Cenovus Energy West White Rose Project (WWRP)
Environmental Assessment Drill Cuttings Amendment
Review Comments

WH-HSE-GM-0064, Rev 1

SPECIFIC COMMENTS

Fisheries and Oceans Canada (DFO)

Comment 1 - Section 2.4 Summary of Updated Modelling, page 3 of 10
A more detailed description of modelling results would be helpful, such as thicknesses (maximum, average) at various distance ranges from the origin, as was provided for the original drill cuttings deposition model.

Cenovus Response

SINTEF Ocean AS (SINTEF) has conducted a lifecycle analysis of different methods for handling solids during and after drilling operations (West White Rose Platform Solid Control Drill Cuttings Dispersion Modelling – WH-DAC-RP-0019). SINTEF used the Dose-related Risk and Effects Assessment Model (DREAM) to assess environmental risk in combination with the resulting discharges of the remaining waste to the marine environment after different solid treatment options (shaker / dryer vs. Thermomechanical Desorption Unit).

DREAM includes tailored modules for modelling transport and fate of the discharged solids and chemicals including nearfield modelling, dispersion, advection, and settling, as well as biodegradation, oxygen depletion, grain size change and burial with resulting restitution time for the sea floor and impacted sediments.

Environmental risk is measured in terms of an environmental impact factor (EIF) which is defined as a reference area (seafloor) and volume (water column) where the risk for a negative impact on 5% or more of the most sensitive species is considered above accepted levels and contributes to the EIF.

The modelling results show that due to the design geometry of West White Rose Platform (WWRP), the majority of large-particle cuttings will accumulate on the base caisson roof and perimeter cells of the Concrete Gravity Structure (CGS) and not reach the sea floor; however, the remaining sea floor area exhibits risk above accepted levels for oxygen depletion and grain size change in different degrees for the considered cases.

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Comment 2 - Section 3.1 Findings of the Original Environmental Assessment, page 5 of 10, paragraph 2
The Proponent should provide a brief explanation as to why Sensitive and Special Areas and Fisheries VCs do not need to be assessed. Revision recommended.

Cenovus Response

The maximum extent of the 1.5 mm drill cuttings is entirely within the White Rose Safety Zone (see Figure 2.1 in the Environmental Assessment (EA) Addendum Report).

The nearest federally designated Sensitive and Special Areas is a small Significant Benthic Area of small gorgonian corals located 110 km west of the WWRP and spotted wolffish critical habitat located 60 km northeast of the WWRP (Figure 1). The nearest internationally designated Sensitive and Special Area is a shrimp closure area located 15 km from the White Rose Safety Zone (Figure 2).

No commercial fishing occurs within the White Rose Safety Zone. While fishing does occur east of the White Rose Safety Zone, there has been no commercial fishing activity in the area of the White Rose Safety Zone for at least the past decade (Figure 3).

Comment 3 - Section 3.2 Summary of Existing Conditions, page 5 of 10
To assist DFO in completing a risk assessment to evaluate effects on fish and fish habitat, we would appreciate if the Proponent could provide a description of the habitat within the updated modelled dispersion area (0.1 mm boundary), as well as in the vicinity. The Proponent has provided information on aquatic species (including species at risk). If there is additional information on species in the updated modelled dispersion area (0.1 mm boundary), that would also be appreciated.

Cenovus Response

Environmental Effects Monitoring (EEM) Stations 21 and WWRP2 are within the 0.1-mm boundary. Particle size analysis characterized Station 21 as 97.9% sand, 3.4% gravel, 0.89% clay, and 0.81% silt. Station WWRP2 was characterized as 96.2% sand, 1.40% gravel, 1.39% silt, and 1.01% clay. This is consistent with the White Rose field as a whole, and as in previous years, sediments collected in 2022 were predominantly comprised of sand. Median gravel content was 0.9%, median organic carbon content was 0.9 g/kg, and median percent fines (i.e., silt and clay fractions combined) content was 1.45% (Cenovus, in prep.)[1].

Station 21 has a long / large benthic invertebrate dataset and Station WWRP2 was sampled during the recent (2022) EEM cycle. In 2022, Station 21 recorded a maximum of 172 individuals in 24 taxa and Station WWRP2 recorded 381 individuals in 31 taxa. The majority of individuals were polychaetes, and included Ampharetidae, Cirratulidae, Opheliidae, Orbiniidae, Paraonidae, Spionidae, and Terebellidae (comprising a combined 126 (73%) and 262 (69%) individuals at Stations 21 and WWRP2, respectively) (Cenovus in prep.).

[1] Cenovus Energy. In Preparation. *White Rose Environmental Effect Monitoring Program 2022: Volume 1*.

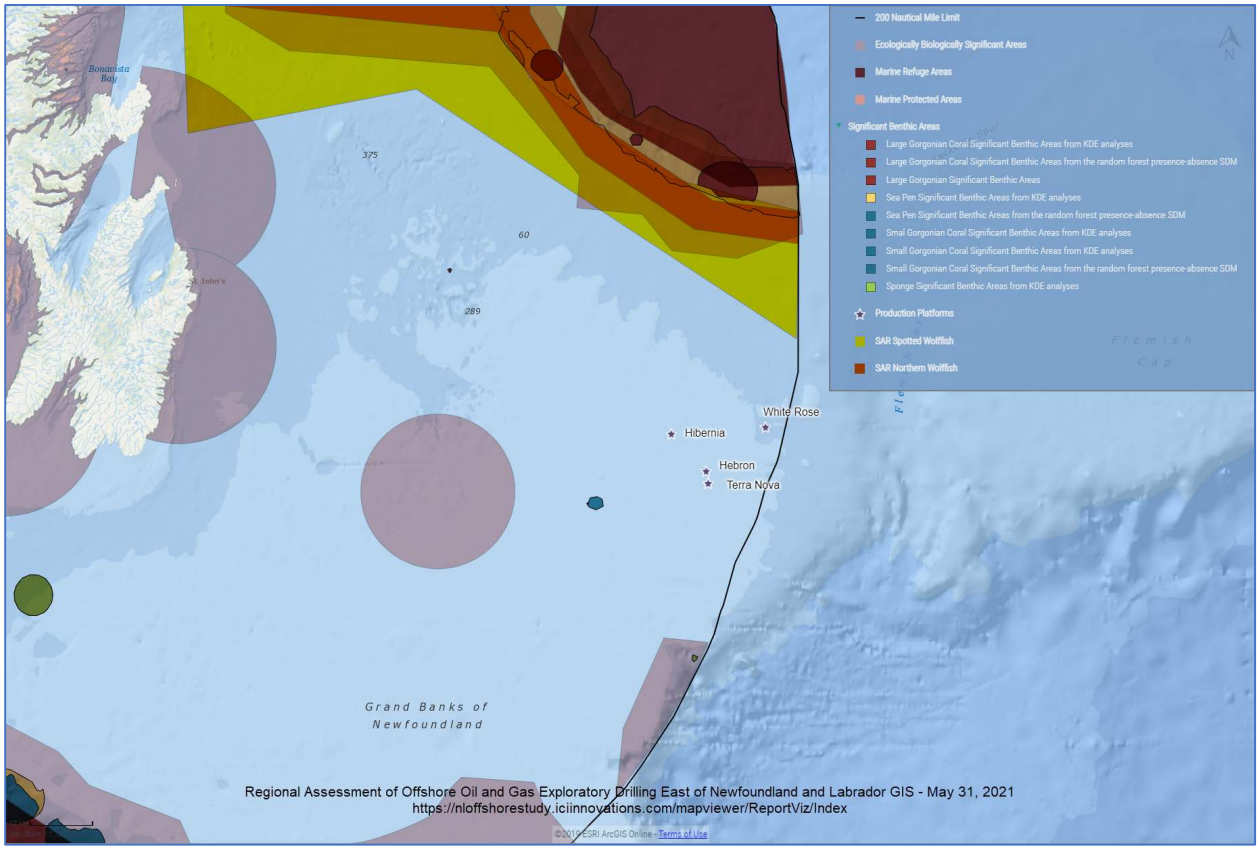

Figure 1 Federally Designated Sensitive and Special Areas in Vicinity of the White Rose Field

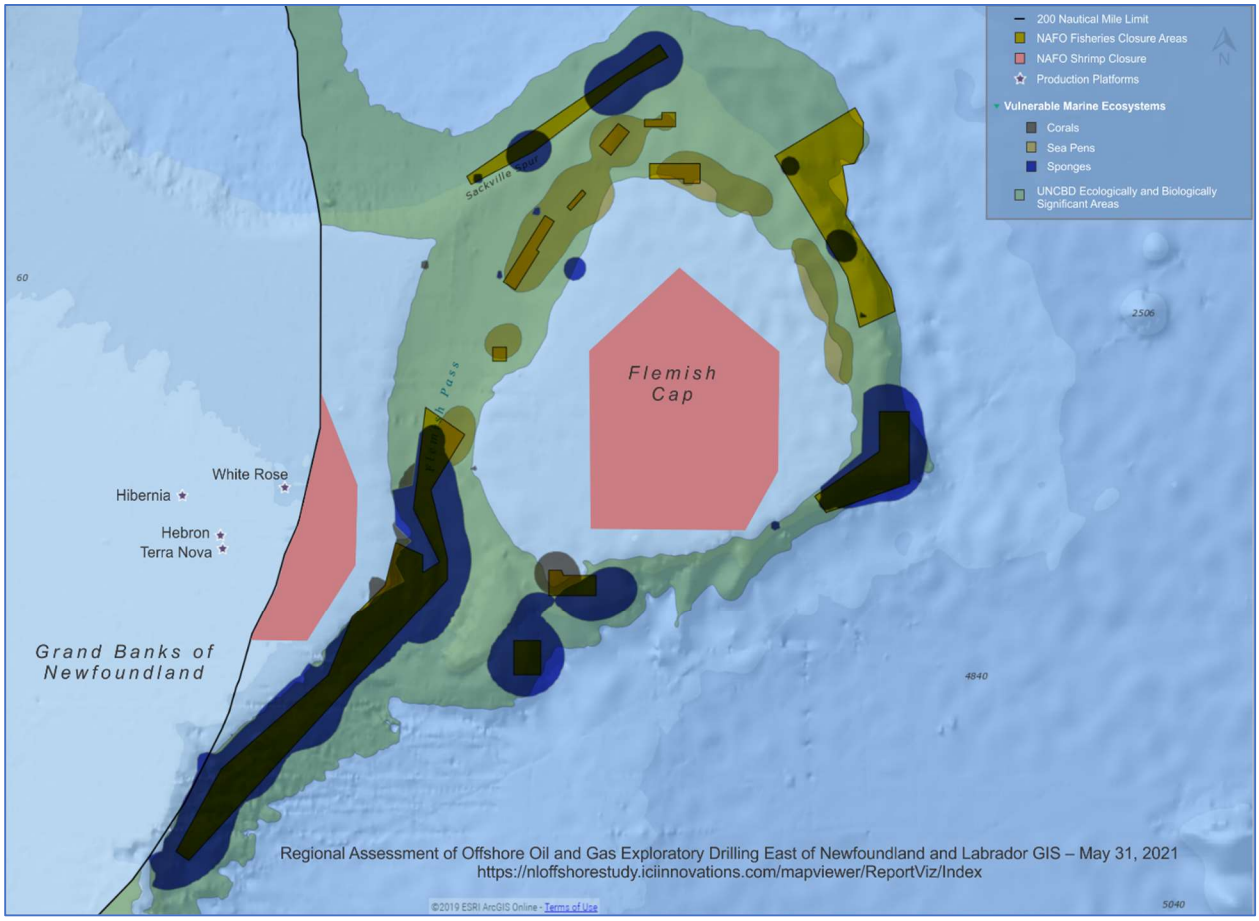

Figure 2 Internationally Designated Sensitive and Special Areas in Vicinity of the White Rose Field

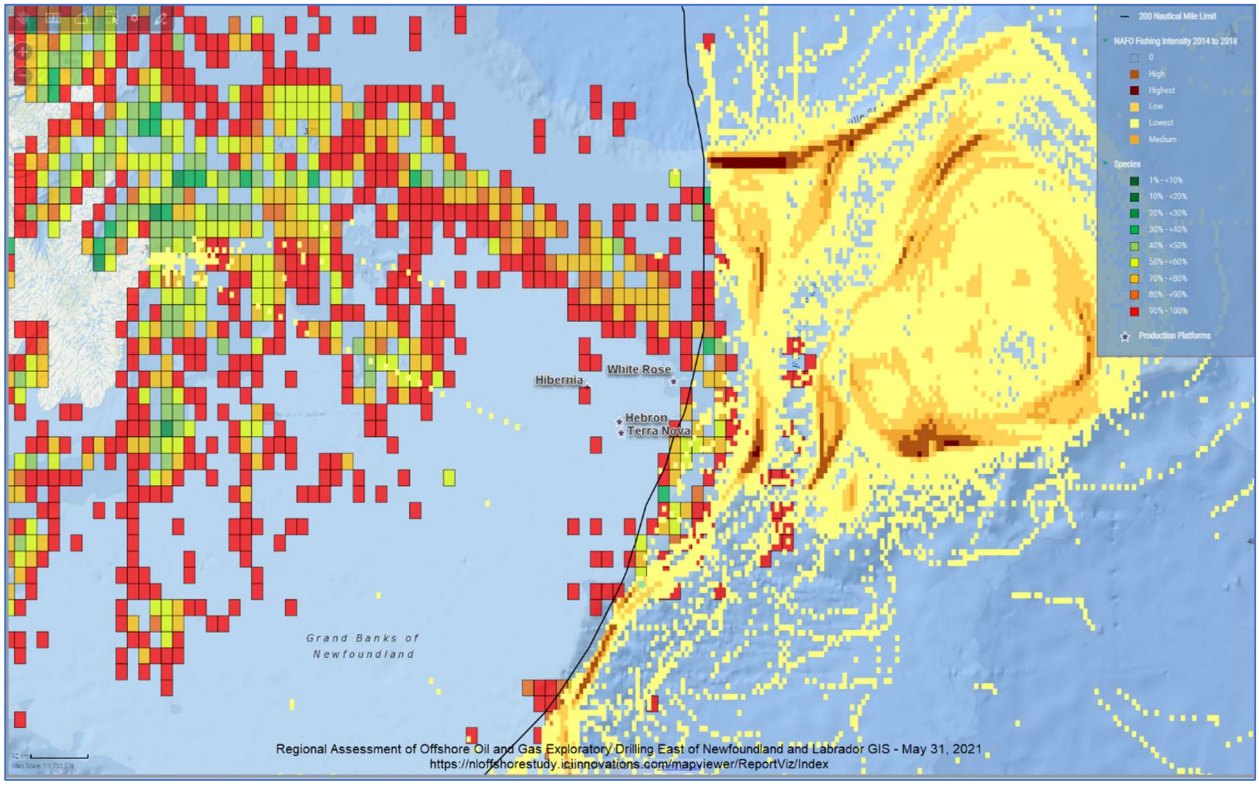

Figure 3 Domestic and International Fishing Intensity in Vicinity of the White Rose Field

Comment 4 - Section 3.3 Assessment of Proposed Project Modifications, pages 5 of 10 to 6 of 10
Recommend that additional justification be provided for the assessment of potential residual adverse environmental effects, especially regarding magnitude and duration. It would be useful if the Proponent described results from other EEM programs in similar environments. Additionally, if there are EEM programs with cuttings volumes that would be comparable to West White Rose, these results should also be discussed.

Cenovus Response

The Hebron oil field is located offshore Newfoundland and Labrador in the Jeanne d'Arc Basin, approximately 350 km southeast of St. John's. The Hebron Platform is located in water depths of approximately 93 m, approximately 46 km southwest of the White Rose development. Like the White Rose Field (including WWRP), the primary particle size for all stations was sand, with concentrations ranging between 77% to 99%, while secondary particle size varied per sample (ExxonMobil Canada Properties 2023)[2]. Like the WWRP, the Hebron (and Hibernia) Development (a gravity-base structure) has a single point-source discharge, including drill cuttings. However, Hebron (and Hibernia) only discharges water-based drill cuttings, as synthetic-based mud (SBM) drill cuttings are re-injected.

Similar to the EEM results for White Rose, the Hebron EEM results (ExxonMobil Canada Properties 2023) indicated that higher concentrations of barium, $>C_{10}$-C_{21} hydrocarbons, and $>C_{21}$-C_{32} hydrocarbons were found within 500 m of the drilling platform, aligning with the Hebron EIS drilling waste fate modelling, which predicted highest levels of drill solids deposition to occur within 500 m. Like White Rose, the lowest values of the monitoring parameters included in the Hebron EEM program (including number of taxa, evenness, and diversity index) were mainly found in the near-field, and like White Rose, polychaetes were the most abundant taxa observed.

Comment 5 - Section 4.0 Mitigations / Commitments, page 7 of 10, bullet 2
There is no active *Fisheries Act* Authorization for this project. This bullet should be removed.

Cenovus Response

Noted and removed.

GENERAL COMMENTS

Fish, Food and Allied Workers Union (FFAW-Unifor)

Overall, FFAW-Unifor does not agree that effects on fish and fish habitat in this instance are not significant. We have concerns from this amendment surrounding the discharging SBM drill cuttings into our shared marine environment. This amendment minimizes the risks imposed on fish and fish habitats and subsequently the fishing industry as a whole. The addition of any foreign material, including SBM

[2] ExxonMobil Canada Properties. 2023. *Hebron Platform Environmental Effects Monitoring Program (2020): Volume I – Interpretation*. Prepared by WSP E&I Canada Limited for ExxonMobil Canada Properties, St. John's, NL. 185 pp.

drill cuttings, no matter the magnitude, jeopardizes the health of the ocean and the resources our members rely on.

The implication throughout this amendment that adverse environmental effects on fish species due to the discharge of SBM drill cuttings are not considered significant if they do not exist beyond one generation is extremely concerning to our members. Any impact on fish biomass or resource availability is significant and potentially detrimental to the economic opportunity of fish harvesters and the profitability of their catch. Furthermore, fish harvesters do not support predictions throughout this amendment that all adverse environmental impacts will be mitigated. This is a very strong statement to make considering it is prediction-based.

Language such as "predominantly non-toxic, highly localized effects, low toxicity and low bioaccumulation effects" are misleading and minimize the admitted impacts imposed on the marine environment with the release of SBM drill cuttings. The ocean is a highly dynamic environment and commercial species are not equally distributed throughout. Impacts within the established safety zone can and likely will affect marine flora and fauna throughout the water column to spread elsewhere.

Oxygen depletion due to biodegradation of chemicals from SBM cuttings treated with the Shaker + Dryer + Centrifuge technology discussed in this amendment have admitted, direct and indirect effects on fish habitat, prey availability, and fish injury and mortality. Environmental changes associated with the deposition of these drill muds can last up to five years or more. Benthic populations in particular face the threat of potentially irreversible changes. Sediment contamination and its effects on benthos has not yet translated into effects on resource availability but this remains to be seen. These threats impact fishing now and may have far-reaching consequences not yet considered.

Cenovus Response

The Grand Banks is a mature (20+ years) oil production area and EEMs conducted around the four production platforms have yet to indicate a measurable effect on fisheries resources on the Grand Banks.

Baseline for the White Rose Development was conducted in 2000 and 2001. EEM programs have been conducted in 2004, 2005, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, and 2022. In 2020 (Cenovus Energy 2023)[3], compounds in the $>C_{10}$-C_{21} and $>C_{21}$-C_{32} hydrocarbon range were detected in all American plaice liver samples. As in previous years, additional Gas Chromatography / Mass Spectrometer analysis did not indicate the presence of drill fluid or petroleum hydrocarbons in those samples. It has been speculated in previous EEM reports (Husky Energy 2011[4], 2013[5]) that these compounds are natural in origin and perhaps diet related.

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[3] Cenovus Energy. 2023. *White Rose Environmental Effect Monitoring Program 2020: Volume 1*. Prepared by Stantec Consulting Ltd. for Cenovus Energy, St. John's, NL. xv + 242 pp.

[4] Husky Energy. 2011. *2010 White Rose Environmental Effects Monitoring Program*. Prepared by Stantec Consulting Ltd. for Husky Energy, St. John's, NL.

[5] Husky Energy. 2013. *2012 White Rose Environmental Effects Monitoring Program*. Prepared by Stantec Consulting Ltd. for Husky Energy, St. John's, NL.

Sediment contamination and effects on benthos noted in the 2020 EEM program, and in previous years, have not translated into effects on the fisheries resources, as indicated by fish health assessment and taint tests. No project-related tissue contamination was noted for crab or plaice, neither resource was tainted, and American plaice health was similar between White Rose and more distant Reference Areas. EEM results from 2020, as well as those from previous years, continue to support the EA prediction of no significant effects on fish.

Deep-Sea Research II published a special issue on the EEM results of the first ten years of drilling at the Terra Nova offshore oil development. This included an examination of body burden and taint on American plaice, which is also a species collected at the White Rose development. With the exception of one liver sample in 2000 noted to have hydrocarbons resembling SBM fluids, there has been no evidence of contamination by hydrocarbons or metals in American plaice fillets or livers (DeBlois *et al.* 2014)[6]. Nor has there been evidence of taint of American plaice from Terra Nova (or Hibernia [Hibernia Management and Development Company 2023][7] or Hebron [ExxonMobil Canada Properties 2023]).

FFAW-Unifor supports ongoing effects monitoring through Cenovus' environmental effects monitoring program. Further clarity on when in Q2 2023 this newly designed program will be completed is welcomed. We are pleased to see revisions will be made to the existing contingency plans and the various outlined mitigation measures, however, it is not clear when these plans will be finalized beyond "prior to the onset of activities."

Cenovus Response

The revised EEM design report (Cenovus 2023)[8] program was approved by the C-NLOPB on July 13, 2023.

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

[7] Hibernia Management and Development Company Ltd. 2023. *Hibernia Environmental Effects Monitoring Program (2020): Volume I – Interpretation (Final)*. Prepared by WSP E&I Canada Limited for Hibernia Management and Development Company, St. John's, NL. 240 pp.

[8] Cenovus Energy. 2023. *White Rose Environmental Effects Monitoring Design Report*: Revised 2023. ii + 30 pp. Available at: https://www.cnlopb.ca/wp-content/uploads/eem/Cenovus-Energy-White-Rose-Environmental-Effects-Monitoring-2023-Revised-Program-Design-Report.pdf