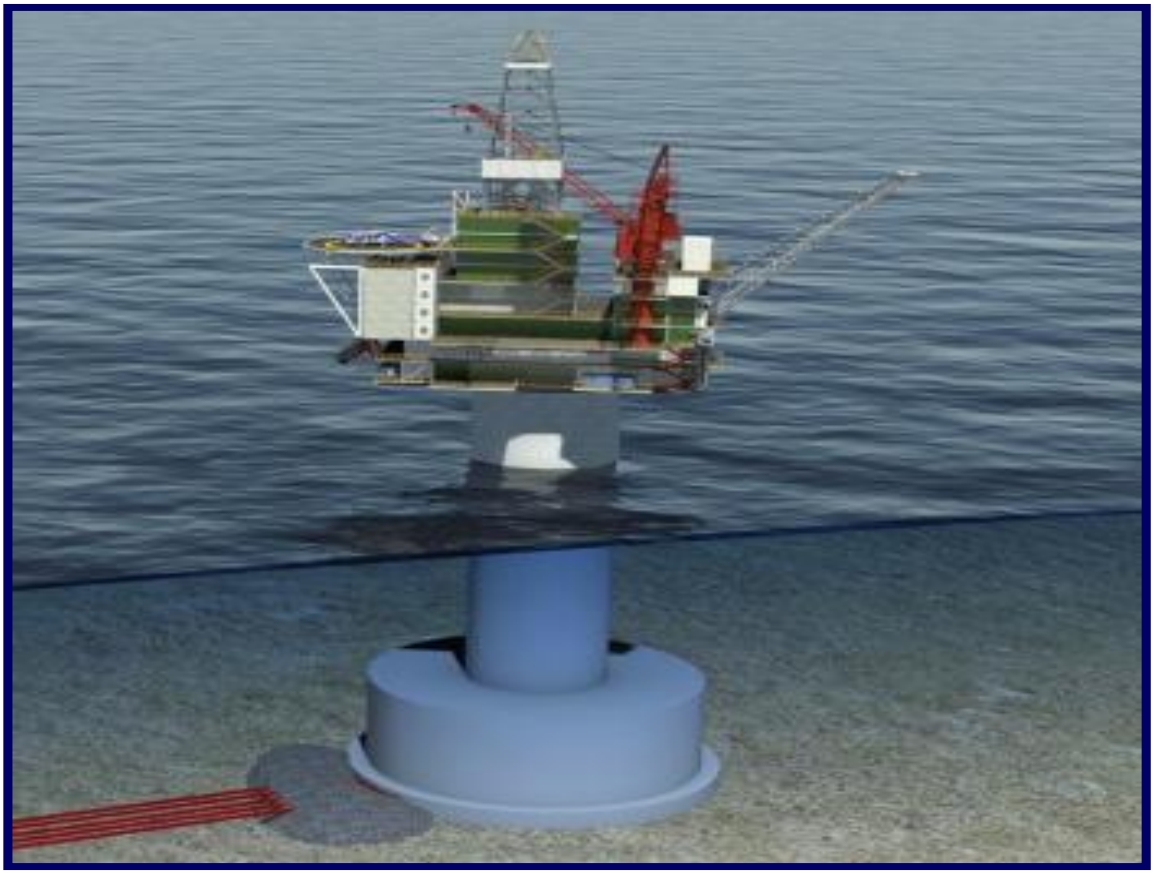


Figure 2-2 Typical Wellhead Platform

The WHP will consist of a concrete gravity structure (CGS) with a topsides consisting of drilling facilities, wellheads and support services such as accommodations for 120 to 130 persons, utilities, flare boom and a helideck. The topsides will be constructed at an existing fabrication facility (the location of which will be determined during engineering) and is therefore not considered part of this Project Description.

The primary function of the WHP is drilling. There will be no oil storage in the CGS. All well fluids will be transported via subsea flowlines to the *SeaRose FPSO* for processing, storage and offloading. The design of the WHP will account for the risks posed by icebergs, sea ice and the harsh environmental conditions found offshore Newfoundland and Labrador. The productive life of the WHP facility is currently planned to be 25 years.

The WHP development option will entail constructing the CGS in a purpose built graving dock. A review of potential onshore CGS construction sites on the island of Newfoundland was undertaken and Argentia was identified as the most suitable location for the construction of the CGS (Figure 2-3).

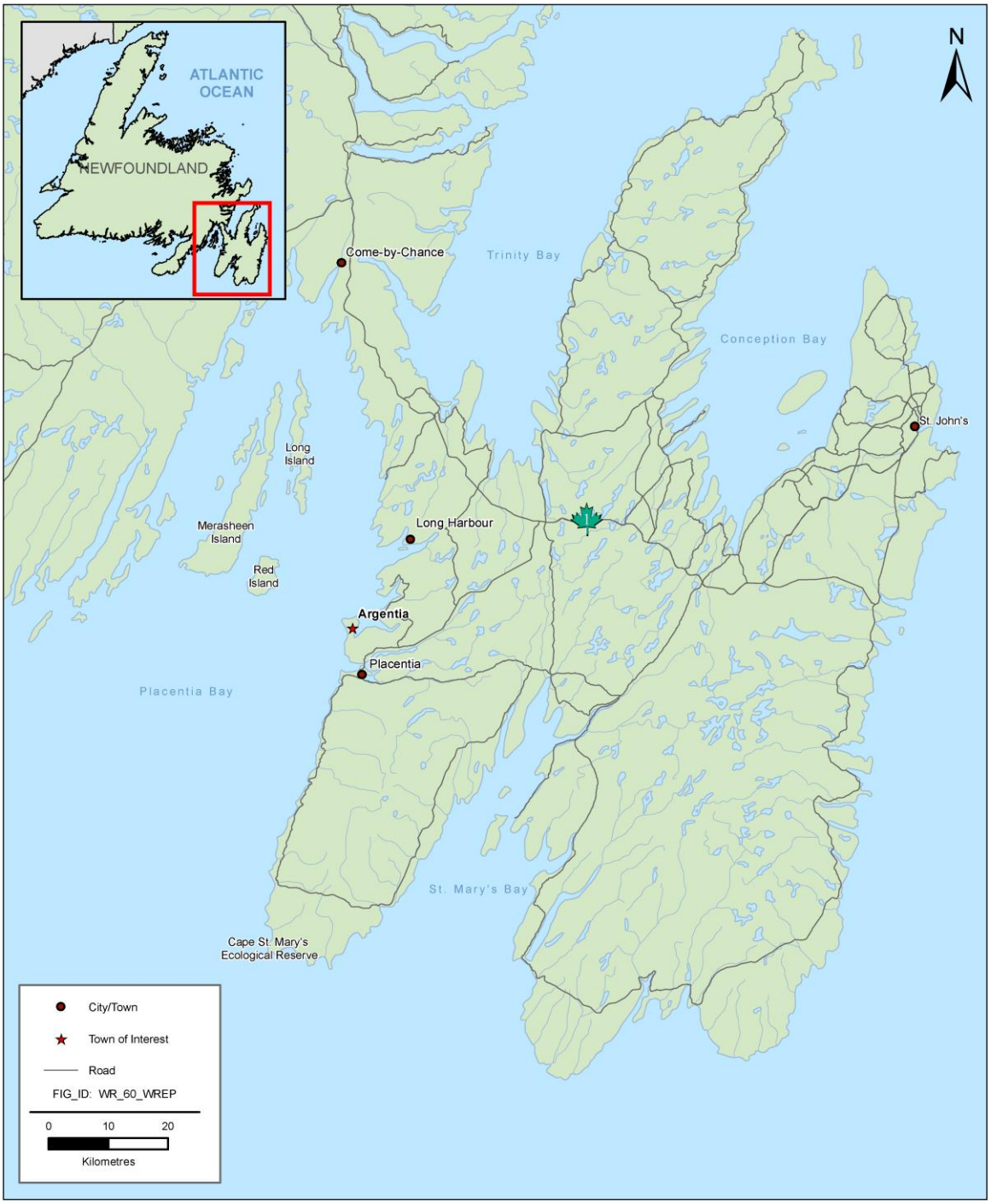


Figure 2-3 Argentia, Avalon Peninsula, Newfoundland and Labrador

The CGS will be constructed in the dry, meaning all concrete construction will be completed in a de-watered graving dock. Upon completion of the CGS, the CGS structure will be floated to one of two potential deep-water sites in Placentia Bay, where it will be mated with the topsides structure. The WHP will then be towed to and installed in the western portion of the White Rose field and tied back to the *SeaRose FPSO*. The WHP development option may be developed in conjunction with new subsea drill centres using subsea drill centre technology (Figure 2-4).

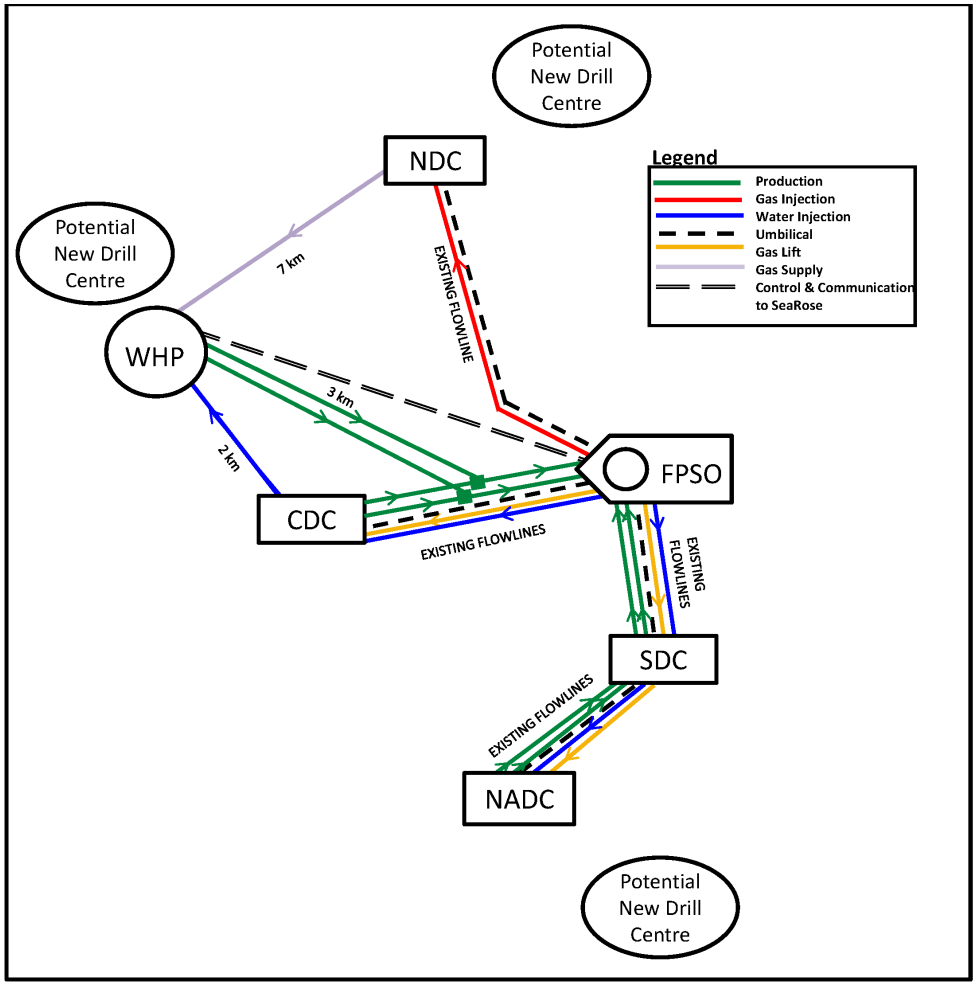


Figure 2-4 Potential Wellhead Platform Concept Integration into Existing White Rose Facilities

2.2 Subsea Drill Centre

Under the subsea development option for West White Rose pool and any other future resources, it will be comprised of an excavated subsea drill centre into which subsea well infrastructure will be placed. Drilling of the wells will be done from a semi-submersible drilling rig. The subsea drill centre will be tied back to the *SeaRose FPSO* via the existing subsea infrastructure, as shown in Figure 2-5. The connections from new subsea drill centres to existing infrastructure have not been determined.

Productive life of the subsea infrastructure will be 20 years, which is similar to the design life of the existing subsea infrastructure in the White Rose field.

The construction and operation of up to four new of subsea drill centres was previously assessed during the *Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment Addendum* (LGL 2007a).

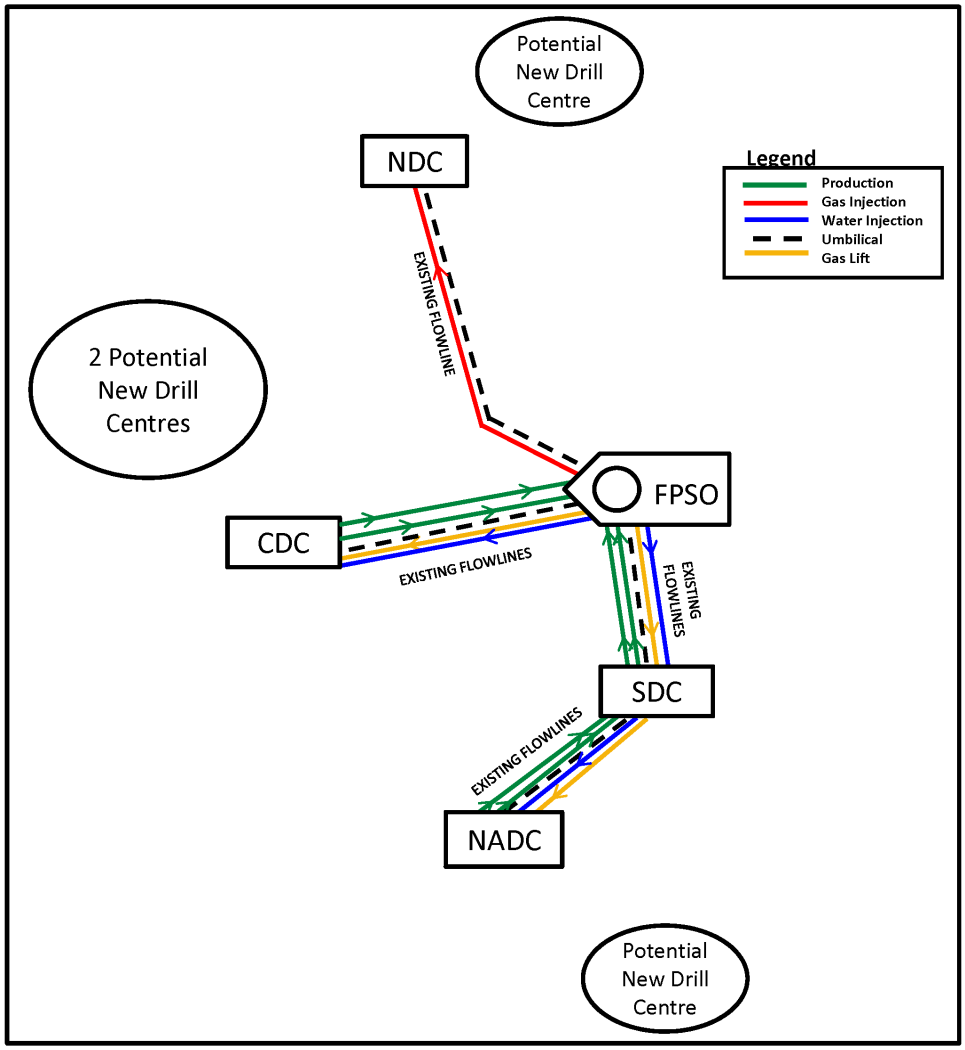


Figure 2-5 Potential New Subsea Drill Centres Location in Relation to the Existing White Rose Facilities

2.3 Regulatory Context

Oil and gas exploration and development activities in the Newfoundland and Labrador offshore area are regulated by the *Canada-Newfoundland Atlantic Accord Implementation Act* (S.C. 1987, c. 3) and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (R.S.N.L. 1990, c. C-2) (collectively, the "Atlantic Accord Acts").

The C-NLOPB, established by the joint operation of the Atlantic Accord Acts, is a prescribed federal authority to which CEAA applies. In accordance with CEAA, the C-NLOPB and other federal authorities are required to conduct an environmental assessment of proposed oil and gas projects, such as the WREP, before they may issue authorizations, licenses and permits for the purpose of enabling such projects to be developed. The environmental assessment process is intended to ensure that projects are considered in a careful and precautionary manner before federal authorities take action in connection with them, in order to ensure that such projects do not cause significant adverse environmental effects.

Regardless of the development option selected, the offshore component of the WREP will be wholly contained within the study area of the original White Rose field, which was previously assessed by a CEAA comprehensive study (Husky Oil 2000). The proposed offshore infrastructure will be connected to existing infrastructure within the previous study area and no portion of the proposed offshore infrastructure will be located outside the boundaries of that area. The proposed offshore WHP's eventual decommissioning will not include disposal or abandonment offshore, nor will it include conversion of the WHP on site to another role. Because of the factors stated above, the WREP is not a project described in CEAA's *Comprehensive Study List Regulations* and therefore, the CEAA process applicable to the WREP is an environmental assessment by screening.

It is anticipated that the C-NLOPB will act as coordinator for the CEAA screening. As such, the C-NLOPB will coordinate the participation of federal authorities in the assessment process and will facilitate communication and cooperation among them, as well as with the Government of Newfoundland and Labrador and other participants. Other participant federal authorities will likely include Fisheries and Oceans Canada ("DFO"), Environment Canada, Transport Canada and Industry Canada, on the basis that:

- The WREP may affect fish habitats within the nearshore and offshore areas, requiring DFO authorization pursuant to section 35(2) of the *Fisheries Act* (R.S.C., 1985, c. F-14).

- The WREP, including removal of a shoreline berm at the Argentia graving dock site and clearance dredging for transportation of the WHP to the deep-water mating site, may involve disposal at sea, requiring Environment Canada authorization pursuant to section 127(1) of the *Canadian Environmental Protection Act*, 1999 (S.C. 1999, c. 33).

- The WREP may involve building and placement in navigable water, requiring Transport Canada authorization pursuant to section 5(1) of the *Navigable Waters Protection Act* (R.S.C., 1985, c. N-22).

- The WREP may include placement of radio apparatus, requiring Industry Canada authorization pursuant to section 5(1)(f) of the *Radiocommunication Act* (R.S.C., 1985, c. R-2).

Other federal authorities in possession of expert knowledge relevant to specific aspects of the WREP may be consulted in the screening process. These may include the Department of Natural Resources, the Department of Health, the Department of National Defence and the Canadian Coast Guard. Departments of the Government of Newfoundland and Labrador may also be consulted, including the Department of Environment and Conservation, the Department of Fisheries and Aquaculture, and the Department of Natural Resources. Other stakeholders with an interest in the WREP will be consulted (as further discussed in Section 4) and the results of the consultations will be reflected in the environmental assessment report.

In addition to the CEAA process, the Atlantic Accord Acts require that an environmental impact statement and a socio-economic impact statement be submitted as part of the development approval process. The environmental assessment of the WREP will therefore include submissions addressing the requirements of both CEAA and the Atlantic Accord Acts.

Husky does not anticipate that a provincial environmental assessment of the WREP will be required. In the event that a provincial environmental impact statement is required, an independent review and assessment of applicable regulations will be completed and a code compliance assessment will be provided.

As previously stated, should the subsea development option be selected, the subsea drill centre and flowlines and the activities associated with that development option have already been assessed under the *Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment Addendum* (CEAR No. 06-01-17410) (LGL 2007a). A fish habitat compensation agreement (Authorization No. 07-01-002) has been in place with DFO since 2007 to compensate for the excavation of up to five subsea drill centre sites, of which only one has been excavated to date (the NADC). The construction of a subsea drill centre for the West White Rose pool was one of the potential subsea drill centres assessed and compensated for in 2007.

2.4 Environmental Assessment Contact Information

Contacts to obtain additional information are indicated below:

Malcolm Maclean
General Manager, Developments
Husky Energy
Suite 901, Scotia Centre
235 Water Street
St. John's, NL A1C 1B6
Phone: (709) 724-4601
Email: malcolm.maclean@huskyenergy.com

SueAnn Thistle
Manager, Health, Safety, Environment and Quality
Husky Energy
Suite 901, Scotia Centre
235 Water Street
St. John's, NL A1C 1B6
Phone: (709) 724-4764
Email: sueann.thistle@huskyenergy.com

3.0 Description of the Proposed Project

As previously stated, the subsea development option has previously been environmentally assessed. As such, the description of the proposed WREP will focus primarily on the WHP.

3.1 Wellhead Platform

3.1.1 Onshore/Nearshore

Under the WHP development option, the CGS will be constructed in a purpose built graving dock at Argentia, NL, which is located in Placentia Bay, on the southern Avalon Peninsula, 130 km south west of St. John's, NL (refer to Figure 2-3). The site is managed by the Argentia Management Authority (AMA) and there are multiple industrial companies occupying the surrounding area. The site is approximately 50 km away from the Trans-Canada Highway, via Route NL S 100, which is an industrial-sized road.

Argentia has been the location of more than 70 years of military and industrial activities. It is a brownfield location and has undergone several geophysical and environmental evaluations. The graving dock will be constructed in the northeast portion of the Northside Peninsula, bordering Argentia Harbour (Figure 3-1).

The proposed graving dock will be excavated behind the natural coastal berm to a depth of approximately 20 m below sea level. Sheet piling may be installed to strengthen the berm and reduce any ingress of water into the graving dock. In the event sheet piles are installed along the inside of the berm, they will be removed during the flooding of the graving dock prior to the float out of the CGS.

3.1.1.1 Site Preparation

The overall construction site area will be approximately 15 hectares. Land clearing or watercourse diversion will not be required for the CGS graving dock construction. General excavating and grading activities will be required. Additional onshore surveys to support site preparation and necessary repairs or upgrades to existing infrastructure may be required.

Geotechnical bore holes, drilled to a maximum depth of 21 m below sea level, indicate that the graving dock can be excavated with routine earth-moving equipment. Environmental samples of soil and groundwater were also extracted from the construction site and indicate little risk to the environment or human health. Additional chemical analysis will be conducted during excavation to ensure compliance with applicable guidelines, but at present, landfill disposal is not anticipated (see Section 3.1.1.6).

Source: Google Earth 2012

Figure 3-1 Potential Graving Dock Construction Site on the Argentia Peninsula

3.1.1.2 Road Construction, Upgrades and Parking

The graving dock site will maximize the use of existing access roads. The road system that currently exists is within 500 m of the graving dock site. Such infrastructure will be extended into the site in a manner compatible with the final site layout. Any required repairs and construction will also be made to the existing roads to prepare them for industrial use.

3.1.1.3 Water Supply

The graving dock site will maximize the use of the existing water supply. An existing source of potable, fire, and industrial water is located near the construction site. If necessary, additional water supply infrastructure will be extended into the area in a

manner compatible with the final site layout. Sewage will be treated on-site prior to ocean disposal.

3.1.1.4 Power Supply

The graving dock site will maximize the use of the existing grid power. Although grid power will be the primary source of electricity, there will be an emergency generator on site with a capacity of approximately 750 kilowatts. This will be used in the case of a grid black-out to provide on-site power for services such as the concrete batching plant and emergency lighting around the site.

The graving dock site location is within 500 m of existing overhead power lines. These lines will be extended into the site and then fed to a site distribution system. The same will be done for telephone lines.

3.1.1.5 Building Construction

Potential support facilities include a concrete batching plant, offices, a mess hall, a medical clinic, temporary sheds, lay down areas and storage areas. The construction site will be fully fenced with a security-controlled entrance. Facilities will be placed and constructed on environmentally and geotechnically suitable locations with soils, groundwater and air quality tested as required. At this time, Husky does not anticipate the need for a labour camp.

3.1.1.6 Graving Dock Excavation

The graving dock area will be less than 5 hectares (flooded area when the bund is removed), excavated to a depth of 20 m below sea level. Appropriate retaining walls around the graving dock and bund will be constructed using rock berm with an impervious core, steel sheet pile wall, or a combination of both. The use of sloped or reinforced sides will depend on the specific site requirements.

The floor area of the dock at the toe of the bund will be approximately 140 m x 140 m, with a total volume of up to 1,000,000 m^3, depending on final slope design (Figure 3-2). The graving dock will be excavated using traditional earth-moving equipment. Where bedrock is encountered that cannot be removed using earth-moving equipment, blasting may be required.

The excavated material will be used within the Argentia Peninsula as approved by the AMA and relevant regulatory authorities. Material suitable for shoreline protection, for example, may be used along the Argentia Peninsula to mitigate shoreline erosion. The opportunity also exists to use suitable surplus materials in other industrial locations on the Argentia Peninsula. The Pond is also being investigated for disposal of excess excavation material below the surface of the water. The Pond is discussed in detail in Section 3.1.1.9.

The excavation of the graving dock is anticipated to take approximately six to eight months.

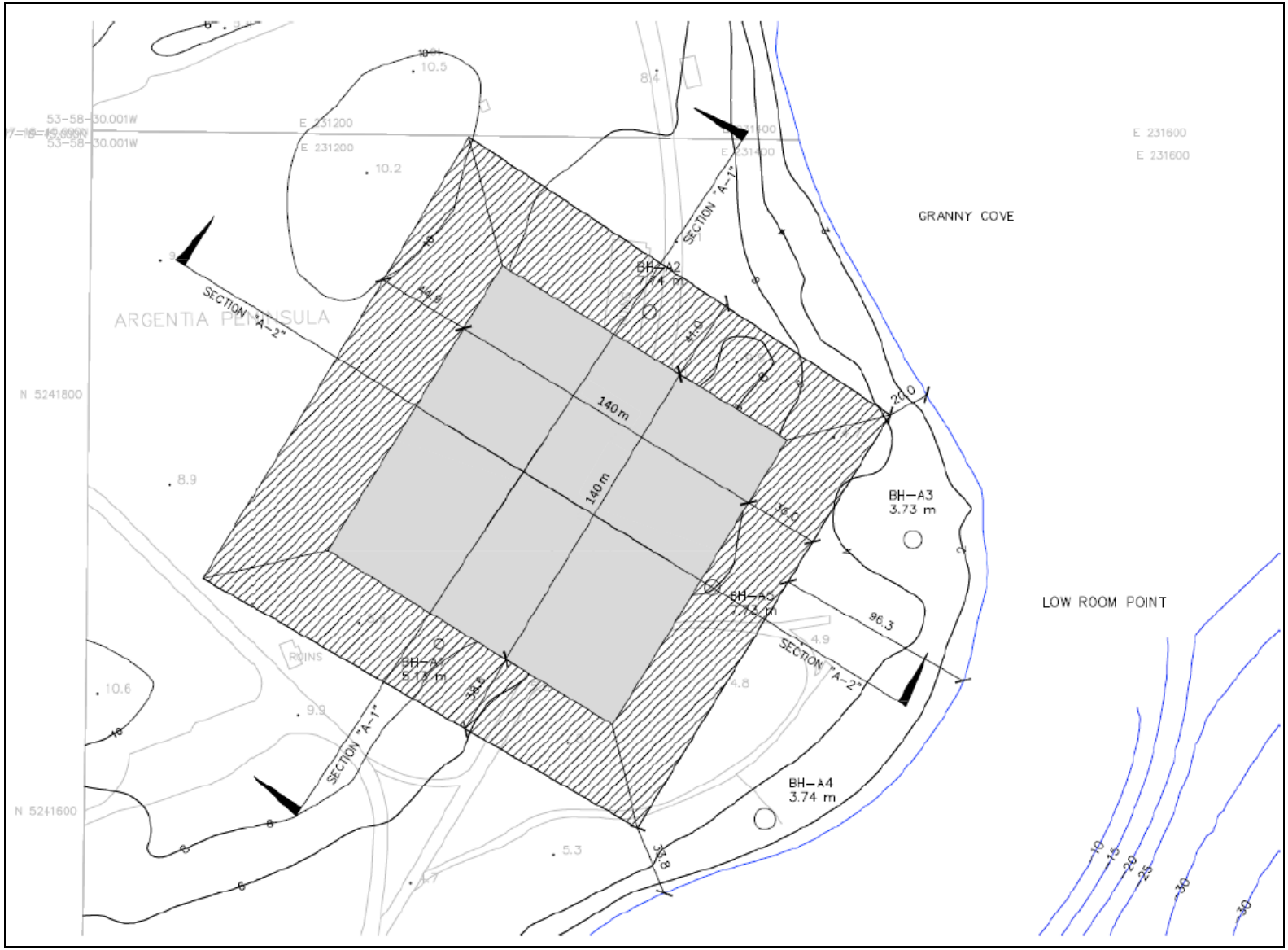


Figure 3-2 Conceptual Site Layout for Graving Dock

During the design of the graving dock and its associated construction site, consideration will be given to designing the facility as a permanent graving dock, which could be used for the construction of future CGSs or for other industrial applications. Design of the graving dock for future use could include provision for a gated system allowing the graving dock to be flooded and drained as required.

3.1.1.7 Site Dewatering and Disposal

The final design of the graving dock will dictate the method and degree of drainage required to maintain a dry facility during the construction of the CGS.

Groundwater from any dewatering will be collected, assessed and, if necessary, held in an engineered settling pond onsite to satisfy all regulatory requirements before being discharged into the marine environment.

3.1.1.8 Concrete Gravity Structure Construction

The CGS will be constructed in the dry, which completes the concrete substructure in the graving dock, prior to towing to the deep-water site for topsides mating. The primary materials for the CGS are cement, sand, gravel and steel rebar for the concrete, and structural steel and pipe for the shaft. The current estimate of the required volume of concrete is approximately 55,000 m^3. Slip-forming and other standard CGS construction methods will be used for the caisson and central shaft construction after completion of the base slab (Figure 3-3). The CGS as currently designed is less than 50 percent of the size of the Hibernia and Hebron gravity base structures. Construction work is expected to occur over a period of 20 to 24 months.

Aggregate for the high-strength concrete will be obtained from an existing quarry in the province. The selection of the quarry will be subject to testing of the aggregate to ensure it is suitable for the high-strength concrete required for the CGS. Caisson and shaft supports will be cast into the concrete for future use when completing the mechanical fit-out of the CGS.

The mechanical fit-out of the CGS will consist of prefabricated components that will be installed at various phases of the base slab, caisson and shaft construction. The typical mechanical components are seawater ballast pipework, deep-water pump caissons, disposal caissons, risers, J-tubes and conductor guide frames.

3.1.1.9 Shoreline and Channel Dredging

The graving dock will initially be flooded to equalize the hydrostatic pressure, then a combination of land-based excavation equipment and a coastal dredger will be used to remove the shoreline berm, after which the float-out will occur. The dredger will be used to create an exit channel from the graving dock to a water depth of approximately 18 to 20 m to accommodate the draft of the CGS. It is currently estimated that this excavation/ dredging work will take between six and eight weeks to complete. During this period, the marine activities from the dredging operation will be closely coordinated with the Port of Argentia. In-water blasting is not expected to be required near the shoreline of the graving dock.

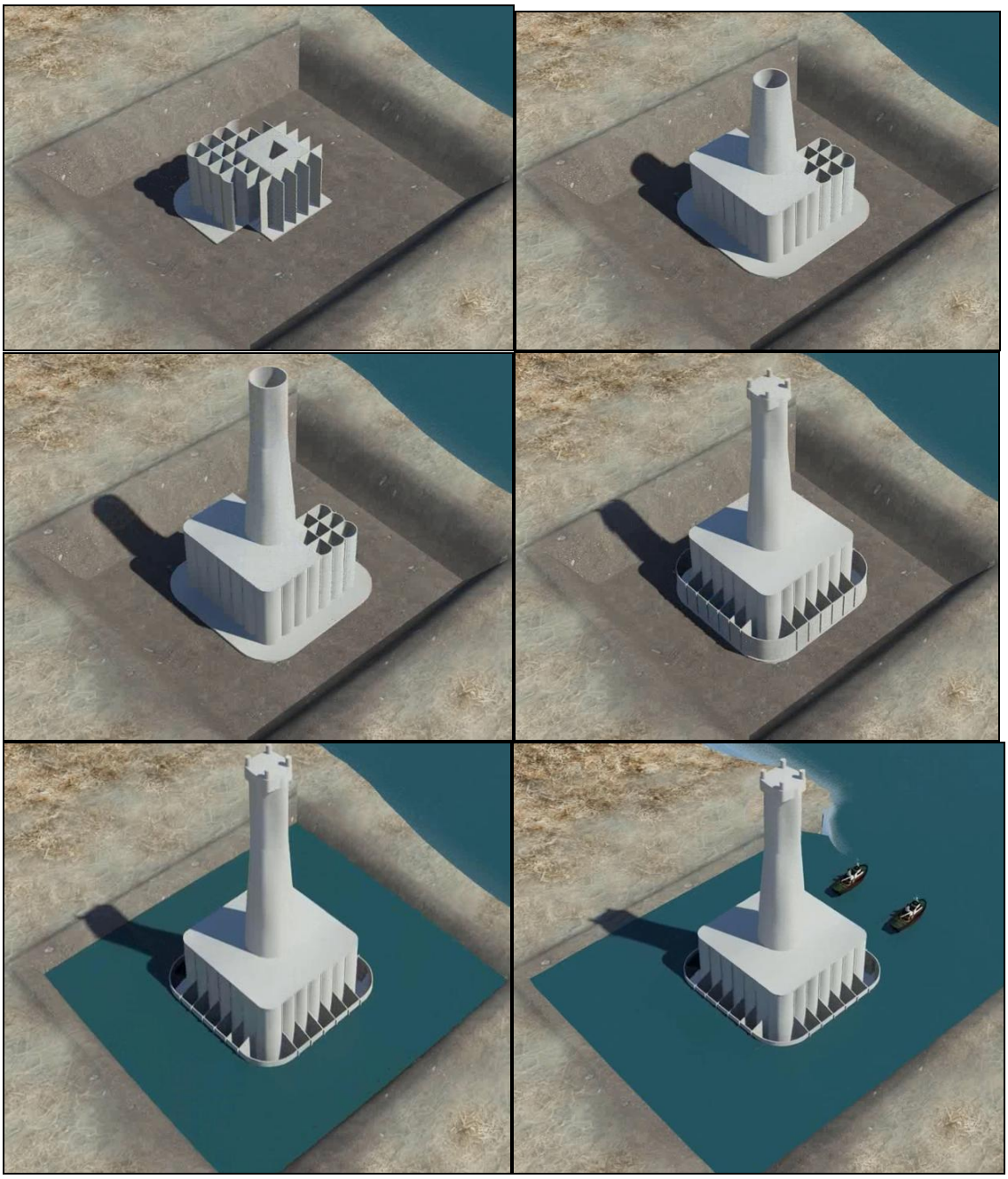
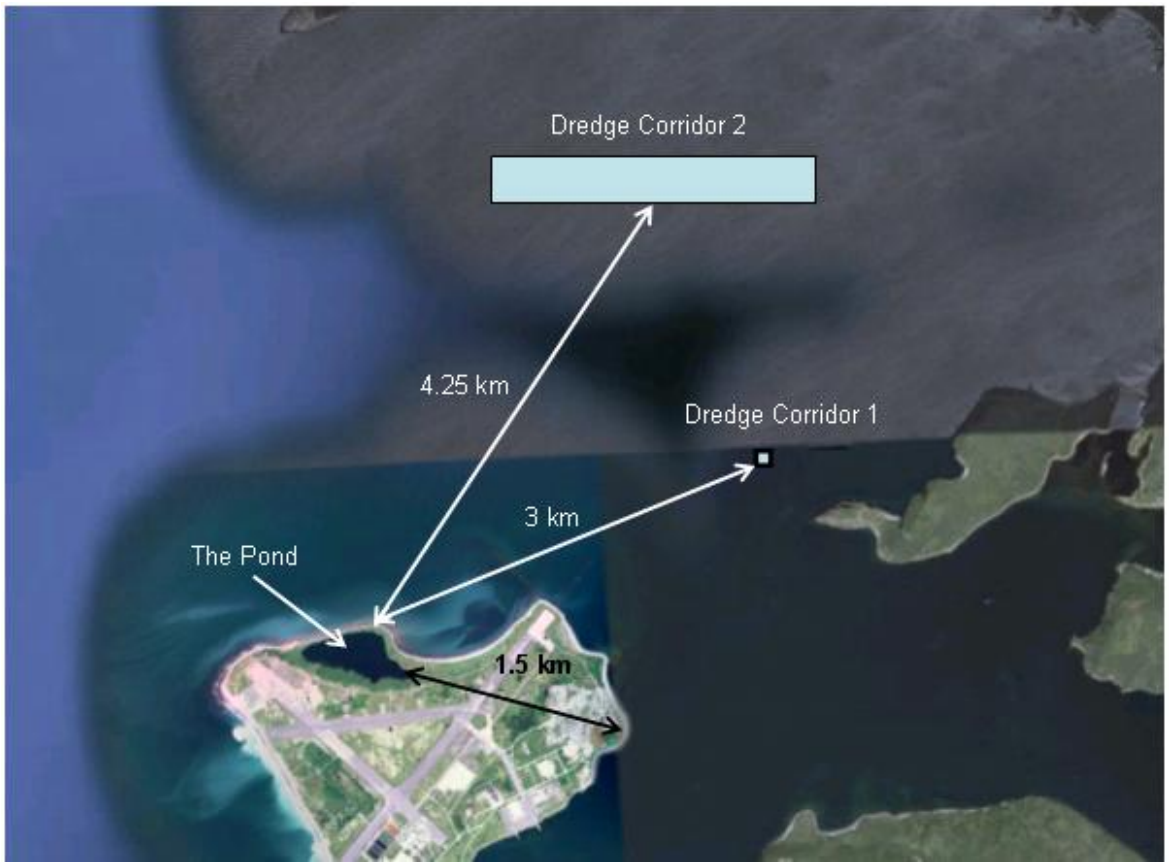


Figure 3-3 Construction of the Concrete Gravity Structure

Shoreline dredging activities can be executed with the use of a cutter suction dredge or a backhoe dredger. Earth-moving equipment will be required to lower the level of the shoreline to the minimum dredging depth of the cutter suction dredge. Once the soil is loosened by the cutter suction dredge, the soil will be sucked into the dredger and pumped through a floating pipeline from the stern of the barge to the shoreline where it will be connected to a land-based pipeline for discharge to The Pond on the tip of the Argentia Peninsula (refer to Section 5.1.3). If a backhoe dredger is used it will deposit the excavated material into a transportation barge alongside the dredger. The barge will

transport the dredged material to quayside for offloading and transportation to The Pond by earth moving equipment.

Husky has completed a bathymetric survey of the CGS tow-out route to ensure adequate water depth exists for the draft of the CGS. The survey identified that dredging will be required in two sections of the tow-out channel (as noted in Figure 3-4). It is anticipated the work could be completed in four to six weeks using a trailing suction hopper dredger.



Source: Google Earth 2012

Figure 3-4 Corridors Requiring Dredging along the Concrete Gravity Structure Tow-out Route

A trailing suction hopper dredger will transfer the sediment into the hopper of the vessel. The soft material within the tow-out corridors could be removed easily with a trailing suction hopper dredger, and if necessary, the assistance of a backhoe dredger for harder material may be required. In the event bedrock is encountered, drilling and blasting, or a rock hammer will be required in order to dredge. Planned boreholes will confirm whether such measures will be necessary along the tow-out route.

Once full, the vessel will transit to quayside where it is connected to a temporary land-based pipeline and the material is pumped ashore. Dredged sediment can be pumped through the temporary land-based pipeline for discharge to The Pond (see Section 5.1.3). These pipelines can be extended and repositioned in such a way that the sediment will be placed evenly over The Pond area. At the end of the pipeline, earth-

moving equipment will be used for the final spreading and levelling of the material, if necessary.

The marine logistics associated with the dredging operation will be coordinated with the Port of Argentia. As previously stated, The Pond at the head of the Argentia Peninsula is currently being evaluated as the primary spoils disposal site. Disposal at sea is also being evaluated; however, a potential disposal site has not been identified to date.

The Pond has undergone extensive environmental sampling as part of the Argentia Ecological Risk Assessment Project, conducted by Public Works and Government Services Canada (PWGSC). Husky will conduct a bathymetry survey of The Pond to confirm there is sufficient capacity for disposal of the dredge material without dewatering The Pond. Pond sediment and water samples will be collected to compare current chemistry against the historical contaminant data. Few species and individual fish are present in The Pond, as concluded in the study conducted by PWGSC in 1998 (Argentia Remediation Group (ARG) 1998). Husky will also conduct a fish and fish habitat survey of The Pond.

Husky has also initiated extensive sampling within the areas to be dredged to test sediment chemistry and to assess fish habitat.

During the construction of the CGS and its subsequent float-out, there will be no requirement for a breakwater.

3.1.1.10 Topsides Facilities

The topsides will consist of drilling facilities, wellheads and support services such as accommodations for 120 to 130 persons, utilities and a helideck. The topsides will be constructed at an existing fabrication facility and is therefore not considered part of this Project Description.

Upon completion of the fabrication and commissioning work, the topsides structure will be loaded onto a heavy-lift transportation vessel, and transported to the deep-water mating site in Placentia Bay.

3.1.1.11 Tow-out to Deep-water Site

Once construction of the CGS is complete, the structure will be floated out of the graving dock and towed to a deep-water site in Placentia Bay for installation of the topsides. Two potential deep-water sites have been identified, west of Red Island and west of Merasheen Island (Figure 3-5). A decision between the two potential mating sites will be made after further site evaluation, including surveys, to obtain all necessary information about the tow-out route and the deep-water location. Local stakeholders will also be consulted.

Husky anticipates that four tugs, each of a capacity between 12,000 and 15,000 horsepower, will be used for the transit. It is currently estimated that two to four days will be required for the CGS transit to the deep-water site. Upon arrival at the deep-water site, the tow tugs will hold the structure at the required location while four moorings are connected to the structure and tightened to maintain position for the installation of the topsides. The tow tugs will then be disconnected.

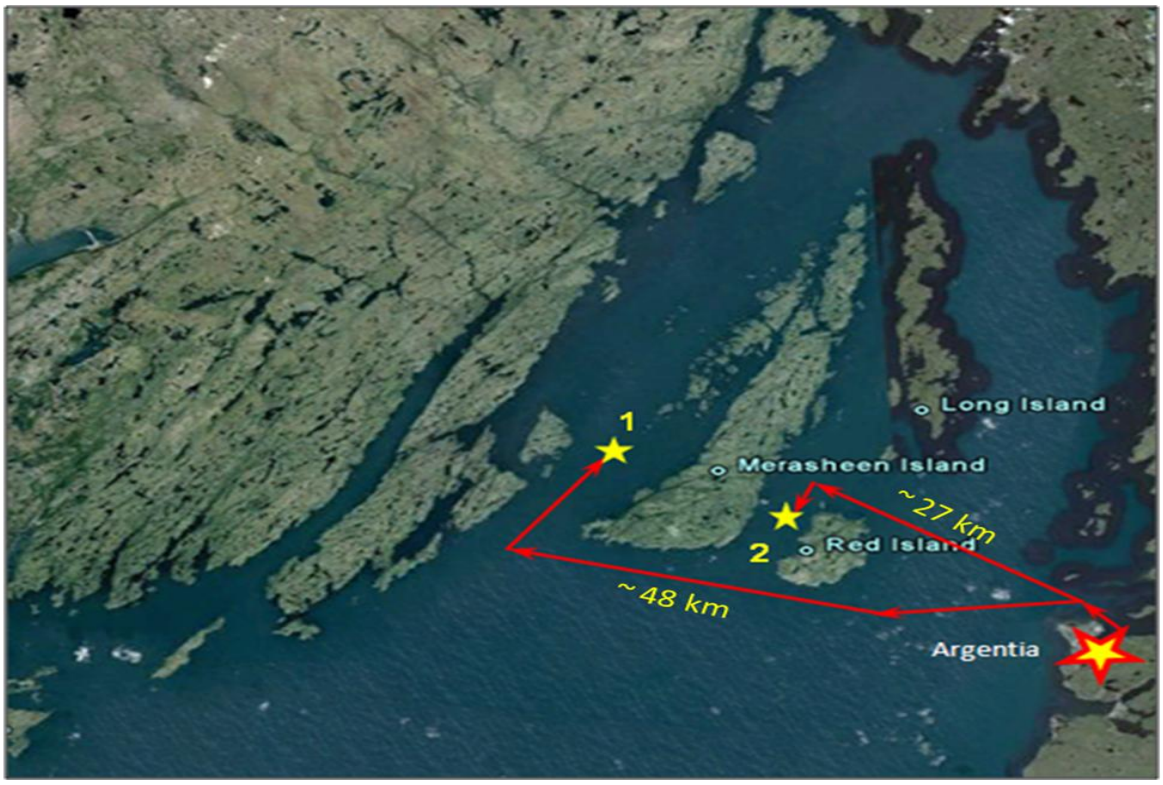


Figure 3-5 Potential Deep-water Mating Sites

The CGS will be ballasted to a predetermined depth for the installation of the topsides. The initial ballasting will use water to achieve the required draft for the CGS. Once installation of the topsides is complete, a transition from water ballast to solid ballast will occur at the deep-water mating site; this activity will be integrated with the topsides/CGS hook-up.

3.1.1.12 Topsides Mating

Two methods for the installation of a topsides structure are contemplated; float-over or heavy lift with the use of a single or dual crane heavy-lift vessel. The method that will be used will be determined during FEED.

The position of the CGS will be maintained by four pre-installed seabed anchors, which will be connected to mooring points on the CGS by anchor chain approximately 1,500 m each in length. Husky does not anticipate the need for cables connected to the land. Each leg of the overall mooring system will be comprised of a seabed anchor, pennant wire and buoy for deployment and recovery of the anchor, a chain connecting the anchor to the CGS and a tension pontoon aligned with the chain. These moorings will be set and marked just prior to the float out of the CGS from the graving dock. The mooring systems will be recovered and removed from the deep-water site once the topsides facility has been mated with the CGS and is under tow to the offshore site. The CGS itself will not be in contact with the seafloor.

During the mating operation and inshore hook-up work, the Port of Argentia will be used as a logistics base for the supply of materials, equipment and personnel. There will be limited marine traffic between the deep-water site and the Port of Argentia throughout the time that the WHP is at the deep-water site, currently estimated to be six to eight weeks.

During the topsides mating, there will be an accommodation vessel for the estimated 100 workers engaged in this component of the work. At all times, the accommodation vessel will have an assistant tug of approximately 5,000 horsepower, with a supply boat of similar size used for logistic runs to the Port of Argentia. Regulated marine vessel discharges can be expected at the deep-water mating site. Air emissions can be expected from the topsides standby generator, as well as from the various support vessels. All waste material will be sorted, recycled and disposed of on land.

Husky anticipates the logistics vessel will visit the Port of Argentia approximately three to four times per week. The transit time will be approximately two hours.

3.1.2 Offshore

The subsea infrastructure to support the WHP will be designed to minimize the need for diver intervention during installation and provide maximum clearance for remotely operated vehicle (ROV) operations during inspection and maintenance of the equipment.

3.1.2.1 Tow-out and Offshore Installation of the Wellhead Platform

Upon completion of the topsides mating and associated hook-up between the CGS and the topsides, the WHP's designated towing draft will be established by water ballast/ deballast activities. Once the towing draft has been established, the structure will remain at this draft until it arrives at the offshore location in the White Rose field. The WHP draft is expected to be approximately 115 m.

The WHP will be towed at the maximum possible water depth to minimize wave action on the topside facilities and the best time to do so is from the end of May through to September. A tow-out route (based on existing bathymetry) to accommodate the WHP draft is illustrated in Figure 3-6. The tow-out route will be surveyed in advance to provide the level of information required to establish an accurate final route for tow-out of the structure. Detailed contingency planning will be developed to manage the tow in the event of bad weather. Continuous weather forecasting will be undertaken during the tow.

For tow-out of the WHP, four ocean-going tugs, each with a capacity of a minimum of 17,000 horsepower, will be connected to towing points on the CGS structure. The four moorings at the deep-water site will be disconnected and the tow to the White Rose field will commence. Husky anticipates the WHP will exit from Placentia Bay within 48 hours from the commencement of the tow and the transit to the White Rose field from the deep-water site will take between 12 and 15 days.

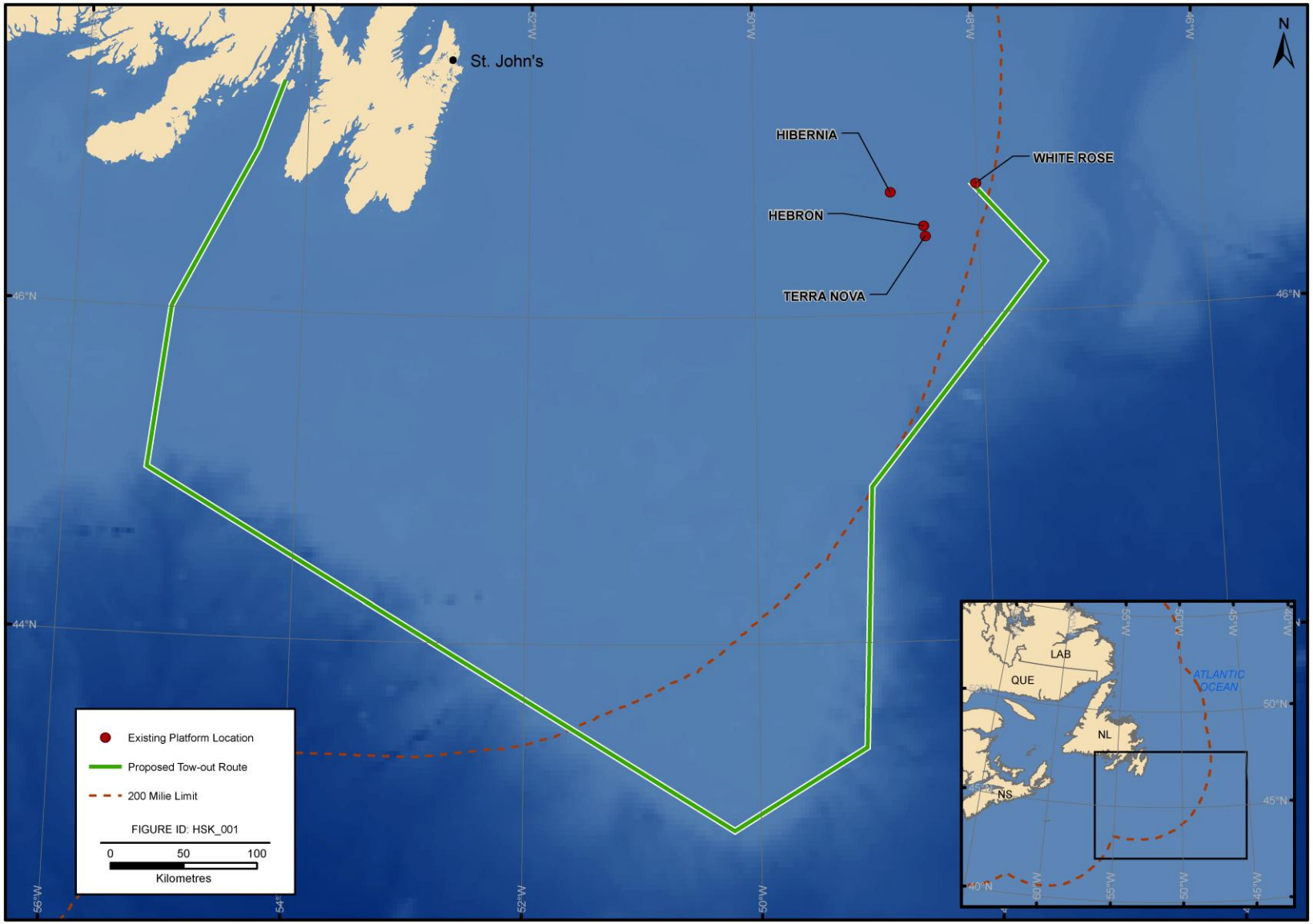


Figure 3-6 Potential Tow-out Route from Placentia Bay to the Wellhead Platform Location

At the offshore location, the WHP will be positioned by the four towing vessels. Once the structure has been situated in the correct location and heading, the CGS will be ballasted with water onto the seabed by controlled flooding of cells within the main base caisson. The CGS foundation will penetrate the seabed, therefore scour protection is not required. Once on the seabed, solid ballast will be placed in specific caisson cells to provide long-term stability for the WHP.

3.1.2.2 Connections to Existing Subsea Infrastructure

The flowlines from the WHP will connect to the CDC production lines at a location between the CDC and *SeaRose FPSO*. There will also be a gas line connected from the NDC to the WHP and a water injection line from the CDC to the WHP. The need for additional flowline tie-in modules and associated valves will be evaluated during engineering. Flowline tie-in modules will sit on the seafloor and range between an estimated 20 m^2 and 40 m^2.

3.1.2.3 Control and Communication with the *SeaRose* FPSO

The method of control and communications to *SeaRose FPSO* is under evaluation and will be further defined during engineering. The connection will be designed to convey control and communication signals between the WHP and the *SeaRose FPSO*. If a cable option is selected, it will contain static sections, which will remain stable on the seabed, and dynamic sections, designed to be compatible with the design of the dynamic risers and *SeaRose FPSO* mooring lines.

3.1.2.4 Operations

The WHP is designed to perform drilling, completions, well interventions and transport of product to the *SeaRose FPSO*. Under the WHP development option (which will have up to 40 wells), plus up to three additional subsea drill centres (each with up to16 wells), the total number of wells could be up to 88. Synthetic-based mud cuttings will be re-injected into a dedicated well from the WHP, pending confirmation of a suitable disposal formation. A discussion of the potential emissions and discharges associated with operation activities is provided in Section 3.4.

3.2 Subsea Drill Centre

3.2.1 Onshore/Nearshore

Under the subsea drill centre option, there will not be any onshore/nearshore activities associated with this development option.

3.2.2 Offshore

Any future subsea drill centres will be installed and operated in a similar manner as existing subsea drill centres in the White Rose field. The subsea infrastructure will be designed to minimize the need for diver intervention during installation and provide maximum clearance for ROV operations during inspection and maintenance of the equipment.

3.2.2.1 Offshore Subsea Construction and Installation

Offshore construction and installation will include: dredging a subsea drill centre; installation of the subsea infrastructure; installation of flowlines to connect a new subsea drill centre to existing subsea infrastructure; and modifications to existing subsea infrastructure.

Dredging for placement of subsea wells below the level of the sea floor will be required to protect equipment from iceberg scour. Construction methods for a new subsea drill centre will be similar to those employed for development of the White Rose and North Amethyst fields.

Dredging will be conducted using a trailing suction hopper dredger vessel. Dredged material will be disposed of in the approved spoils disposal area, used during construction of the subsea drill centres for White Rose and North Amethyst. It is anticipated that the subsea drill centre will be excavated to a measured depth of 9 to 11 m below existing seabed level. The maximum base dimension will be approximately 45 m by 80 m, with 1 vertical by 3 horizontal graded sloped sides as required for stability and flowline ramps.

Subsea facilities to support any new subsea drill centres will include all equipment necessary for the safe operation and control of the subsea wells and transportation of production and injection fluids. Husky will use designs currently used in the White Rose field. Procedures for installation of subsea facilities and subsequent operations are anticipated to be similar to those currently employed for the existing White Rose field. A subsea construction vessel will support the installation of the equipment and a diving support vessel will support the hook-up of the equipment by divers.

Iceberg protection measures applied to the current White Rose project will also be applied to any new subsea drill centre, including placement of wellheads and xmas trees with the top of the equipment a minimum of 2 to 3 m below the seabed level and use of flowline weak link technology.

3.2.2.2 Connections to Existing Subsea Infrastructure

Subsea flowlines will interconnect a new subsea drill centre (refer to Figure 2-5) with the *SeaRose FPSO.* Flowlines will be laid directly on the seafloor, similar to installation methods used for flowlines currently in the White Rose field. The need for additional flowline tie-in modules and associated valves will be evaluated during engineering. Flowline tie-in modules will sit on the seafloor and range between an estimated 20 m^2 and 40 m^2.

Modifications may be required to existing subsea drill centres under the subsea drill centre development option. This could include removal of excess mud and cuttings from existing subsea drill centres. Husky does not anticipate that any existing subsea drill centres will increase in size; modifications would be to equipment only.

3.2.2.3 Control and Communication with the *SeaRose* FPSO

Communications between the new subsea drill centre and the *SeaRose FPSO* will be via a subsea umbilical. The location of the umbilical tie-in will be determined during FEED.

3.2.2.4 Operation

A semi-submersible drilling rig is expected to perform the drilling, completions and well interventions. The subsea drill centre will produce crude, which will be transported directly to the *SeaRose FPSO*. Developing the WREP using subsea drill centres (West White Rose plus up to three additional, each with 16 wells), the total number of wells could be 64. Synthetic-based mud cuttings will be treated and discharged from the drilling rig in accordance with the *Offshore Waste Treatment Guidelines* (OWTG) (National Energy Board et al. 2010). A discussion of the potential emissions and discharges associated with operation activities is provided in Section 3.4.

3.3 Project Schedule

The WREP development schedule (Figure 3-7) reflects the current preliminary timeline projected to achieve first oil within the fourth quarter of 2016, under the WHP option. Developing the WREP using a subsea drill centre, construction could begin in 2014, with installation of equipment and first oil potentially in 2015 (Figure 3-8). Additional subsea drill centres could be developed in a similar timeframe or later in the WREP life. In either development option, the WREP is designed to support production by the *SeaRose FPSO* for the life of the White Rose field.

3.3.1 Pre-Front-end Engineering and Design

The major focus within pre-FEED is to identify, screen and select the preferred development option for the development of the identified resources and to provide information to support regulatory submissions. It is currently estimated that pre-FEED will start in the second quarter and will conclude by the third quarter of 2012.

3.3.2 Front-end Engineering and Design

The major focus within FEED will be to fully define the scope of the WREP, complete detailed execution plans and refine engineering, cost estimates and schedules for the selected development option. It is currently estimated that FEED will commence in the second quarter of 2012 and will conclude by the first quarter of 2013.

3.3.3 Detailed Design and Follow-on Engineering

It is currently estimated that detailed design and engineering work will commence in the fourth quarter of 2012, culminating in award of the various contracts during 2013. The detailed design and engineering will be replaced by follow-on engineering, which will be managed by the respective contractors responsible for the construction of the WREP components.

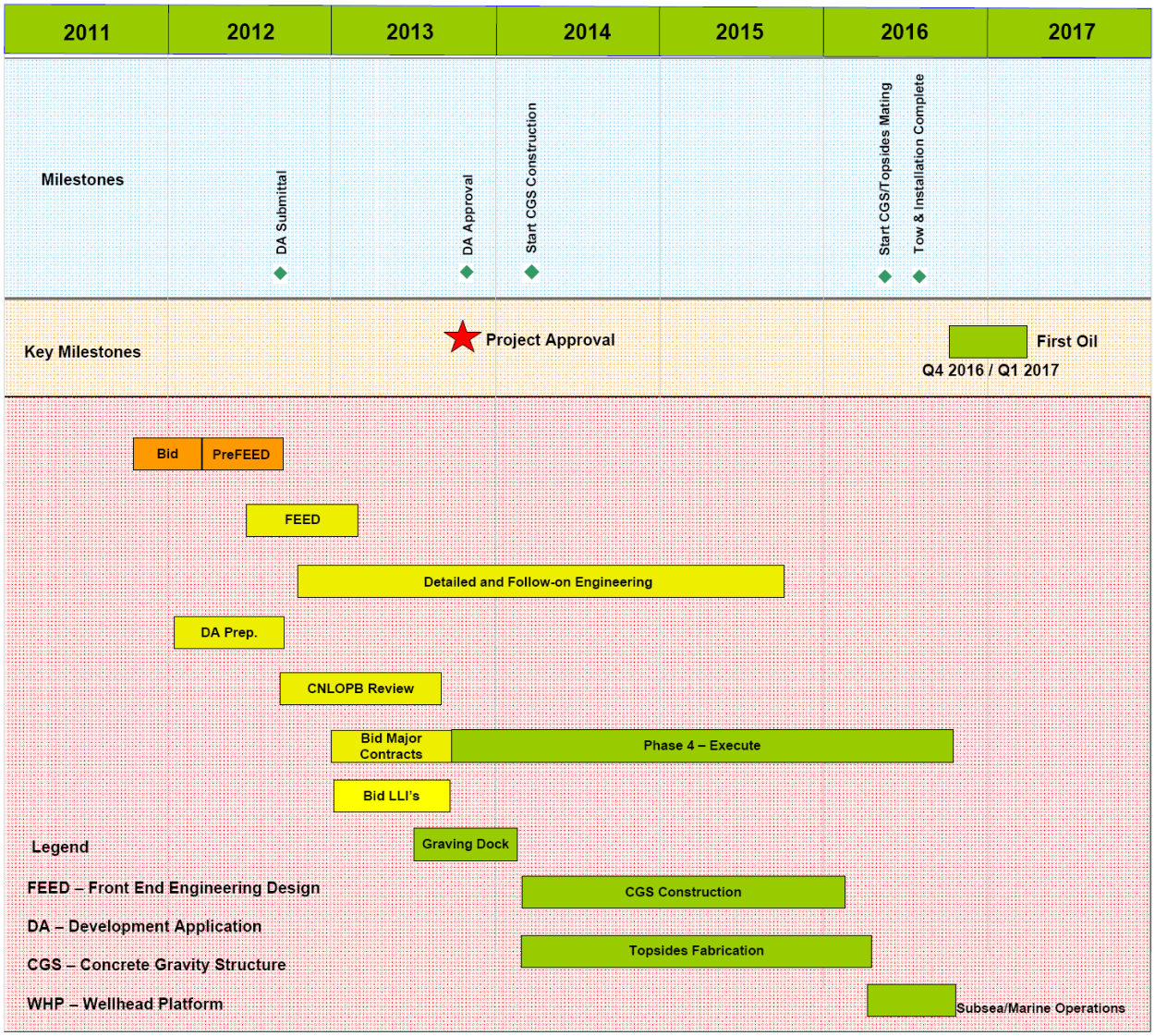


Figure 3-7 Proposed Schedule for Wellhead Platform Development Option

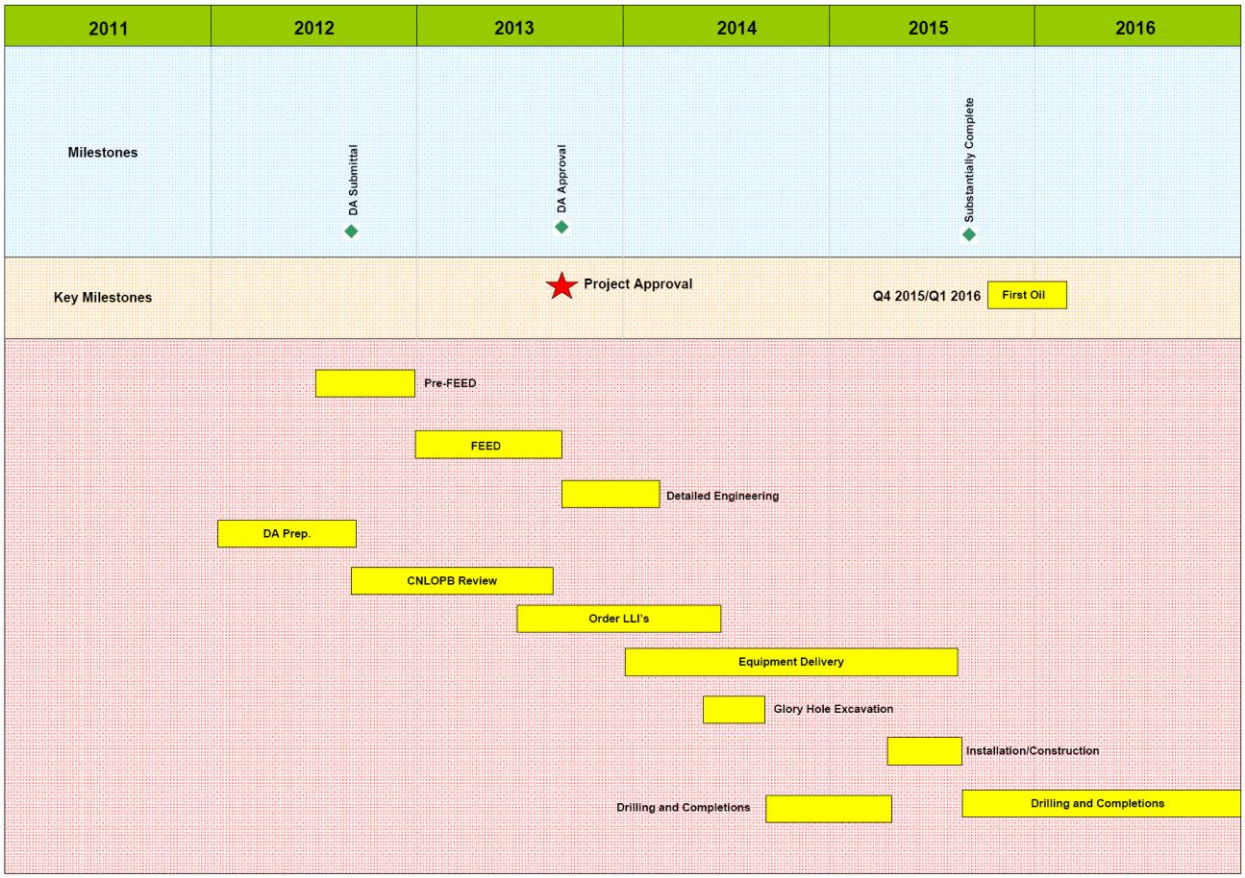


Figure 3-8 Proposed Schedule for Subsea Drill Centre Development Option

3.4 Emissions, Discharges and Waste Management

Waste discharges during either development option for the WREP could include water-based drill muds and cuttings, grey and black water, ballast water, bilge water, deck drainage, discharges from machinery spaces, cement, blowout preventer fluid, and air emissions. All waste discharges associated with the operation of the *SeaRose FPSO* have been previously assessed and permitted and continue to be monitored through environmental compliance monitoring and environmental effects monitoring.

Husky's current environmental effects monitoring program will be revised to include assessment of the effects of discharges related to the WHP or any new subsea drill centres.

Should development of the WREP occur via a new subsea drill centre, Husky has an approved *Environmental Protection Compliance Monitoring Plan* in place for its semi-submersible drilling rig. Husky will continue to fully comply with the OWTG and will develop an *Environmental Protection Compliance Monitoring Plan* for the WHP. Husky's existing comprehensive offshore waste management plan will be revised and adapted to include the WHP as necessary.

Husky will also develop a site-specific environmental protection plan for the activities associated with graving dock excavation and CSG construction at Argentia under the WHP development option.

Husky will design the WREP using the best available technology to minimize the environmental effects of activities associated with the construction and operation of the WREP. Husky will adhere to all policies and regulatory requirements associated with the construction and operation of the WREP. Project-specific mitigation measures will be provided in the environmental assessment.

Some of the key activities and associated discharges and emissions for each phase of the WREP are listed in Tables 3-1 to 3-5.

Table 3-1 Potential Discharges and Emissions Associated with Pre-Construction and Installation Activities

Potential Activities	Potential Discharges/Emissions/Wastes
Onshore (Argentia Construction Site)	
Additional onshore surveys (e.g., topographic, geotechnical, environmental) Grading of site Construction of new temporary buildings and structures Upgrading/installation of infrastructure (e.g., site roads, buildings, cranes) Drill and blasting, if required Water supply requirements (potable water, fire water and industrial water) Waste (domestic, construction, hazardous and sanitary) Excavation and material disposal Chemical and fuel storage Welding and x-ray inspections Bulk material handling (sand, cement, crushed rock, aggregate) Construction of graving dock (include sheet pile/driving, potential grouting)	Air emissions Stormwater, potable water, fire water and industrial water Noise Site run-off (e.g., soil erosion) Solid, construction, hazardous, domestic and sanitary waste disposal

Table 3-2 Potential Discharges and Emissions Associated Concrete Gravity Structure Construction and Installation

Potential Activities	Potential Discharges/Emissions/Wastes
Onshore (Argentia Construction Site)	
Concrete production Back-up power generation Slip-forming Chemical/fuel storage Road transportation of materials, equipment, and personnel Water requirements (potable water, fire water and industrial water) Waste generated (domestic waste, construction waste, hazardous, sanitary waste) Use of new sewage treatment plant Continued use of fabrication and laydown yards Bulk material handling (sand, cement, crushed rock, aggregate) Welding and x-ray inspections	Air emissions Bilge/ballast water Deck drainage/onshore site runoff Elevated suspended solids Noise (including underwater) Solid, construction, hazardous, domestic and sanitary waste disposal Stormwater, potable water, fire water and industrial water Seawater discharges
Marine (Argentia and deep-water mating site)	
Additional nearshore surveys (e.g., geotechnical, geophysical, environmental) Blasting [(A)] /dredging/spoils disposal CGS solid ballasting (which may include disposal of water containing fine material) CGS water ballasting and de-ballasting Waste generated (domestic waste, construction waste, hazardous, sanitary waste) Topsides mating Additional hook-up and commissioning of topsides Operation of helicopters, supply, support, standby, mooring and tow vessels/barges/ (ROVs) Welding and x-ray inspection	Stormwater, potable water, fire water, cooling water and industrial water Noise (including underwater) [(A)] Shoreline runoff (e.g., erosion) Solid, construction, hazardous, domestic and sanitary waste disposal Air emissions Bilge/ballast water Deck drainage
Notes: (A) Clearance dredging could potentially include blasting if hard bottom substrate is encountered.	

Table 3-3 Potential Discharges and Emissions Associated with Wellhead Platform Installation/Commissioning Activities

Potential Activities	Potential Discharges/Emissions/Wastes
Clearance surveys (e.g., sidescan sonar) prior to installation of WHP or pipelines/flowlines Tow-out/offshore installation Operation of helicopters and supply, support, standby and tow vessels/barges Diving activities Operation of ROVs Installation of flowlines from WHP to subsea drill centre(s) Potential rock berms for flowline protection rock berms Installation of control and communications to *SeaRose FPSO* Additional hook-up, production testing and commissioning Hydrostatic test fluid (flowlines) Possible use of corrosion inhibitors or biocides (flowlines) (A) Water requirements (potable water, fire water and industrial water) Waste generated (domestic waste, construction waste, hazardous waste, sanitary waste) Vertical seismic profile survey	Air emissions Bilge/ballast water Deck drainage Storm water, potable water, fire water and industrial water Noise (including underwater noise) Solid, construction, hazardous, domestic and sanitary waste disposal Well treatment fluids

Note:

(A) The Operator will evaluate the use of biocides other than chlorine. The discharge from the hypochlorite system will be treated to meet a limit approved by the C-NLOPB's Chief Conservation Officer.

Table 3-4 Potential Discharges and Emissions Associated with Subsea Drill Centre Excavation/ Installation Activities

Potential Activities	Potential Discharges/Emissions/Wastes
Dredging Ocean disposal of dredge material (at existing White Rose field disposal site) Clearance surveys (e.g., sidescan sonar) prior to installation of pipelines/flowlines Operation of helicopters and supply, support, standby and tow vessels/barges Diving activities Operation of ROVs Installation of flowlines and tie-in modules to existing subsea drill centre(s) Installation of control and communications to *SeaRose FPSO* Additional hook-up, production testing and commissioning Hydrostatic test fluid (flowlines) Possible use of corrosion inhibitors or biocides (flowlines) (A) Water requirements (potable water, fire water and industrial water) Waste generated (domestic waste, construction waste, hazardous waste, sanitary waste) Vertical seismic profile survey	Air emissions Bilge/ballast water Deck drainage Storm water, potable water, fire water and industrial water Noise (including underwater noise) Solid, construction, hazardous, domestic and sanitary waste disposal Well treatment fluids Dredge spoil discharge

Note:

(A) The Operator will evaluate the use of biocides other than chlorine. The discharge from the hypochlorite system will be treated to meet a limit approved by the C-NLOPB's Chief Conservation Officer.

Table 3-5 Potential Discharges and Emissions Associated with Offshore Production/Operation Activities

Potential Activities	Potential Discharges/Emissions/Wastes
Maintenance activities	Air emissions (including waste incinerator)
Power generation and flaring	Bilge/ballast water
Welding and x-ray inspection	Deck drainage/open drains
Normal platform operational activities	Stormwater, potable water, fire water, cooling water, and industrial water
Operation of seawater systems (cooling, firewater)	Drilling fluids and cuttings (water-based mud and non-aqueous fluid) disposal (B)
Water requirements (potable water, fire water, cooling water, and industrial water)	Noise (including underwater noise)
Waste generated (domestic waste, construction waste, hazardous, sanitary waste)	Solid, hazardous, domestic and sanitary waste disposal
Operation of utilities systems	Well treatment fluids
Corrosion protection system (use of corrosion inhibitors or biocides (e.g., hypochlorite) flowlines and pipelines (A))	
Chemical/fuel management and storage	
Operation of helicopters, supply, support, standby and tow vessels/barges/ROVs	
Well interventions and workovers	
Preparation and storage of drilling fluids	
Management of drilling fluids and cuttings (reconditioning, discharge or injection) (B)	
Management and storage of blowout preventer fluids and well treatment fluids	
Cementing and completing wells	
Operation of corrosion protection systems	
Gas injection systems	
Seawater injection system (to maintain reservoir pressure)	
Artificial lift (gas lift, electric submersible pumps or a combination)	
Oily water treatment (C)	
Vent and flare system (D)	
Ongoing geotechnical and environmental wellsite surveys	
Diving activities	
Operation of ROVs	

Potential Activities	Potential Discharges/Emissions/Wastes
Notes:	
(A) The Operator will evaluate the use of biocides other than chlorine. The discharge from the hypochlorite system will be treated to meet a limit approved by the C-NLOPB's Chief Conservation Officer.	
(B) Water-based drilling fluids and cuttings will be discharged overboard. The Operator will evaluate best available cuttings management technology and practices to identify a waste management strategy for spent non-aqueous fluid and non-aqueous fluid cuttings from the semi-submersible drilling rig. Synthetic-based mud cuttings will be re-injected into a dedicated well from the WHP, pending confirmation of a suitable disposal formation.	
(C) Water will be treated prior to being discharged to the sea in accordance with OWTG. Water from the open drains will also either be disposed overboard in accordance with OWTG.	
(D) Small amounts of fuel gas will be used for flare pilots and may also be used to sweep the flare system piping. "Pilotless" flares will be evaluated during FEED.	

3.5 Logistics and Other Support

3.5.1 Onshore/Nearshore Construction of Wellhead Platform

Under the WHP development option, the excavation of the graving dock in Argentia is scheduled to take approximately six to eight months. The logistics support for this work will be very localized. The equipment required for the excavation of the graving dock will be mobilized by road. Fuelling of equipment will be by road tanker, to be replenished from the local market.

The contractor responsible for the construction of the CGS will establish site infrastructure in accordance with the execution plan for the work. Specific site facilities will be established to support the work and the construction personnel. At this time, Husky does not anticipate the need for a labour camp. However, workforce and area accommodations availability will be assessed in the Socio-economic Impact Statement (SEIS).

3.5.2 Offshore Operation

Husky currently maintains logistical support to the *SeaRose FPSO* and to a semi-submersible drilling rig on a full-time basis. At times, logistical support is also provided to a second drilling rig. Therefore, much of the required infrastructure and support services are already in place to support both development options. Key areas of support during operation and maintenance of both development options include shore-based marine logistics, warehouse services, personnel transportation, supply and standby vessels, communications, ice management services, marine fuel supply, waste management, medical services and weather forecasting.

3.6 Decommissioning and Abandonment

3.6.1 Onshore/Nearshore

Under the WHP development option, consideration will be given during the design phase to designing the facility as a permanent graving dock, which could be used for the construction of future CGSs or for other industrial applications. Design of the graving dock for future use could include provision for a gated system allowing the graving dock to be flooded and drained as required. If it is determined that the graving dock will be designed for a single CGS construction use only, consideration will be given to other potential uses in consultation with local stakeholders and authorities.

3.6.2 Offshore

Under the WHP development option, the WHP will be decommissioned and abandoned by first abandoning the wells in accordance with standard oil field practices, then decommissioning the topsides, followed by decommissioning and abandonment of the CGS. All infrastructure will be abandoned in accordance with the relevant regulations. The topsides will be removed from the CGS in a manner evaluated to be most effective at the time of decommissioning. The WHP will not be abandoned and disposed of offshore, nor converted to another use on site.

Under the subsea drill centre development option, the wells will be plugged and abandoned and the subsea infrastructure will be removed or abandoned in accordance with the relevant regulations.

3.7 Accidental Events and Contingency Plans

The Husky Operational Integrity Management System (HOIMS) requires an emergency management system that allows for immediate response to all emergencies involving personnel, the environment and assets.

During the design and construction phases for both the WHP and the subsea drill centre development options, detailed constructability and installation reviews will be performed to ensure all infrastructure will be efficiently and safely constructed. Husky's project and operations personnel will be integrated in the review process and there will be full compliance with the applicable HOIMS requirements.

Contractors involved in the construction of new facilities will be required to submit detailed construction engineering and procedure documents for all critical activities, including contingency plans in the event of an emergency. Prior to the commencement of critical activities, process hazard assessments will be completed to ensure all participants are familiar with the events to be performed and the potential risks and mitigation measures that will be in place.

Husky recognizes that prevention is the most effective way to avoid damage to the environment. Husky has in place the policies, procedures, equipment and trained personnel necessary to reduce the probability of oil spills related to its Atlantic Region operations and to minimize the effects of spills, if they do occur.

Husky's *Oil Spill Response Plan* outlines the procedures for responding to a marine oil spill. Husky's *Incident Coordination Plan* outlines the process to be used by Husky's onshore Emergency Response Team in a response to an emergency. Husky's onshore Emergency Response Team receives regular training in management of oil spill response. Officers and crew of supply vessels under contract to Husky also receive annual training in oil spill countermeasures, including field practice in deploying vessel-based oil spill response equipment. Annually, Husky onshore and offshore responders participate in an integrated exercise that involves offshore equipment operations and communications and coordination. All personnel on offshore installations are trained to understand their role in response to emergencies. Similar training will be implemented on the WHP, as required.

Husky's Emergency Response Plan, Incident Coordination Plan and Oil Spill Response Plan are filed with the C-NLOPB.

3.8 Land Holdings and Water Lot(s)

The graving dock site is on lands administered by the AMA. In 1999, the AMA completed the land transfer agreement with PWGSC for transfer of ownership of the southside and backlands area of the former US Naval Facility to the AMA. All remaining Government of Canada property from the former naval facility was transferred to the AMA from PWGSC in 2002, specifically ownership of the north side of Argentia, the port facility and the Government of Canada portion of the Northeast Arm recreation camp. PWGSC remained responsible for the remediation of all US Navy contamination in Argentia under the Argentia Environmental Remediation Project (AMA undated).

The AMA is also the parent organization for a property management and service division, Argentia Property Services Inc., and a port ownership and management division, Argentia Port Corporation Inc. These divisions manage and maintain Argentia's infrastructure.

Husky has contractual arrangements in place with the AMA for the construction of the graving dock site should the WHP development option be selected.

Offshore, the WREP will be executed within Husky's existing Production Licenses 1007, 1008, 1009 and 1010, in which Husky and its co-venturers were granted rights by the C-NLOPB. The C-NLOPB administers the various requirements and commitments related to these rights on behalf of the federal and provincial governments. The development of these licenses was assessed under the previous *White Rose Oilfield Comprehensive Study* (Husky Oil 2000) and *Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment Addendum* (LGL 2007a).

There are no Aboriginal lands in the vicinity of the proposed graving dock or deep-water site. There is no dedicated Aboriginal fishery in Placentia Bay or the White Rose field.

3.9 Occupations

3.9.1 Construction Employment

The estimates for both development options are preliminary and subject to change as the scope is further refined in the FEED phase and further discussed in the SEIS.

3.9.1.1 Wellhead Platform Development Option

Under the WHP development option, the anticipated direct and indirect labour requirement for the graving dock excavation is 85,000 person-hours and for CGS construction is 1,600,000 person-hours. Excavation and construction opportunities will provide work for heavy equipment operators, sheet metal workers, crane operations, truck drivers, welders, cement finishers, electricians, pipe fitters and construction inspectors.

3.9.1.2 Subsea Drill Centre Development Option

Under the subsea drill centre development option, the anticipated labour requirement for a development tied back through existing infrastructure is estimated to be approximately 500,000 person-hours. Fabrication opportunities will provide work for welders, electricians and pipe fitters. There will also be opportunities during the testing and installation phase for inspectors, marine personnel, divers, logistic coordinators and heavy equipment operators.

3.9.2 Operations Employment

3.9.2.1 Wellhead Platform Development Option

The WHP will be designed to accommodate 120 to 130 persons under the WHP development option. The types of employment that will be required on the WHP include those related to drilling and associated handling of petroleum, as well as personnel for maintenance, catering, weather observation and medical services. The final personnel requirements will be determined during detailed design of the facility.

Husky anticipates that there will still be a requirement for a semi-submersible drilling rig during certain periods to execute exploration drilling and drilling in existing or future subsea drill centres. Employment on the semi-submersible drilling rig will be 120 to 130 persons. The types of employment on a semi-submersible drilling rig will be similar to those on the WHP, with the exception of handling of petroleum for export to the *SeaRose FPSO*.

3.9.2.2 Subsea Drill Centre Development Option

New subsea drill centres create little or no new employment during their operation. New subsea drill centres will be integrated into existing Husky operations and the semi-submersible drilling rig will continue to drill development wells.

4.0 Public Consultation

Husky recognizes the importance of public consultation and is developing a consultation plan to engage stakeholders in its environmental and socio-economic assessments of the WREP. Husky has met and will continue to meet with various stakeholders to provide information on the WREP and solicit feedback from stakeholders.

Husky has provided an overview presentation on the WREP to several government agencies. Husky will continue to engage government scientists to ensure an ongoing exchange of information that could be useful in the preparation of the environmental assessment and SEIS. Husky will meet with One Ocean, the Food, Fish and Allied Workers (and individual local fishers) and non-governmental organizations to exchange information that can assist in the preparation of the environmental assessment. Husky will also meet with relevant community representatives and social groups to share knowledge and assist in the preparation of the SEIS. Husky will respond to other stakeholders that express an interest in the environmental and socio-economic aspects of the WREP.

Husky will conduct open houses in key locations relevant to the WREP in April/May 2012. The open houses will provide an opportunity for Husky to present information on key components of the WREP and for stakeholders to discuss the WREP directly with Husky, and its environmental assessment and SEIS teams. The open houses will be accessible to any interested member of the public and will be advertised in local newspapers and on local radio to encourage maximum participation. Husky will also meet with local community leaders to discuss their interests and concerns in regard to the WREP. In addition, specific components of the WREP will be discussed in stakeholder workshops that will focus on interests and concerns of local communities and stakeholders.

All issues raised during the various consultation activities will be tracked in a database to ensure they are addressed in the environmental assessment or SEIS, as appropriate. A table of concordance of issues raised during the stakeholder consultation process will advise the way in which such issues have been addressed in the environmental assessment or SEIS documents.

5.0 Environmental and Socio-economic Setting

5.1 Biophysical

5.1.1 Physical Environment Setting

5.1.1.1 Onshore/Nearshore

The graving dock site in Argentia is flat with very slight undulations with elevations ranging from 3 to 5 m above sea level. The soil conditions at this site comprise fill and discontinuous organic soils overlying native soils. The native soils within the depths investigated varied from clean, fine-grained, poorly graded sand to silty sand with gravel. Occasional to some cobbles and boulders were noted to occur throughout the stratum. Bedrock was not encountered within the depths investigated. Generally, the water table at this site was found to be within 1 to 3 m of the ground's surface.

The average annual wind speed for Placentia Bay is recorded at approximately 27 km/h, with the prevailing direction being west in the fall/winter months and southwest in the spring/summer months. The annual average maximum wind speed in Placentia Bay is approximately 106 km/h. The mean temperature for Placentia Bay ranges from -4.3°C in February to 15.6°C in August. The mean temperature ranges from -1.6°C in February to 14.8°C in August.

Monthly rainfall values typically average at least 90 mm, except during the winter months (January through March), when the peak snowfalls occur. On average, the rainiest season for Placentia Bay is in the fall months (September to November), when monthly rainfall is usually between 125 to 150 mm.

While eastern Newfoundland often receives the most freezing precipitation events in all of Canada, these occurrences are less frequent over Placentia Bay. The average annual freezing precipitation (freezing rain/drizzle, ice pellets and sleet) for the Placentia Bay area is 34.8 hours. Thunderstorms occur far less over Placentia Bay than the surrounding land area, but have the potential to occur throughout the year, particularly in the summer months; hail is typically associated with thunderstorms.

In Argentia, the highest frequency of greater than 10 km visibility occurs in the fall. Meanwhile, the greatest occurrence of reduced visibilities occurs during the late spring and early summer. Poor visibility conditions (less than 2 km) increase through the spring and peak in July, occurring over 30 percent of the time.

5.1.1.2 Offshore

Water depths within a 1 km x 1 km area of the proposed WHP location in the White Rose field range from approximately 115 m to 120 m. The seafloor is generally flat-lying, with low relief undulations and depressions. Regional slope is less than 1 degree to the northeast. The seabed is fairly featureless, with the exception of iceberg scours.

The seabed consists of fine to medium-grained sand with local exposures and concentrations of shelly coarse grained sand and gravel. The surficial sands cover an underlying, irregular ice-scoured glacial sediment surface. Iceberg scours and pits occur

in places. Scour depths appear to be typically less than 0.3 m. Pits generally appear approximately 1.3 m deep and less.

The Grand Banks region has a harsh environment due to the presence of intense mid-latitude low-pressure systems during fall and winter, tropical cyclones in late summer and fall, and sea ice and icebergs in spring. The intense winter storms occur frequently and generally have winds from the southwest, west, or northwest. The highest waves usually occur in January and February.

There is a potential for superstructure icing to occur between November and May with the highest potential for freezing spray being in February due to colder temperatures, and high wind and wave conditions.

In spring, icebergs are a common occurrence. Icebergs originate from the glaciers in Greenland and Ellesmere Island and drift south through the White Rose area with the Labrador Current. Icebergs up to 5,900,000 tonnes have been observed in the area. The number of icebergs that drift through the White Rose area is variable from year-to-year. From 1974 to 2009, the mean number of sightings has been 60 while the maximum number was 215 in a 1°-grid centred on White Rose. Iceberg scours up to 1.5 to 2.0 m deep have been measured on the seafloor in the White Rose area.

In winter, spring and fall, the dominant winds in the area are westerly and in summer, southwesterly. Winter storms are considerably more intense and frequent than those in the summer. The associated winds reach gale force several times in a typical year, and sometimes attain hurricane force.

Precipitation on the Grand Banks is highest in January and lowest in July. 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. 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, the foggiest month, visibility is often reduced to less than 1 km (ExxonMobil Canada Properties 2009).

5.1.2 Atmospheric Environment

5.1.2.1 Onshore/Nearshore

Come By Chance is the air quality monitoring site located closest to Argentia. The background concentrations indicate that the area meets the air quality regulations of the province, and attains the National Ambient Air Quality Objectives of Canada (ExxonMobil Canada Properties 2011). The closest industrial sites to Argentia are the North Atlantic Refining Limited refinery at Come By Chance and the Newfoundland Transshipment Terminal at Whiffen Head. The nickel processing facility operated by Vale Newfoundland & Labrador Limited is currently under construction at Long Harbour. The refinery at Come By Chance is the dominant source of emissions in the airshed.

5.1.2.2 Offshore

Air quality within the offshore area is anticipated to be good, with only occasional exposure to exhaust products from vessel traffic (including offshore oil supply vessels),

helicopters and existing offshore oil production facilities at White Rose, Terra Nova and Hibernia (each platform will generally be downwind of another less than 15 percent of the time). The Jeanne d'Arc Basin also receives long-range contaminants from the northeastern seaboard and industrial mid-west of the United States (ExxonMobil Canada Properties 2011).

5.1.3 Onshore Environment

Furbearers located onshore near Argentia include small rodents such as rats and mice, meadow vole, snowshoe hare, mink, fox and masked shrew (ARG 1995). Numerous species of birds inhabit the Argentia Peninsula. In summer, gannet, alcid and gull nesting and shearwater foraging communities characterize the inshore zone of Placentia Bay; a substantial waterfowl population occurs in the nearshore waters of Placentia Bay in the winter (VBNC 2002).

There are several ponds in the area just south of the isthmus of the Argentia Peninsula and a number of rivers and ponds in the region surrounding the peninsula. The unnamed stream from Argentia Pond (that empties into Salmon Cove in Argentia Harbour) is not a scheduled salmon or brook trout river. No salmon are known to be in the area, although schools of brook trout are seen regularly in the stream and Argentia Pond.

The Argentia Peninsula has one water body. The Pond is elongated in the east-west direction and is 775 m long by 300 m wide, with a mean water depth of 7 m (maximum depth is 14 m) and a volume of 1,038,250 m^3 (ARG 1995). The substrate is primarily fines/clay (anoxic) and the surface area of the bottom is approximately 148,300 m^2. The Pond's water is brackish, with a probable seawater intrusion from Placentia Bay through the gravel ridge between the pond and the ocean and by waves and spray overtopping the gravel divider during severe storms or high tide events (ARG 1995). It is believed to be hydraulically connected through a cobble barasway/berm, with in-flow through a groundwater stream at the southeast end of The Pond (ARG 1995). Previous chemical analyses of sediments found total petroleum hydrocarbon/polycyclic aromatic hydrocarbon contamination from subsurface transport and the runway, as well as metals (such as arsenic, copper and lead) contamination from an unknown source, but possibly from air emissions (ARG 1995). Previous chemical analyses of water found copper and nickel from sediment and subsurface transport (ARG 1995). An Ecological Risk Assessment concluded that there is the potential for sub-lethal effects on fish and other aquatic biota from polycyclic aromatic hydrocarbons; however, terrestrial and avian species are not expected to be at risk from The Pond (ARG 1998).

5.1.4 Species at Risk

5.1.4.1 Nearshore

Fish species at risk that could occur in the Argentia area include the following Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed species: Atlantic cod (Newfoundland and Labrador population, Southern population); American plaice (Newfoundland and Labrador and Maritime populations); American eel; and Atlantic salmon.

Harlequin Duck (*Species at Risk Act* (SARA)-listed as Special Concern) occur in the waters off Cape St. Mary's Seabird Ecological Reserve (Section 5.1.5.1). Between 1998

and 2008, there have been incidental sightings of Red Knot *rufa* subspecies (COSEWIC-assessed as endangered) along the Cape Shore of Placentia Bay (Garland and Thomas 2009). There are no known critical nesting, feeding, staging or overwintering areas of at-risk bird and mammal species in the immediate vicinity of the nearshore area.

Marine mammals species at risk that may occur in Placentia Bay include the SARA listed blue and fin whale and the COSEWIC-assessed harbour porpoise (Northwest Atlantic population). The leatherback sea turtle is listed as a Schedule 1 species under SARA and may also be present in Placentia Bay.

5.1.4.2 Offshore

Fish species at risk that may occur near the WREP include three SARA-listed species: Atlantic; northern; and spotted wolffish. COSEWIC-assessed species that could occur near the Project include Atlantic cod (Newfoundland and Labrador population, Southern population), American plaice (Newfoundland and Labrador and Maritime populations), cusk, American eel, roughhead and roundnose grenadier, Acadian and deepwater redfish, Atlantic salmon (South Newfoundland population), porbeagle shark, shortfin mako shark, blue shark (Atlantic population), white shark (Atlantic population), basking shark (Atlantic population), spiny dogfish (Atlantic population), Atlantic bluefin tuna and Atlantic sturgeon (Maritimes population).

The only at-risk marine bird species that may occur near the WREP is the Ivory Gull (a SARA-listed species).

Marine mammal species at risk that may occur near the WREP include the SARA-listed blue whale, fin whale and North Atlantic right whale and the COSEWIC-assessed killer whale, northern bottlenose whale (Davis Strait-Baffin Bay-Labrador Sea population and Scotian Shelf population), Sowerby's beaked whale and harbour porpoise (Northwest Atlantic population). The SARA-listed leatherback sea turtle is a visitor to the Grand Banks. The loggerhead sea turtle has been assessed as an at-risk species by COSEWIC and may also occur.

5.1.5 Marine Environment

5.1.5.1 Nearshore

The coastline of Placentia Bay is irregular with many bays, inlets, and islands. The eastern Placentia Bay shoreline running from Little Harbour to Argentia is dominated by rocky headlands, gravel pocket beaches and rock platforms (Canadian Environmental Assessment Agency 2008). The bathymetry of Placentia Bay is also very irregular with many banks and troughs. Merasheen Island, Long Island and Red Island divide the inner bay into three channels. The eastern channel between the eastern shores of the bay and the eastern shores of Red and Long Island is the widest, the deepest and the least obstructed by shoals (LGL 2007b).

These nearshore rock/gravel/sand habitats and their attendant marine algae shelter a variety of species that could include anemones, barnacles and sponges, sea urchins, sand dollars, mussels, scallop, hermit crabs, lobsters, and small numbers of cod, flounder and plaice (LGL 2007b). A benthic fish habitat video survey and sediment

collection program is currently being conducted for the nearshore area. The results of this program will be incorporated into the WREP environmental assessment.

The commercial fishery landings values in Placentia Bay were primarily based on snow crab and cod landings, with lobster and lumpfish roe also contributing substantially (LGL 2007b). While some harvesting in Placentia Bay is conducted year-round (see Figure 7.6), the peak harvesting months are June and July, with a fairly strong fishery in November for cod. The average annual total value of commercial fishery for Northwest Atlantic Fisheries Organization (NAFO) Unit Area 3PSc (Placentia Bay) is approximately $13,000,000 (VBNC 2007).

5.1.5.2 Offshore

Peak abundance of phytoplankton on the Grand Banks usually occurs in late April to early May, within the top 30 to 50 m of the water column (Pepin and Paranjape 1996). An autumn phytoplankton peak is also characteristic of the northern Grand Banks but an obvious peak may not occur on the southern Grand Banks (Myers et al. 1994).

Zooplankton are an important link between primary production and higher trophic levels (e.g., fish, crustaceans) and many harvested species including crab, shrimp, and a number of fish species have planktonic eggs and larvae.

Epibenthic invertebrate species collected during the White Rose 2004, 2005, 2006 and 2008 environmental effects monitoring programs have included snow crab, Iceland scallop, toad crab, various echinoderms and sponges (Husky 2005, 2006, 2007, 2009). Benthic infauna collected during the same program was dominated by polychaetes which accounted for approximately 80 percent of the organisms in the samples. Other infauna included molluscs, crustaceans and echinoderms.

Key fisheries for the NAFO Unit Area 3Lt 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. The average annual total value of the commercial fishery in NAFO Unit Areas 3L and 3M is approximately $28,500,000 (LGL 2011).

The Grand Banks provide important habitat for millions of marine birds. Over 60 species have been reported. Approximately 19 of these species are pelagic and could occur in the offshore area. Approximately 20 species of marine mammals are found on the Grand Banks include whales, dolphins, porpoises and seals. Many mammal species occur seasonally to feed in the area. There are only a few permanent residents, including the Atlantic pilot whale (Nelson and Lien 1996; Waring et al. 2009).

5.1.6 Sensitive Areas

5.1.6.1 Nearshore

As part of the fish habitat survey conducted by Husky, eelgrass was observed near the graving dock site in Argentia Harbour. The quantity of eelgrass that could be affected by dredging operations will be discussed in the environmental assessment. Eelgrass is primarily a subtidal species that penetrates to some extent into the intertidal zone. It is

common on mud flats that are exposed at low tide, in estuaries and shallow, protected bays (Kelly et al 2009). Habitat provided by eelgrass along the coast is highly productive and a haven for juvenile fish of many species, with most fish found in the 3 to 5 m zone (DFO 2010). Catto et al. (1999) identified extensive eelgrass beds in Placentia Bay.

The arrival of capelin to the head of Placentia Bay generally occurs in June and July (VBNC 2002). Capelin spawning on beaches located in Argentia Harbour has been reported historically (VBNC 2002). The size of the substrate on a beach will determine its suitability for capelin spawning. Capelin appear to prefer gravel 5 to 15 mm in diameter but will spawn on substrate as small as 2 mm diameter and as large as 25 mm diameter (VBNC 2002). There are several capelin spawning beaches throughout Placentia Bay. Typical capelin beaches are located at Fox Harbour (north of Argentia) and Point Verde, southern Ship Cove and Gooseberry Cove (along the Cape Shore south of Argentia) (Catto et al. 1999).

There are major seabird colonies at or near the mouth of Placentia Bay, with smaller colonies located on inner islands and along the coastlines of Placentia Bay. Cape St. Mary's Seabird Ecological Reserve (an Important Bird Area), is located at the mouth of Placentia Bay and is the most important breeding area in Placentia Bay. Cape St. Mary's was established as an ecological reserve in 1983 and covers 64 km^2 (54 km^2 of this is in the marine environment). During the breeding season, it is home to 24,000 Northern Gannet, 20,000 Black-legged Kittiwake, 20,000 Common Murre and 2,000 Thick-billed Murre. In addition, greater than 100 pairs of Razorbill and greater than 60 pairs of Black Guillemot nest at the Reserve, as do Double-crested and Great Cormorant and Northern Fulmar (Newfoundland and Labrador Department of Environment and Conservation 2011). The adjacent marine environment is an important wintering site for thousands of sea ducks, including Harlequin Duck, Common Eider, scoter and Long-tailed Duck.

5.1.6.2 Offshore

Although there are likely important feeding areas for fish, marine birds, marine mammals and sea turtles, particularly in localized upwelling areas that may be associated with the channels and slopes, there are no designated Marine Protected Areas in the offshore area. The WREP is within the Placentia Bay-Grand Banks Large Ocean Management Area (DFO 2007).

DFO has identified Ecologically and Biologically Sensitive Areas (EBSAs) within the offshore portion of the Placentia Bay-Grand Banks Large Ocean Management Area (DFO 2004). The Southeast Shoal and Tail of the Banks EBSA: is the only shallow sandy offshore shoal in the Large Ocean Management Area; is the only known offshore spawning site for capelin; is the single nursery area of the entire stock of yellowtail flounder; contains the highest benthic biomass on the Grand Banks; and contains relict populations of blue mussel, wedge clam and capelin associated with beach habitats.

The Northeast Shelf and Slope EBSA is on the northeastern Grand Bank and has been identified as an EBSA because portions of the area are known for: two important coral areas at Tobin's Point and Funk Island Spur (Canadian Parks and Wilderness Society (CPAWS) 2009); spring aggregations of spotted wolffish (listed as threatened under SARA and assessed as threatened under COSEWIC); high spring concentrations of Greenland halibut; and aggregations of marine mammals, particularly harp seals, hooded seals and pilot whales.

Lily Canyon-Carson Canyon EBSA has as a high proportion of Iceland scallops known to occur in the canyons, as well as year-round aggregations of marine mammals for feeding and overwintering (CPAWS 2009). The EBSA remains highly productive, and the deeper parts of the canyons are relatively undisturbed.

The Virgin Rocks EBSA is known to attract aggregations of capelin and marine birds and support spawning and breeding of Atlantic cod, American plaice and yellowtail flounder, although these species are known to spawn elsewhere (CPAWS 2009).

The NAFO Ecosystem Working Group has proposed a number of Vulnerable Marine Ecosystems, including many of the canyons along the shelf edge, seamounts and knolls, the Southeast Shoal, cold seeps, and carbonate mounds and hydrothermal vents, in the NAFO regulatory area. Canyon Vulnerable Marine Ecosystems can support diverse biological communities, including sensitive structure-forming coldwater corals and deep sea fishes (Gordon and Fenton 2002; Rutherford and Breeze 2002). Candidate Vulnerable Marine Ecosystems are identified within the context of managing deep sea fisheries and their potential environmental implications of these activities. Thirteen offshore canyons, which occur along the continental shelf break, have been identified as potential Vulnerable Marine Ecosystems. There is one seamount chain, the Newfoundland Seamounts, located in deep water beyond the continental slope and one isolated knoll, known as the Beothuk Knoll that have been identified as potential Vulnerable Marine Ecosystems (NAFO 2008).

5.2 Socio-Economic Environment

Newfoundland and Labrador has undergone strong economic growth during the past decade, during which the primary economic drivers have been offshore oil production and mining. The Newfoundland and Labrador Department of Finance (NLDF) reports that the provincial real gross domestic product (GDP) increased 58.8 percent between 1997 and 2010, with approximately half of this growth attributed to oil and gas production (NLDF 2011a). After enduring the global recession in 2009, real GDP grew by an estimated 6.1 percent in 2010, fuelled by investment growth and a rebound in exports. Real GDP growth and employment growth in the province were the highest among provinces for 2010. Economic conditions remained robust in Newfoundland and Labrador in 2011, with a forecasted real GDP increase of 4.9 percent (NLDF 2011a). The provincial unemployment rate now stands at 12.7 percent, having decreased each year since the 2009 recession (NL Statistics Agency 2012). Economic expansion is expected to continue as a result of investment in major projects, including Vale Newfoundland & Labrador Limited's nickel processing facility in Long Harbour, the IOC mining expansion in Labrador City, the Muskrat Falls development, the Hebron oil project and planned expansion projects for the Hibernia and White Rose oil fields.

The province’s economic performance over the last decade marks a recovery from the economic downturn of the 1990s. Newfoundland and Labrador has experienced a long period of population decline, which was largely due to economic consequences of the 1992 fisheries moratorium. This blow to the economy was reflected in high unemployment rates (20 percent in 1992 to 1994), a decline in the labour force, decreases in retail trade and declining housing starts. Census counts show net losses over 15,000 people between 1991 and 1996, nearly 40,000 between 1996 and 2001 and over 5,000 between 2001 and 2006. This period of population decline is also illustrated by interprovincial migration data, which show net out-migration for each year between

1991 and 2006. Population loss, out-migration and unemployment particularly affected rural areas of Newfoundland and Labrador.

The recent period of relative prosperity has influenced demographic changes and the provincial population has stabilized in recent years. In 2008-09, there was a net in-migration for the first time since 1991. Newfoundland and Labrador population estimates for 2009 showed an increase of 0.5 percent compared to the previous year (NL Statistics Agency 2011). This was the first year since 1992 that the province recorded a population increase. By 2010, population estimates had increased by a further 0.5 percent. The 2011 census reports a provincial population of 514,536, representing a 1.8 percent increase since 2006.

The St John's area economy has fared comparatively well by provincial standards over the past decade, and continues to enjoy a boom in economic growth and activity. Real GDP in the St. John's Census Metropolitan Area (CMA) increased by 2.9 percent in 2011 as a result of increased capital investment related to major projects such as the Long Harbour nickel processing facility, the Hebron project and the Hibernia Southern Extension. Other economic measures, such as employment and housing starts, remained strong in 2010 and 2011 after outperforming most other CMAs in Canada during the 2009 recession (NLDF and City of St. John's 2011, 2012). The population of the St. John's CMA has been increasing steadily since 2001. Between 2006 and 2011, the population of the St. John's CMA grew by 8.8 percent to 196,966 (Statistics Canada 2011). The 2011 population counts for both the City of St. John's and the St. John's CMA are the highest on record.

Major projects over the past decade have included construction of the Janeway Hospital, the Mile One Civic Centre and convention facility, The Rooms (provincial art gallery and archives complex), and the Outer Ring Road. Phase One construction of the Team Gushue Highway was completed in 2006 at a cost of $12.8 million, and an extension of the highway is scheduled for completion by 2013. Construction of the Torbay Bypass began in 2008 and was completed in 2011 at a cost of $22.7 million.

The St. John's Airport also underwent a $48 million redevelopment, there was expansion and redevelopment at the St. John's Dockyard (NEWDOCK), the St. John's Port Authority completed a $13 million upgrade of Pier 17, the A. Harvey & Co. wharf (Piers 15 and 16) was upgraded and in 2005 the Bay Bulls Marine Terminal was completed. The Riverhead Wastewater Treatment Facility was completed and commenced operation in September 2009; it provides primary sewage treatment to St. John's, Mount Pearl and part of Paradise (City of St. John's 2011).

Many substantial construction projects are currently in progress or scheduled for the near future in the St. John's Area. Major housing developments include expansions of subdivisions St. John's, Mount Pearl and Paradise. The Canadian Forces base at Pleasantville is being replaced with a new multi-purpose facility at an estimated cost of $150 million. Continued improvements and expansion of the St John's Airport valued at $167.2 million are scheduled for 2011 to 2020. Other current projects include redevelopment of the Royal Newfoundland Constabulary headquarters at Fort Townsend, construction of new residences at Memorial University, construction of a recreation facility in Mount Pearl and extension of the Conception Bay South Bypass. Proposed projects include the Henry Bell condominiums, the Fortis office building and the Eastport Properties office building in downtown St. John's, as well as the

construction of a new Metrobus Depot and a new mental health facility to replace the Waterford Hospital (NLDF 2011b).

Economic conditions in the Argentia area are not as strong as in the St. John's area, but a relatively diverse economy and a proximity to several large industrial projects have enabled a stronger economy than many other rural areas of the province. However, the area has not avoided the population decline experienced by the province as a whole. According to the 2011 census, the population of the Argentia area is approximately 7,600, which represents a decline of 8.8 percent since 2001, when the population was over 8,000. In 2011, 1.5 percent of the total provincial population was living in the Argentia area. This percentage has decreased over the past 20 years. As the largest community in the Argentia area, Placentia had 3,643 residents in 2011 (Statistics Canada 2011). This represents a population decline of over 30 percent since 1991, when the population stood at over 5,500.

The economy in the Argentia area is diversifying. Argentia is the site of port facilities and an industrial park, which houses several fabrication operations that provide employment to the area (AMA undated). Argentia is also the site of a Marine Atlantic terminal for ferry service to North Sydney, Nova Scotia. In 2010-2011, Marine Atlantic made substantial capital investment to upgrade the Argentia terminal building and added a new vessel, the *MV Atlantic Vision*, to service the Argentia-North Sydney Route (Marine Atlantic 2011).The fishery, marine and agriculture industries are still important for the area and the tourism industry has continued to develop, with Placentia as a regional centre for cultural heritage tourism (Avalon Gateway 2009). The Vale Newfoundland & Labrador Limited nickel processing facility under construction in Long Harbour is expected to provide local employment and create spin-off business opportunities for new and existing companies. The processing facility will have an annual capacity of 50,000 tonnes of nickel. The value of the project is estimated at $2.8 billion, with capital expenditures of $817 million expected in 2011 (NLDF 2011b). Construction in the Argentia area will also continue with further upgrades to the Marine Atlantic shore facilities and the replacement of the Sir Ambrose Shea Lift Bridge in Placentia, a project valued at $26 million. Other project developments that will affect the economy and demographics of the area include the Hebron Project at Bull Arm, as well as potential fabrication and marine transport opportunities at Argentia (Avalon Gateway 2010).

5.3 Potential Environmental Effects

Valued Environmental Components (VECs) have been identified and defined based on the understanding of the nearshore and offshore WREP areas. The definition, basis for selection, assessment boundaries (including proposed data sources and limitations) and potential interactions with the WREP components are presented in Table 5-1. The VECs may be further refined during the course of the environmental assessment based on the Scoping Document, stakeholder consultation and additional data gathering and analysis.

Table 5-1 Potential Valued Environmental Components to be Assessed in the White Rose Extension Project Environmental Assessment

VEC	Definition	Basis for Selection	Information Source(s) and Boundaries	Potential Interactions (Before Mitigation)			
				Construction	Operation and Maintenance	Decommissioning	Malfunctions and Accidental Events
Atmospheric Environment	• Ambient air quality	• Protection of human health and safety, as well as ecological heath and aesthetics • Provisions of federal *Canadian Environmental Protection Act* and *Air Quality Regulations* under the NL *Environmental Protection Act* • Concerns with greenhouse gas emissions	• Air pollutant and noise dispersion modelling to determine zone of influence for construction and operating emissions • Spatial boundaries limited to within areas that can reasonably be affected by the WREP • Scope of assessment limited to air quality and greenhouse gas emissions from Project activities	• Effects on ambient air quality from dust and construction vessel emissions	• Effect on ambient air quality (including air pollutants and greenhouse gases) due to drilling operations • Air emissions associated with supply vessels • Fugitive emissions	• Effects on ambient air quality from dust and vessel emissions	• Effect on ambient air quality (including air pollutants and greenhouse gases)
Marine Fish and Fish Habitat	• Habitat quality and marine fish and shellfish species	• Concern with protection of marine fish and shellfish diversity • *Fisheries Act*	• Assessment based on existing information and habitat characterization survey at Argentia and at White Rose field • Spatial boundaries limited to areas that could reasonably be affected	• Habitat alteration and/or direct mortality associated with construction • Avoidance of nearshore area due to construction activities	• Habitat alteration • Attraction to drilling platform (reef effect) • Deposition of water-based and synthetic-based (at subsea drill centres only) cuttings	• Habitat degradation or alteration associated with decommissioning	• Habitat degradation or alteration and direct mortality from oil spill • Effects on prey species

VEC	Definition	Basis for Selection	Information Source(s) and Boundaries	Potential Interactions (Before Mitigation)			
				Construction	Operation and Maintenance	Decommissioning	Malfunctions and Accidental Events
Commercial Fisheries	• Commercial fish species	• Importance of commercial fishery to area fishers	• Assessment based on existing information (DFO statistical information) and consultation with nearshore and offshore fishers • Spatial boundaries limited to areas that could reasonably be affected	• Exclusion of fishing activities during construction (e.g., flowline installation)	• Exclusion of fishing activities in vicinity of WHP and/or subsea drill centres	• Regain access in exclusion area(s)	• Decrease in value of harvested species due to (perceived) tainting of product from an oil spill; fouling of gear from an oil spill
Marine Birds	• Marine bird species	• Concern with protection of marine bird species diversity • *Migratory Birds Act*	• Assessment based on existing information • Spatial boundaries limited to areas that could reasonably be affected	• Avoidance of nearshore area due to construction activities	• Attraction of birds to WHP and/or MODUs/supply vessel • Direct mortality from routine activities or interaction with WHP/MODU/ supply vessel/flare	• Disturbance due to decommissioning activities	• Habitat degradation or alteration and direct mortality from oil spill • Effects on prey species
Marine Mammals and Sea Turtles	• Marine mammals and sea turtle species	• Concern with protection of marine mammals and sea turtles species diversity • *Fisheries Act*	• Assessment based on existing information • Spatial boundaries limited to areas that could reasonably be affected	• Avoidance of nearshore area due to construction activities	• Attraction to WHP and/or MODUs	• Disturbance due to decommissioning activities	• Direct mortality from oil spill • Effects on prey species

VEC	Definition	Basis for Selection	Information Source(s) and Boundaries	Potential Interactions (Before Mitigation)			
				Construction	Operation and Maintenance	Decommissioning	Malfunctions and Accidental Events
Species at Risk	• Marine fish, marine bird, shorebird, marine mammal and sea turtle species at risk	• Concern with protection of species at risk (marine fish, marine birds and shorebirds, marine mammals and sea turtles) • SARA • NL *Endangered Species Act* • COSEWIC assessment	• Assessment based on existing information • Spatial boundaries limited to areas that could reasonably be affected	• Habitat alteration and/or direct mortality associated with construction	• Attraction to WHP/MODU/ supply vessel	• Disturbance due to decommissioning activities	• Habitat degradation or alteration and direct mortality from oil spill • Effects on prey species
Sensitive Areas	• Eelgrass beds, capelin beaches, saltmarshes, designated Marine Protected Areas and other vulnerable marine areas	• Important habitat for various species and/or life cycle stages	• Assessment based on existing information • Spatial boundaries limited to areas that could reasonably be affected	• Habitat degradation or alteration from construction activities	• None identified (i.e., no proximity of sensitive areas in offshore)	• None identified (i.e., no proximity of sensitive areas in offshore)	• Habitat degradation or alteration from oil spill (in both nearshore and offshore areas)

6.0 Health, Safety, Environment, Quality and Security

Husky is strongly committed to protecting its employees, contractors, general public, assets and the environment in which we operate. This commitment is clearly communicated in its Health, Safety and Environment Policy. Healthy, safe, secure, reliable, injury and incident-free operations are key to Husky's success. This commitment requires compliance with all applicable laws and regulations, facilities that are designed and operated to a high standard and the systematic identification and management of safety, health, security and environmental risks.

Husky has developed the Husky Operational Integrity Management System (HOIMS) as a systematic approach towards operational excellence. HOIMS includes 14 fundamental elements; each element contains well defined aims and expectations.

- Leadership, Commitment and Accountability
- Safe Operations
- Risk Assessment and Management
- Emergency Preparedness
- Reliability and Integrity
- Personal Competency and Training
- Incident Management
- Environmental Stewardship
- Management of Change
- Information, Documentation and Effective Communication
- Compliance Assurance and Regulatory Advocacy
- Design, Construction, Commissioning, Operating and Decommissioning
- Performance Assessment and Continues Improvement.

Husky ensures compliance with HOIMS and regulatory requirements through the implementation of effective management systems and processes as well as the availability of adequate resources. The Atlantic Region's management system includes plans for ice management, waste management, oil spill response and contingency plans for emergency events.

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