

**Amendment to the Husky White Rose Drill Centre Environmental Assessment****Canada-Newfoundland and Labrador Offshore Petroleum Board**

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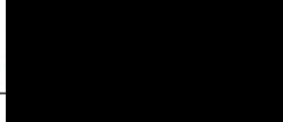
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*Revised based on review comments received on June 8, 2016.*

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## 1.0 Introduction

In May 2007, Husky Energy received a determination from the Canada-Newfoundland Offshore Petroleum Board (C-NLOPB) under the Canadian Environmental Assessment Act that based on the Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment (CEAR No. 06-01-17410) and Addendum, the Project would not likely cause significant adverse environmental effects. Annual environmental assessment (EA) updates confirm that the proposed program activities fall within the scope of the previously assessed program and indicate if the EA predictions remain valid. The C-NLOPB's Screening Report for the Project provides a summary description of the Project, the biological and physical environments and effects assessment (<http://www.cnlopb.ca/pdfs/hedc/hescrrpt.pdf>).

The Project proposed development of up to five new drill centres within the White Rose Field. Construction activities also included installation of drilling templates and other subsea equipment in the drill centres to support production operations. Subsea flowlines would connect new drill centres with existing ones which in turn connect to the SeaRose FPSO.

Two of the five drill centres have been excavated to date, the North Amethyst Drill Centre (NADC) and the South White Rose Extension (SWRX). There were a total of 54 wells proposed for these five drill centres, but only 13 have been drilled to date. 10 wells have been drilled at NADC and 3 at SWRX.

Given the development nature of the project, timelines were proposed for particular activities. Construction of the drill centres and installation of the drilling templates and flowlines for example, were proposed from 2007 to 2015. These activities have been completed for the existing drill centres. Production operations were proposed from 2009 to 2020 and are ongoing. At the time of application, drilling activity was planned to be completed by 2015, but there are several wells remaining to complete the development.

This document is intended to assess drilling activity within the North Amethyst and South White Rose Extension drill centres from 2016 to 2020 to determine if there were any changes to the conclusions within original environmental assessment and subsequent updates.

The following sections provide an overview of this proposed modification to the Project as originally described and assessed, including an analysis of any implications to the EA's predicted environmental effects, the mitigation measures that have been identified and proposed by Husky Energy for the Project, and thus for the overall findings and conclusions of the Drill Centre EA.

This amendment to the Drill Centre EA is a focused assessment of the proposed change in temporal scope and does not repeat all of the detailed environmental information and analysis provided in the Drill Centre EA. Instead, hyperlinks are provided to relevant documents if further background information is required.

## 2.0 Project Description

Under the original Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment (September 2006: <http://www.cnlopb.ca/assessments/hedc.php>) and subsequent Addendum (January 2007: <http://www.cnlopb.ca/pdfs/hedc/heearpt.pdf>) (Drill Centre EA), there were several activities assessed in order to develop additional resources within the White Rose Field, including:

- Drill Centre Excavation & TGB Installation;
- Drilling and Completions;
- Subsea Production Equipment Installation;
- Subsea Flowline Installation and Tie-ins;
- Production Operations; and
- Abandonment

Excavation and the subsea equipment installations and tie-ins have been completed for SWRX and NADC (Figure 2-1). Production operations are ongoing and will continue under the necessary authorizations for the life of the White Rose Field.

Within the Drill Centre EA, up to 16 wells were assessed in each of NADC and SWRX. To date, Husky has completed 10 wells at NADC (from 2010 to 2014) and 3 at SWRX (2013 to 2015). Husky estimates 1 additional well is required at NADC and up to 8 wells at SWRX from 2016 to 2020. Drilling activities will continue to be conducted by a mobile offshore drilling unit (MODU) at each drill centre, with potential for concurrent drilling at another location within the White Rose Field. All activities reviewed under the Drill Centre EA will remain within the White Rose Safety Zone as depicted in Figure 2-1.

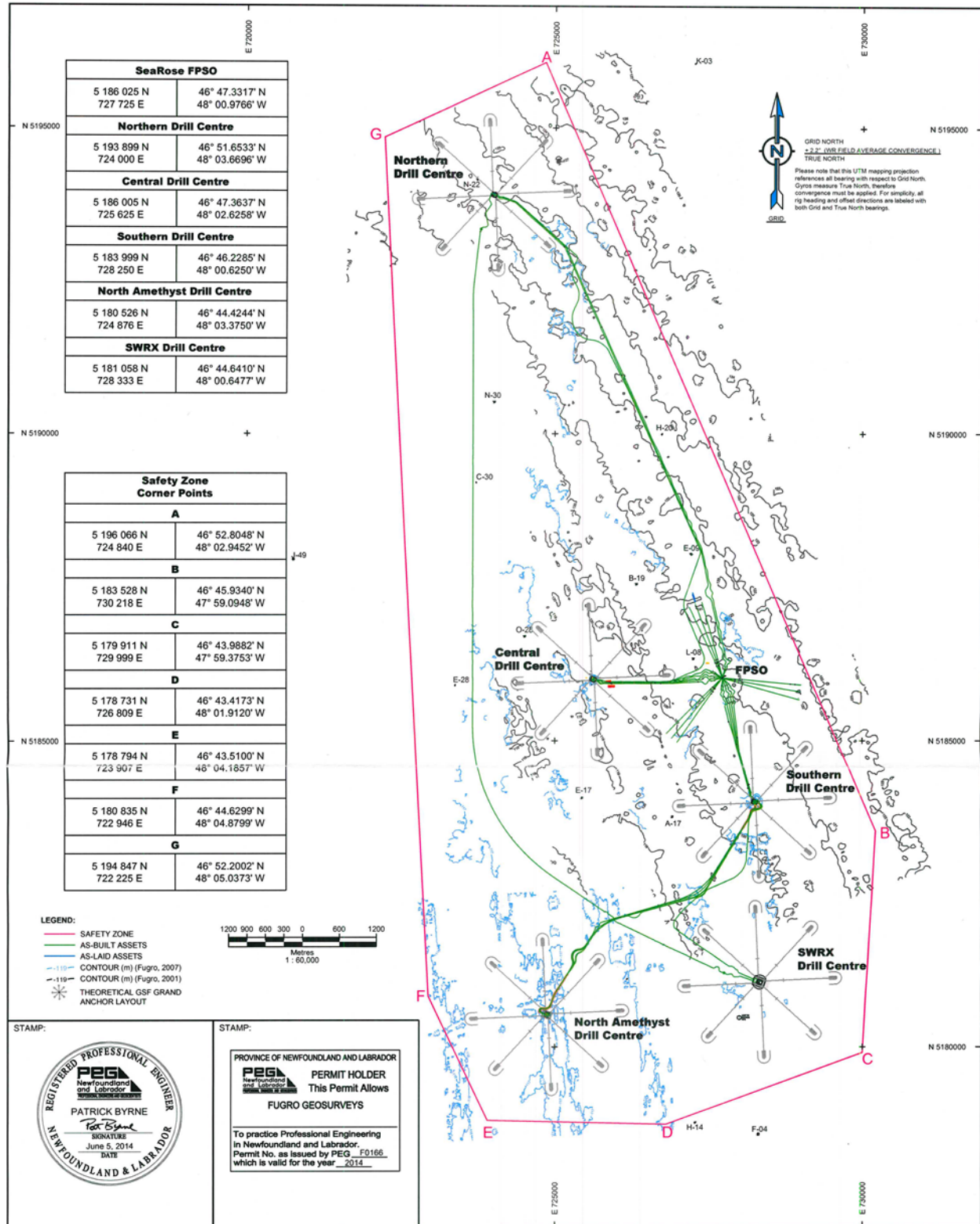


Figure 2-1 – White Rose Field Layout

Drilling practices employed to drill conductor and surface hole sections will continue to be applied to mitigate the impact of drill cuttings and cement spillage into the drill centre. Specifically, guar gum sweeps, cuttings transport systems and reduced excess cement will be used. Synthetic-based muds will be used to drill the intermediate and production hole sections. Best available technology will continue to be used to minimize synthetic drill mud on cuttings. Existing cementing practices will also continue to be applied. Conductor and surface casing strings will be cemented to the seafloor, and subsequent strings will be cemented in such a manner to ensure that the movement of formation fluids in the casing annulus is prevented and the reservoir zone is isolated. Well completions will be designed to maximize well productivity while maintaining the necessary standard of risk and well integrity. Detailed design of the drilling and completions programs for wells will be addressed in the individual Approval to Drill a Well (ADW) applications.

There is one change planned to current drilling activities. Starting in 2016, Husky is planning to increase the riserless surface section hole size from 16" (406 mm) to 17 ½" (445 mm). The increase in diameter of the surface section generates a subsequent increase of approximately 20 percent in cuttings volume during that section of drilling. The increase in diameter will also require approximately 50 m<sup>3</sup> more water based mud (WBM) to be used and an additional 62.3 m<sup>3</sup> of cement per well (See Section 4.0).

All operational discharges during drilling will be in compliance with Husky's Environmental Protection and Compliance Monitoring Plan (EPCMP) for the drilling installation. Any substances, wastes, residues or discharges not identified in the EPCMP are not permitted for discharge.



### 3.0 Boundaries

The boundaries of the Project as defined in the 2006 EA Report and 2007 EA Addendum are as follows:

Boundary	Description
Temporal	Year-round from 2007 to 2015 for construction, drilling and pre-production activities. Year-round from 2009 to 2020 for production operations. After 2020 for abandonment activities.
Project Area	Where project activities will occur in any given year within SWRX (SDLs 1043 and 1044; EL 1045), North Amethyst (SDLs 1043 and 1044; EL 1045), WWRX (SDLs 1024, 1025, 1028; PL 1006), and NWRX (SDL 1028). See Figure 3-1.
Study Area	Based on the oil spill trajectory modeling conducted for the White Rose Oilfield Comprehensive Study and the Drill Centre EA. See Figure 3-1.

The only change proposed to the spatial or temporal scope of the Drill Centre EA is to extend the temporal boundary for drilling from 2015 to 2020.

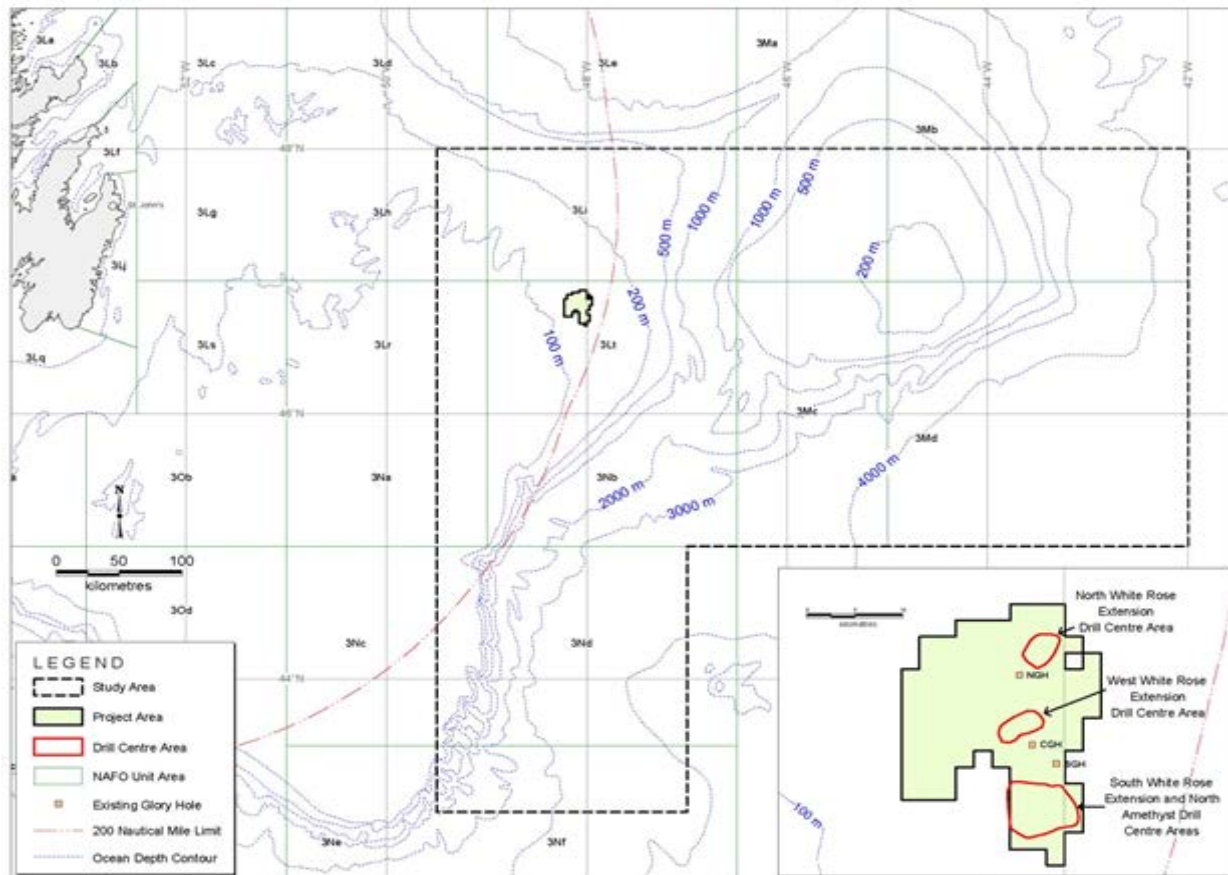


Figure 3-1 - Locations of the Project Area, the Study Area and the Three Proposed Drill Centre Areas

## 4.0 Effects Assessment

As described in Section 2, the only change in Husky's drilling practices since the Drill Centre EA, is the increase in surface well diameter from 16" (406 mm) to 17 ½" (445 mm), resulting in a 20 percent increase in cuttings generated and slight increases in WBM and cement required for this section. The conductor and surface sections of the well are drilled with WBM and since the riser is not yet in place, the drilling mud and cuttings from the top part of the hole are discharged alongside the hole onto the seabed. The main component of WBM is seawater and the primary additives are bentonite (clay), barite and potassium chloride. Other chemicals such as potassium chloride, caustic soda, soda ash, viscosifiers, filtration-control additives and shale inhibitors are added to control mud properties. Low toxicity chemicals are used for the water-based drilling mud to reduce the effect on the environment. The additional cuttings and WBM generated from the increase in diameter of the surface section will not increase the footprint of the discharge to the seafloor, but we may expect a proportional increase in the thickness of the cuttings pile, WBM and cement footprints.

Once the riser is in place, the synthetic based mud (SBM) and cuttings are brought to the surface for cleaning and recycling. The riser provides a conduit from the seabed to the rig through which drilling mud and cuttings move back to the surface mud system. Once on board the rig, the drill cuttings are removed from the mud in successive separation stages and discharged. Some mud remains with the discharged cuttings. The treated cuttings are discharged via a chute below the water's surface. The mud and cuttings are dispersed in the water column and settle on the sea floor with the heavier particles near the hole and the fines at increasing distances from the rig. The main component of SBM is a white synthetic based oil called Pure Drill IA-35. This drilling fluid is used by all operators on the East Coast and has been demonstrated to be non-acutely or chronically toxic through operator and government testing (Payne et al., 2000). The other additives are primarily the same as WBM, mostly barite (weighting agent with other additives).

The original Drill Centre EA was based on the operational discharges from a drilling operation of 16 wells in each of five drill centres over 60 months. For the purposes of this addendum, we will assess the effect of extending the temporal scope of drilling within the NADC and SWRX drill centres only. There is no increase in the number of wells. In fact, the total number of wells in each drill center will be less than originally assessed.

The Drill Centre EA assessed the effects of drilling up to 54 wells in five drill centres. To date, there have been only 13 wells drilled in two drill centres. An additional 9 wells are planned in two existing drill centres to the end of 2020. The outcome is less than half the original level of activity and associated discharges as originally assessed, even with a 20 percent increase in the diameter of the surface section of the well. The Drill Centre EA concluded 500 m as the radius of each well's biological zone of influence (ZOI) (i.e., potential smothering due to a minimum of one centimetre thickness of deposited cuttings and mud), there would be essentially 100% overlap of the ZOIs of adjacent wells within a single drill centre. Deposition from adjacent wells in any single drill centre will accumulate vertically (i.e., overlap of individual well biological ZOIs). Given the almost complete overlap of well ZOIs in each drill centre, the occasional occurrence of concurrent drilling is insignificant in terms of cumulative effects.



The Drill Centre EA concluded no significant effects from the operational discharges of drilling on any Valued Ecosystem Component (VECs) of fish and fish habitat, commercial fisheries, marine birds, marine mammals, sea turtles or species at risk. As reiterated in the annual EA updates for this Project, there has been no change to the effects predictions during the described Project activities. Changes to the SARA listed species and commercial fisheries have been re-evaluated each year of the Project since 2007 and will continue during the temporal scope of this Addendum. As per the Husky 2015 EA Review (<http://www.cnlopb.ca/pdfs/hejdar/revea2015.pdf>), none of the recovery plans for SARA-listed species in place materially change the mitigation measures currently committed by Husky for the scope of the operations addressed by the environmental assessment because critical habitat has not been identified within the Study Area. Environmental conditions within the Project Area are not expected to change significantly throughout the remaining duration of this assessment, but the annual EA updates will account for any changes.

Continuation of activities associated with drilling within NADC and SWRX from 2016 to 2020 will not change any of the effects predictions within the original Drill Centre EA. From the models used to describe the dispersion of operation discharges in the Drill Centre EA, we can expect drill cuttings and muds from subsequent wells to be deposited over existing cuttings. The actual number of wells to be drilled for this Project will be 22 in total, as compared to the 54 wells in the Drill Centre EA. The risk of an accidental event is therefore less and the total amount of operational discharge and emissions are proportionately less. Having a mobile offshore drilling rig (MODU) in operation for an extra five years does protract the potential interactions due to associated noise, lights and the physical presence of the structure. However the magnitude, duration, frequency, geographic extent, and/or reversibility of the EA predictions for these interactions do not change as a result. The mitigations measures committed to in the Drill Centre EA remain sufficient to ensure the associated effects of drilling activities are not significant.

Ongoing EA reviews will ensure that any changes to commercial fisheries and species at risk will be re-assessed if necessary. The White Rose environmental effects monitoring program will continue to monitor the effects of production operations, including drilling.

## 5.0 Conclusion

With the exception of the above described temporal scope extension, no other aspect of the proposed Project is planned to change as compared to that which was described and assessed in the original EA Report. Moreover, all of the mitigation measures and commitments outlined in the EA Report would remain applicable and will continue to be implemented and adhered to by Husky Energy. This proposed amendment therefore does not change the results of the Drill Centre EA.

Husky regards the environmental predictions and mitigations cited in the Drill Centre EA and subsequent significance determinations as still valid and re-commits to implementing these mitigation measures for the activities to be carried out under the scope of this assessment this year.

The potential environmental effects of drilling activities as described are assessed to be not significant when evaluated against the assessment definitions and criteria applied to the valued ecosystem components addressed in the Drill Centre EA.

With the implementation of the mitigations as outlined in the Drill Centre EA, no significant residual environmental effects are predicted from the continuation of routine activities associated with drilling activities within the NADC and SWRX drill centres from 2016 to 2020.