

Wintershall Noordzee BV P.O. Box 1011 NL 2280 CA Rijswijk Netherlands DEPA Industrial Division J.nr. 2022 - 29374 Ref. hebec Date 24. October 2023

Att. Arthur van Dalen

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Permit for use of chemicals for P&A activities at Rayn Platform

With reference to § 3 of the Danish "Order on discharge into the sea of substances and materials from offshore oil and gas facilities and on monitoring in the sea around the facilities" Bek. No. 571 of May 23, 2023, DEPA hereby grants permission to use the chemicals as applied for the plug and abandonment operations of the Ravn installation wells.

Background

Wintershall Noordzee BV (Wintershall) has by mail dated August 21, 2023 to the Danish Environmental Protection Agency (DEDPA) and subsequently by mail on October 2, 2023 with further information, applied for the use of chemicals for the plug and abandonment operations of the Ravn installation wells. The application of chemicals is scheduled to take place early 2024.

The list of chemicals is provided in Annex I to this permit. A total of 33 chemicals will be used for the operation. Twenty four of the chemicals are classified as green, seven are classified as yellow and two are classified as red.

Except for a rig wash product (Tristar ECO Rig Wash HD-E) and a jacking grease product (Statoil Multidope) *none* of the remaining applied chemicals will be discharged to the sea. This is informed by Winterhall by mail dated August 21, 2023 and confirmed by mail dated October 2, 2023.

DEPA Comments

DEPA has checked the eco toxicological features of the chemicals and agree to the assessments of the classification sent by Wintershall.

DEPA has asked for clarification, that the chemicals will not be released to the sea after use. Wintershall has by mail dated October 2, 2023 elaborated that the operation takes place at a depth 1500 meter under sea surface and chemicals are contained below the 13 3/8" casing shoe by a 1500m seawater column, a bridge and cement plug, that are watertight and a cement retainer and cement plug. There is no force to push the fluid out of the well and the fluid density is heavier than seawater.

According to Annex I point 3 c of the Danish "Order on discharge into the sea.... DEPA has sought clarification whether the two red chemicals (D600G GASBLOK*Gas-Migration Control Additive and GASBLOK* LT D500) are the best choice, in terms of technical, safety and environmental perspective compared to other chemicals with similar function but with better environmental profile.

Wintershall has by mail dated October 2, 2023 responded, that the two red chemicals are the only and best choice to mitigate the gas migration below the 13 3/8" casing shoe. The two chemicals are mixed (significantly diluted) with the cement and permanently remain in the cement at the 13 3/8" casing shoe when the cement is hardened. The two chemicals in the cement plugs are under 1500m of seawater in the well and below a cement retainer and surface cement plug below sea floor. The previously used chemicals with similar functions and better environmental profile did not work.

Finally, DEPA has sought clarification on the fate of the two chemicals - rig wash product (Tristar ECO Rig Wash HD-E) and the jacking grease product (Statoil Multidope) as they will be discharged to the sea.

Wintershall has further, by the mail on October 2, 2023 elaborated - with reference to the EIA for the abandonment of the wells at RAVN - that the rig wash chemicals are significantly diluted before being discharged to the sea and prescreened as a green substance (PLONOR) and therefore the impact is insignificant.

It is informed, that the impact regarding the discharge of the jacking grease is short term (within hours) and the magnitude of the impact is marginal, it is assessed, that the impact of discharge on pelagic organisms is negligible.

Based on the above information, DEPA assess, that with a view to the classification of the rig wash product as green (PLONOR) the discharge of the product is unlikely to have any significant impact on the marine environment. DEPA further asses that the jacking grease will have only marginal - if not negligible - impact on the marine environment, given the amount and the short-term use.

Assessment of impact on the Natura 2000 site

According the EIA for the Ravn wells closure project, discharge of the chemicals – Rig Wash and Jacking grease – the maximum distance for an impact will be <250 meter from the discharge point. DEPA assess that the environmental impact from the use of the chemicals at the Ravn wells closure project has very little or no effect on the Natura 2000 site (Dogger Banke) which is located in a distance of 15 km from the Ravn field.

Wintershall is to be informed, that the use of chemicals is required to be reported to DEPA for the agency's obligation for annual reporting to OSPAR. Hence, use of chemical in early 2024 will have to be reported to DEPA latest by 1. March 2025.

Best regards

Henrik Bechmann Nielsen DEPA – Industry Division

CC – Danish Energy Agency, att. Laura Strøm Magner

Ref: 20230821-AD-E1										
	Product Name	Product function	Classification/pre-s	4	Use of chemicals			Discharge of chemicals		PR Number
					I/d	t/d	t/year	I/d	t/year	
Fluids	M-I BAR	Weighting Agent	Green	4,2			200		0	1154758
	Citric Acid	pH control	Green	2,2			1		0	701692
MI Swaco	ONECLEAN	Detergent	Yellow	1,2			10		0	4343159
	Defoam Plus NS	Defoamer	Yellow	1,1			1		0	2429813
	Duovis	Viscosifier	Green	2,2			4		0	412232
	Sodium Bicarbonate	pH Control	Green	2,2			2		0	336787
	Sugar	Cement Retarder	Green	2,2			2		0	1899864
	Calcium Chloride Brine	Base Fluid	Green	1,36			350		0	988603
	Caustic Soda	pH control	Yellow	2,1			2		0	336808
	Lime	pH control	Green	2,2			2		0	34275
	Safescav HSN	H2S Scavenger	Yellow	1,2			1		0	230386
Cementing	Multifunctional Additive D243	Cement additive	Green				2		0	4271503
	Anti-settling Agent D153	Cement additive	Green				1		0	1005808
Schlumberger	Cement Additive D095	Cement additive	Green				1		0	156125
	Cement Class G D907	Cement	Green				100		0	1005867
	Class G - Silica Blend D956	Cement	Green				100		0	2081968
	Environmentally Friendly Dispersant D240	Cement additive	Green				3		0	2407390
	Expanding Cement Additive D174	Cement additive	Yellow				2		0	1302503
	High Temperature Expanding Additive D176	Cement additive	Yellow				2		0	130251
	Liquid Antifoam D242	Cement additive	Green				20		0	
	Liquid Retarder D81	Cement additive	Green				2		0	
	Mid-Temp Retarder-L D801	Cement additive	Green				2		0	100000
	Uniflac* S D167	Fluid Loss Control Chemical	Green				1		0	21/3/7
	AccuSET Retarder D197	Cement additive	Green				2		0	
	Viscosifier for MUDPUSH II spacer D244	Cement additive	Green				1		0	
	Granulated Salt D44	Cement additive	Green				10		0	100702
	D600G GASBLOK*Gas-Migration Control Additive		Red				1		0	ILULEU.
	GASBLOK* LT D500	Cement additive	Red				1		0	11/011
	Dye D247	Dye	Green				1		0	4443926
	D242 (surface plug)	Antifoam	Green				1		0	242069:
yckerhoff	Cement G (surface plug)	Cement	Green				5,5		0	360576
ristar Industries Nederland B.V.		Detergent / Cleaning Fluid	Green				1		1	1872880
Statoil	Statoil Multidope	Jacking Grease	Yellow				0,5		0,5	1640262