SEPTEMBER 2023
WINTERSHALL NOORDZEE B.V.

RAVN DECOMMISSIONING NON-TECHNICAL SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT

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CONTENTS

1 Non-technical summary

Wintershall Noordzee B.V. has started the planning of the decommissioning of the Ravn field located in the Danish part of the North Sea.

This report includes an Environmental Impact Assessment (EIA) of the decommissioning of the Ravn platform and pipelines and focus on the environmental impacts related to the offshore activities related to this.

The platform will either be sent onshore for dismantling or for temporary storage for reuse. These two options will only be described briefly as these activities will be covered by the environmental permits and other permits for the specific disposal yard/location of storage.

The cleaning of the topside, the pipelines and umbilical has been carried out prior to the decommissioning and there is no further cleaning needed for the topside, pipelines and umbilical. The cleaning scope includes;

- Removal of tanks etc. from topside
- Flushing, purging and cleaning of the topside, pipelines and umbilical

Thus, these processes are not a part of the decommissioning and are not included in the present EIA. Any cumulative effects are covered in chapter 14.

The plug and abandonment program of the wells in relation to the Ravn field has been included in EIA screenings and/or EIAs and are subject to an independent approval process and for that reason are not included in the present EIA. The EIA screenings have been sent to the Danish Energy Agency (DEA) on 8th of July 2022. The plug and abandonment of the wells will take place before the actual decommissioning and thus no cumulative effects are expected, and this activity will not be assessed further in this EIA. Thus, the EIA will not contain information on discharges from chemicals used for plug and abandonment, underwater noise and emissions from rig and vessel activities, unplanned discharges, and spills in relation to wells.

1.1 The project

The Ravn field is developed as an unmanned oil production offshore platform, tied-back to the German A6-A platform. Production export is through subsea infrastructure to the German platform and no processing takes place at Ravn.

The platform is located in the Greater Ravn area in license 5/06, Block 5504, approximately 245 km from the Danish west coast and 11.3 km northeast of the border between Germany and Denmark.

The platform is located at position 55°52'50.2" N, 4°14'5.4" E (ETRS89), see Figure 1-1. The water depths around the site are consistently between 48 and 50 m LAT.

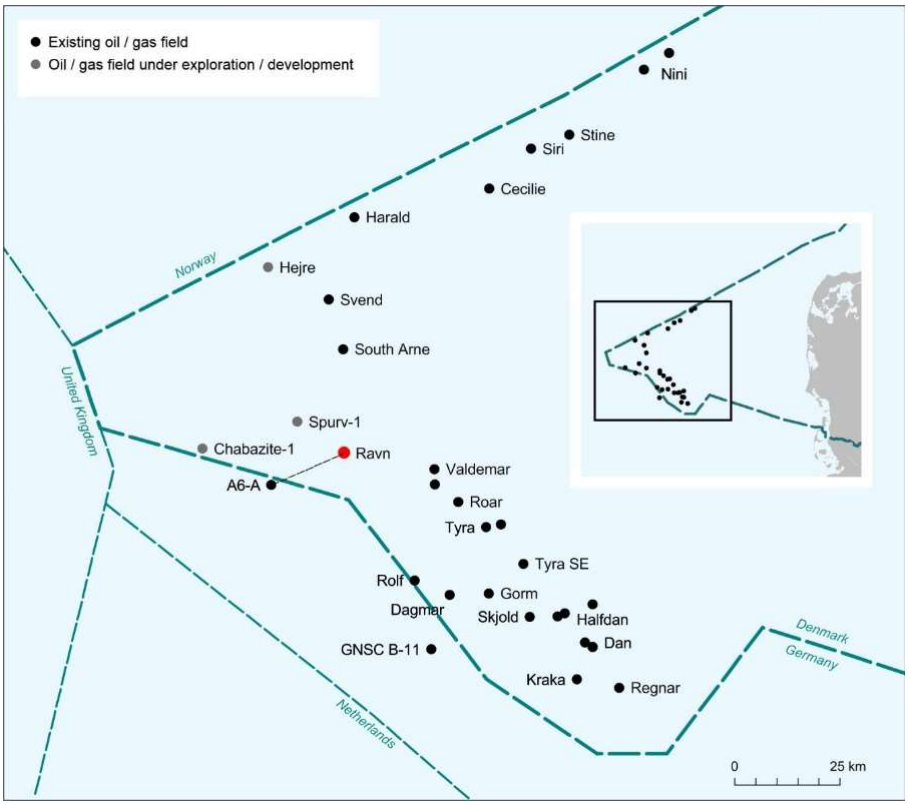

Figure 1-1 Location of the Ravn field in the North Sea.

The offshore facilities consist of a minimum facility platform with 2 wells no longer in operation and 2 pipelines (an 8" multiphase production pipeline, a 3" gas lift pipeline, piggy-backed to the 8" pipeline) and an umbilical tied back to the A6-A platform (5.7" umbilical providing chemicals, fiberoptics and electricity to the Ravn platform).

The Danish Ravn platform is located about 15 km from the border with Germany; consequently, the pipelines run through the German North Sea over approx. 3 km and through the Danish waters for the remaining 15 km. At the Danish shelf the pipeline bundle crosses the 40" Europipe I.

The decommissioning project covers:

- Disconnection of pipelines and umbilical at the ends and removal of the spool piece and umbilical sections that have been cut.

- Removal of topside and jacket
- Decommissioning of pipelines. 4 alternatives included:
    - Leaving in situ
    - Removal of materials above seabed
    - Removal by reversed installation or
    - Removal by cut and lift
- Post decommissioning site surveys

The platform will either be sent onshore for dismantling or for temporary storage for reuse. These two options will only be described briefly as these activities will be covered by the environmental permits and other permits for the specific disposal yard/location of storage.

1.2 Alternatives

The 0-alternative is a situation in which the present project is not carried out. However, as decommissioning is required as per OSPAR 98/3 the 0-alternative is not possible, and therefore not further assessed.

Different technical scenarios for decommissioning have been assessed throughout the EIA.

1.3 Existing environment

The Ravn field is located centrally in the North Sea at the northeast border of the Dogger Bank, in a water depth of around 48 m. This is an area with a relatively low biological production. However, the shallow Dogger Bank has been identified as an area which exhibits high primary production throughout the year.

The water is dominated by Atlantic water with a relatively stable salinity of 35-38 ppm and an average temperature of 10-11 °C. Based on an integrated assessment of the chemical status, most of the Danish part of the North Sea is classified as "problem areas" due to a combination of input of contaminants from sources on both land and sea and input from atmospheric deposition.

The sediment around Ravn consists of mud to muddy sand. The benthic fauna includes infauna that lives within the sediments of the seabed and epifauna that lives on the surface of the seabed. The abundance of infauna at the Ravn field is relatively high, whereas the abundance of epifauna species is relatively low compared to other areas in the North Sea. Herring, sprat, and mackerel are the dominating pelagic fish species at the Ravn field. The dominating demersal fish species include whiting, haddock, dab, long rough dab, plaice, and grey gurnard. Cod, plaice, lemon sole and mackerel spawn in the project area.

The waters around Ravn are not important for sea birds. During winter, some seabirds may however be encountered in the area, not because the area is of importance for these species, but because they are distributed over the entire North Sea during winter.

Harbour porpoise is the most common species of cetacean in the North Sea and is regularly encountered in the waters around the Ravn field, although the area is not a core area for the species. Harbour seals and Grey seals are also regularly sighted around oil and gas fields in the

North Sea although they tend to be coastal species. 15 km south of the Ravn field is the Dogger Bank, a designated Natura 2000 area in Germany (SAC DE 1003-301 Doggerbank), Netherlands (SAC NL 2008-001 Doggerbank) and the UK (SAC UK003,352). Dogger Bank is designated to protect the habitat type Sandbanks (1110) and the species Harbour porpoise (1356) and Harbour seal (1365).

Valuable and vulnerable areas (SVO-areas) have been designated as marine protected areas in Norway. The closest SVO to Ravn is the Sandeel field South bordering the Danish Exclusive Economic Zone (EEZ).

1.4 Assessment of impacts and environmental risks

1.4.1 Impacts that have been assessed

Below is an overview of the potential impacts related to the decommissioning of Ravn and conditions that potentially may affect organisms and other environmental features that have been assessed in the EIA.

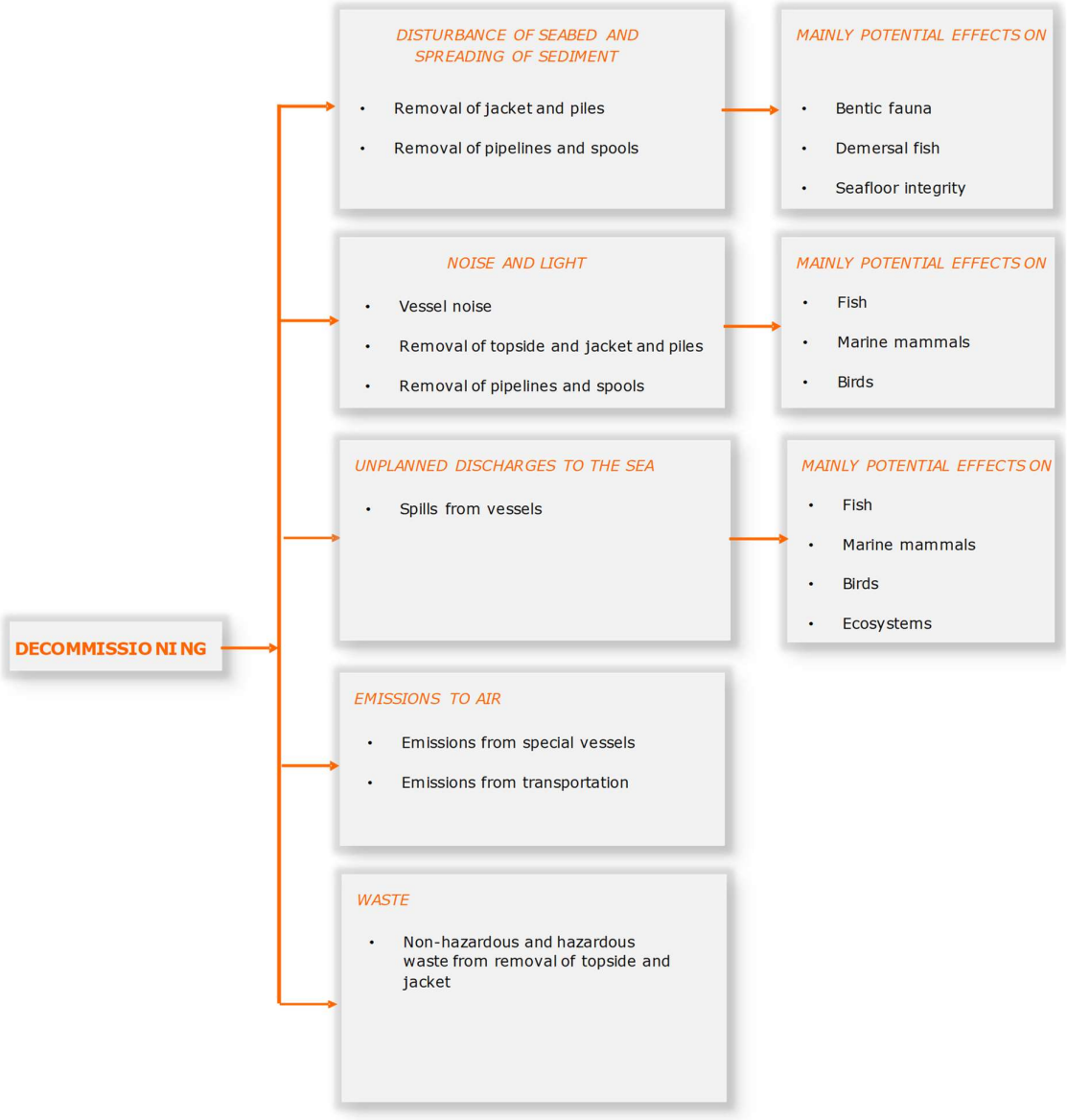

Figure 1-2 Overview of potential environmental impacts from Ravn decommissioning and effects on environmental components.

1.4.2 Severity and risk of impacts

Environmental severity and risks of different project activities and incidences have been assessed. Environmental risk is defined as the combination of the severity and impact of an activity/incidence and the probability that the impact will occur.

The severity of an impact has been defined by combining criteria for:

- The nature of the impact (Positive or negative)
- Extension of the impact (Local, regional, national, or international)
- Duration of the impact (Short-term, medium-term, or long-term)

- Magnitude of the impact (Small, medium, or large)
- Reversibility (whether an impact is permanent, reversible or irreversible)

By combining these criteria in a predefined manner, the following severity categories have been used: Positive impact, no impact, minor impact, moderate impact, or major impact.

The probability that an impact will occur has been defined as very low, low, probable, highly probable, or definite.

1.4.3 Impacts during decommissioning of pipelines

Before the decommissioning of the pipelines and umbilical the cleaning and disconnection of the pipeline and umbilical ends will be conducted. The disconnection will be done by installing a hydraulic isolation plug and disconnecting the subsea pipeline flange and cutting of the spools. The ends have been covered with gravel to protect the ends against fishing activities. In compliance with regulations, the pipeline cleaning programme has been designed to ensure the hydrocarbon content and any deposits within the pipelines are sufficiently cleaned.

Four methods are assessed for decommissioning of pipelines in the Danish part of the North Sea:

- Leaving in situ, where the pipelines and the umbilical are left in situ
- Removal of materials above seabed and pipelines and umbilical are left in situ (stabilization of pipeline ends and at crossing with rock placement)
- Removal of pipelines by reverse installation
- Removal of pipelines by cut and lifting

Leaving the pipelines in situ will result in gradual dissolvement of the pipeline coating buried under the sediment). However, the impact on benthic flora and fauna is expected to be negligible. There will be no or very limited impact on benthic fauna and seabed integrity from physical disturbance of the seabed if the pipelines are not removed. Removal of the pipelines will on the other hand result in physical disturbance and loss of benthic fauna both within the footprint of the pipelines but also as they are buried under settled material.

In addition, removal of pipelines will result in dispersion of sediments in the water column. Physical disturbance and sediment dispersal are assessed not to impact spawning fish stocks. The seabed integrity and marine fauna is expected to recover within 2 years after removal and backfilling of the trench.

Underwater noise is related to vessels used during the removal activities in addition to noise created by the potential removal of the pipelines. The underwater noise is expected not to cause hearing damage of mammals. The mammals may however exhibit avoidance behavior during the decommissioning activities, but it's expected that they will return to the area. Fish may flee from noisy areas, but this will not affect fish populations.

Waste related to pipelines consists mainly of the steel pipes, concrete mattresses at the ends and the pipeline coating. Depending on the selected decommissioning method, the amounts of waste can range from minor (left *in situ*) to substantial (complete removal).

During decommissioning of pipelines there will be emissions to air in relation to vessel activities. The emissions are assessed for the four different decommissioning methods for pipelines, as the activities will include different types of offshore vessels such as offshore construction vessels, vessels for rock placement, pipe trench vessels etc. and also result in different length of the offshore work-scope. The worst-case decommissioning scenario for the pipelines in relation to emissions to air, is the cut and lift scenario. The CO2 emissions related to the removal of pipelines by cut and lift are comparable to the yearly emissions from approx. 1,400 Danes or 0.03% of the total Danish emissions for 2020. The impacts related to air quality are assessed to be negligible and relatively low for the impacts related to global warming potential.

1.4.4 Impacts during decommissioning of the platform

Two methods are assessed for removal of the topside and jacket:

- Single-lift removal, where the topside and jacket are lifted in a single lift each
- Piece-small removal, where the jacket is cut into smaller pieces and the topside and jacket are lifted in several lifts

The removal of the platform structures and to some extent disconnection of pipelines cf. the section above will cause disturbance of the seabed and result in removal of hard substrate and associated flora and fauna from the area. Since the fauna living on the platform structures do not represent high biodiversity value, the environmental impact from loss of fauna attached to the physical structures is assessed to be small and local. Because the disturbance will be temporary, short-term, and confined to a small area compared to the potential available living space, measurable impacts on the fish population are not anticipated. The impacts are assessed to be negligible.

Underwater noise is related to the vessels used for removal of the platform in addition to noise generated by the cutting of underwater structures, including disconnection of pipelines and jacket structures. Noisy activities will not exceed the threshold for triggering temporary or permanent hearing damage of mammals or result in impacts on fishes and are thus expected to be negligible.

Light and noise from vessels can potentially impact birds. Lights from the vessels may thus create additional foraging opportunities for gulls that normally forage by daylight, thus supplementing their diets and, potentially, increasing their survival and reproductive success. However, illumination of the vessels may also attract and disorient migratory birds. Since the impacts of light from the vessels is temporary and the magnitude small, it is assessed that the environmental risk is negligible and in no way will affect bird populations. Some loud noise will be generated during decommissioning of platform that will temporarily disturb seabirds locally. This will in no way impact seabird population. Thus, the impacts are assessed to be negligible.

Removal of artificial lights from the platform can cause both positive and negative impacts. There are examples that illumination from offshore platforms under such circumstances can attract and disorient the birds and have a trapping effect that leads birds to circle around the light source. Removal of the artificial light will hereby have a positive effect on especially migratory birds.

Removal of night lights from platform may have negative impact on foraging gulls because light attract prey to the surface waters (zooplankton and/or small fishes). All together the impact is assessed to be negligible.

Emissions to air related to removal of the platform by cutting and lifting is assessed. The CO_2 emissions related to removal of the platform are comparable to the yearly emissions from approx. 140 Danes or 0.003% of the total Danish emissions for 2020. The impacts related to air quality are assessed to be negligible and relatively low for the impacts related to global warming potential. Also, the transport of the platform to shore will generate emissions. The disposal yard is not decided upon yet, but it is expected that the Ravn platform will be decommissioned in the northern part of Europe and thus an estimate of the emissions related to the transport shows that this will only comprise approx. 7% of the emissions related to the removal activities, and thus the impacts are expected to be negligible.

1.4.5 Environmental assessment of an accidental oil spill

Accidental spill of oil can be spilled from the vessels. The risk of a large oil spill (>1 m^3) from a vessel is comparable to the risk related to spills from other offshore vessels operating and is thus very small and the extent will be limited.

1.4.6 Summary of environmental impacts

Below a summary of the environmental risk assessment can be seen related to decommissioning pipeline activities and removal of the platform (Table 1-1, Table 1-2, Table 1-3 and Table 1-4).

For the pipeline activities also the comparative assessment between the decommission methods is summarized, as the overall risk assessment does not capture the short-term effects and thus does not capture the differences between the methods.

Table 1-1 Environmental risk for activities for leaving pipelines in situ.

Impact related to leaving pipelines *in situ*	Severity of impact	Probability of impact	Environmental risk
Impact on benthic fauna from rock placement			N/A
Impact from pipeline corrosion and decomposition	Insignificant impact	Highly probable	Negligible
Impact on sea floor integrity			N/A
Impacts of underwater noise on mammals	Insignificant impact	Probable	Negligible
Impacts of underwater noise on fish	Insignificant impact	Probable	Negligible
Impacts of waste	Minor impact	Probable	Negligible
Impacts of air emissions (NO_X, SO_X)	Minor impact	Probable	Negligible
Impacts of air emissions (CO_2-eq.)	Minor impact	Highly probable	Low

Table 1-2 Environmental risk for activities for disconnect of pipelines and removal of material above seabed.

Impact related to removal of material above seabed	Severity of impact	Probability of impact	Environmental risk
Impact on benthic fauna from rock placement	Insignificant Impact (positive)	Probable	Negligible
Impact from pipeline corrosion and decomposition	Insignificant impact	Highly probable	Negligible
Impact on sea floor integrity	Insignificant	Low	Negligible
Impacts of underwater noise on mammals	Insignificant impact	Probable	Negligible
Impacts of underwater noise on fish	Insignificant impact	Probable	Negligible
Impacts of waste	Minor impact	Probable	Negligible
Impacts of air emissions (NO_X, SO_X)	Minor impact	Probable	Negligible
Impacts of air emissions (CO_2-eq.)	Minor impact	Highly probable	Low

Table 1-3 Environmental risk for activities for removal of the pipelines.

Impact related to removal of pipelines by reverse installation or cut and lift	Severity of impact	Probability of impact	Environmental risk
Impact on benthic fauna from physical disturbance and sediment dispersal	Insignificant impact	Highly probable	Negligible
Impact on sea floor integrity	Minor	Highly probable	Low
Impacts of sediment dispersal on fish stocks	Insignificant impact	Highly probable	Negligible
Impacts of underwater noise on mammals	Insignificant impact	Probable	Negligible
Impacts of underwater noise on fish	Insignificant impact	Probable	Negligible
Impacts of waste	Minor impact	Probable	Negligible
Impacts of air emissions (NO_X, SO_X)	Minor impact	Probable	Negligible
Impacts of air emissions (CO_2-eq.)	Minor impact	Highly probable	Low

Table 1-4 Environmental risk for activities for removal of platform.

Impact of decommissioning activities for platform	Severity of impact	Probability of impact	Environmental Risk
Impacts of disturbance of seabed and benthic fauna	Insignificant impact	Highly probable	Negligible
Impacts of underwater noise on marine mammals	Insignificant impact	Highly probable	Negligible
Impacts of underwater noise on fish	Insignificant impact	Highly probable	Negligible
Impacts of artificial light from vessels	Insignificant impact	Highly probable	Negligible
Impact of noise (airborne) from vessels	Insignificant impact	Highly probable	Negligible
Impacts of removal of artificial light from platform	Insignificant impact	Highly probable	Negligible
Impacts of air emissions (NO_X, SO_X)	Minor impact	Probable	Negligible
Impacts of air emissions (CO_2-eq.)	Minor impact	Highly probable	Low
Impacts of non-indigenous species	Major impact	Very low	Low

From the comparative assessment of the pipeline decommissioning methods both the short-term and long-term impacts can be seen (Table 1-5). From this comparative assessment it can be seen, that leaving the pipelines *in situ* mostly will have an impact on the sea floor integrity due to leaving the pipelines which are not a natural part of the seabed and also the materials from the pipelines will not be recycled. However, looking at the two removal methods these will have larger impact on the benthic fauna, marine growth, and fishes by the physical disturbances and generate larger emissions to air.

Table 1-5: Comparison of the environmental impacts related to the four decommissioning methods for pipelines. The three shadings are used to indicate the difference between the three methods and not the severity of the impact.

Comparative impacts assessed	Left *in situ*	Removal of material above seabed	Removal by reverse installation	Removal by cut and lift
Environment	Least impact on benthic fauna, marine growth, and fish.	Least impact on benthic fauna, marine growth, and fish, but slightly higher than for left *in situ.*	Medium impact on benthic fauna, marine growth and fish.	Medium impact on benthic fauna, marine growth, and fish.
	Least impact on physical disturbance and disturbance on water column.	Least impact on physical disturbance and disturbance on water column, but slightly higher than for left *in situ*.	Medium impact on physical disturbance and disturbance on water column.	Medium impact on physical disturbance and disturbance on water column.
	Least impact on sea floor integrity.	Least impact on sea floor integrity, but slightly higher than for left *in situ*.	Medium impact on sea floor integrity.	Medium impact on sea floor integrity.
Pipeline corrosion and decomposition	Larger impact on the aquatic environment.	Larger impact on the aquatic environment.	No impact as pipelines are removed.	No impact as pipelines are removed.
Underwater noise	Least underwater noise levels with no impacts on mammals and fish.	Least underwater noise levels with no impacts on mammals and fish, but slightly higher than for left *in situ*.	Medium underwater noise levels with no impact on mammals and fishes.	Medium underwater noise levels with no impact on mammals and fishes.
Emissions to air (NO_X, SO_X)	Least amount of emissions due to vessel activities.	Least amount of emissions due to vessel activities, but slightly higher than for left *in situ*.	Medium amount of emissions due to vessel activities.	Larger amount of emissions due to vessel activities.
Emissions to air (CO_2-eq.)	Least amount of short-term emissions due to vessel activities.	Least amount of short-term emissions due to vessel activities, but slightly higher than for left *in situ*.	Medium amount of short-term emissions due to vessel activities.	Larger amount of short-term emissions due to vessel activities.
	Larger amount of long-term emissions due to no recycling potential for the pipeline materials	Larger amount of long-term emissions due to no recycling potential for the pipeline materials and thus an indirect	Least amount of long-term emissions due to recycling potential of materials from	Least amount of long-term emissions due to recycling potential of materials from pipelines and thus

Comparative impacts assessed	Left *in situ*	Removal of material above seabed	Removal by reverse installation	Removal by cut and lift
	and thus an indirect energy use for production of primary materials.	energy use for production of primary materials.	pipelines and thus substitution of primary materials and saved energy related to production.	substitution of primary materials and saved energy related to production.
Waste	Least amounts of waste shipped to shore.	Medium amounts of waste shipped to shore.	Larger amounts of waste shipped to shore.	Larger amounts of waste shipped to shore.
	Least amounts of materials to be recycled and thus no substitution of primary materials/resources. Risk of gradual corrosion and leachate of chemicals in the coating over time.	Medium amounts of materials to be recycled and thus no substitution of primary materials/resources. Risk of gradual corrosion and leachate of chemicals in the coating over time.	Larger amounts of materials to be recycled and thus substitution of primary materials/resources.	Larger amounts of materials to be recycled and thus substitution of primary materials/resources.

1.5 Socio-economic impacts

The platform and pipelines are surrounded by fisheries safety zones to prevent ship collision with the platform and pipeline rupture. After decommissioning of the platform and pipelines, the safety zones can either be removed or extended. The removal of safety zones impact a relatively small area and will not affect fish landings from the area. Ravn is situated far from major shipping lanes and removal of safety zones around the platform will only have a minor positive impact on marine traffic.

1.6 Cumulative effects

The potential cumulative effects of activities in the area around Ravn field have been assessed. There are no significant cumulative impacts in relation to the project. As the effects are considered minor and the removal would happen in a consecutive order (in one process) no cumulative effects are expected. It is expected that the potential impacts will be local in extent. Further, they take place in an area where there is already a significant natural physical disturbance. With the expected local extent for a relatively short period of time, for an activity that will not take place simultaneously, no cumulative effects are expected from removal of the pipelines with reverse installation or cut and lifting.

1.7 Cross border impacts

The only potential cross boarder impact resulting from the decommissioning activities are the release of a maximum of approx. 20,000 tons CO_2 and the activities. Compared to national CO_2 emissions, the release is however insignificant (the total CO_2 emissions for the project are

comparable to the yearly emissions from ca. 1,600 Danes corresponding to 0,03% of the Danish Emissions (2020 numbers)). The CO_2 emissions related to the decommissioning are lower than the yearly emissions from producing platforms, and thus the CO_2 emissions will be reduced from the first year of decommissioning. The activities in regard to disconnection of the pipelines between Ravn and the A6-A in the German sector could result in temporary disturbance of the seabed from spool removal but no cross-boundary effects are expected. If the pipelines were to be removed a larger area of the seabed would be affected but the sedimentation would be local and the potential effects of physical disturbance would be minor. Based on the assessment in section 16.4 of the EIA, the decommissioning activities are expected to be in compliance with the specific protection measures in the Dogger Bank – for more detail see the EIA.

1.8 Natura 2000

Underwater noise caused by topside/jacket removal and pipeline disconnecting activities, accidental spills, and the removal of the pipelines (if applicable) may potentially affect designated species and habitats of Natura 2000 areas. There will however be no impacts in the Danish Natura 2000-areas due to the distance between these and the Ravn field.

The nearest Natura 2000-site is the German DE 1003-301 Dogger Bank area located approximately 15 km from the Ravn field. In general, the potential impacts from underwater noise and accidental spills are expected to be local and for a relatively short period of time.

Decommissioning of the topside and jacket at the Ravn field is therefore not expected to negatively impact the conservation status of habitats and species in this Natura 2000-area. The same accounts for the disconnect scope that needs to be executed prior topside and jacket removal.

There are 18 km of pipelines between the Ravn field and the A6-A platform, where the 3 km of pipelines are located directly in the German DE 1003-301 Doggerbank area. The decommissioning of the pipelines within the Danish waters has been assessed and it has been concluded that neither leaving the pipelines in situ nor removing the pipelines will significantly influence the conservation objectives within the Dogger Bank area negatively. However, leaving the pipelines in situ will cause less disturbance to the seabed.

1.9 Marine strategy Framework Directive (MSFD)

The EU has a marine strategy that aims to maintain or establish a 'Good Environmental Status' (GES) in all European marine areas by 2020. The strategy is implemented in Denmark by the Danish Marine Strategy II. The Marine Strategy II defines what is regarded as 'Good Environmental Status' of the marine environment using 11 different descriptors. For each descriptor a set of qualitative environmental targets and preliminary indicators are set. The impact of the project on relevant descriptors is assessed.

The potential impacts from the Ravn decommissioning project activities are compared with the targets for the 11 descriptors as described in the EIA. These impacts are summarized in Table 1-6 below.

Based on the assessment it is concluded that the Ravn decommissioning activities will not prevent or delay the achievements of good environmental status for each descriptor as defined in the Danish Marine Strategy II.

Table 1-6 Potential impacts on the environmental targets in the Danish Marine Strategy II which implements EU's Marine Strategy Framework Directive (MSFD).

Descriptor	Assessment of potential impact
D1 Biodiversity	Birds may potentially be impacted by light and noise disturbances although impacts are assessed to be negligible. The project area is not considered important for seabirds. Marine mammals may potentially be impacted by underwater noise and disturbance. The noise levels are not expected to cause any hearing damage, but the mammals may exhibit avoidance behaviour. The project area is not assessed to be a core area for marine mammals. The impacts will be temporary and not expected to affect the marine mammal populations.
D2 Non-indigenous species	Vessels may potentially introduce non-indigenous species by growth on the hull or discharge by ballast water, however it is assessed that there is a low risk. Non-indigenous species may use platforms in the North Sea as steppingstones for dispersal, however this risk for the Ravn platform is taken away after the decommissioning.
D3 Commercially exploited fish stocks	The diversity of fish in the Ravn field area is low, as is the fishing intensity. Decommissioning of the Ravn platform may open up more commercial fishing in the area. Decommissioning of Ravn is not expected to impact fish mortality or spawning biomass. There may however be local impacts caused by an unplanned oil spill.
D4 Marine Food webs	The decommissioning of Ravn is not expected to impact the marine food webs in the area.
D5 Eutrophication	The decommissioning of Ravn is not expected to impact the level of eutrophication in the area.
D6 Sea floor integrity	The decommissioning of Ravn may cause physical disturbance of the seabed under the footprint (directly) and increased sedimentation (indirectly) during the removal of the platform and pipelines (if applicable). The physical disturbance is expected to be temporary. The extent of physical disturbance for each habitat type is expected to be reported. The decommissioning of Ravn will decrease the footprint from oil and gas installations in the North Sea.
D7 Hydrographical changes	The decommissioning of the Ravn platform will not cause physical loss of the seabed. There will only be very limited and local temporary impacts.
D8 Contaminants	According to the Danish Marine Strategy Directive II threshold values are decided for PFOS, PBDE, Benz(A)pyrene and mercury. None of these substances are expected to be discharged during decommissioning. Acute pollution events are extremely rare events.
D9 Contaminants in seafood for human consumption	No major discharges of contaminants are expected from the decommissioning activities. Measurable contaminants in fish and other seafood are assessed to only occur because of a major oil spill.

Descriptor	Assessment of potential impact
D10 Marine litter	All general waste is transported to shore. All topside material will be transported to a suitable shipyard on land for decommissioning or storage for reuse. If the pipelines are left *in situ* it can be argued that some waste is left as marine litter, leachates of compounds from degradation and corrosion of the pipelines may potentially introduce plastic, although it is assessed that this risk is negligible as the pipelines are buried within the seabed.
D11 Underwater noise	Very limited (if any) impulse noise is expected during the decommissioning activities. The low frequency noise will not cause hearing damage to the marine mammals but may cause disturbance so the mammals may exhibit temporary avoidance behaviour. This is not expected to impact the populations.

In addition, the Ravn decommissioning project is assessed not to impact any of the monitoring activities described in the monitoring programme under the Marine Strategy Framework Directive, or any of the measures described in the programme of measures.

1.10 Monitoring programme

A post decommissioning monitoring programme will be set up for the Ravn field.

1.11 Mitigating measures

The main structures of the field will be taken to shore for further dismantling or storage for reuse, thereby limiting the work offshore and no waste production is foreseen offshore. Onshore, the dismantling of platform structures and waste sorting will be performed on a regulated site approved for this type of work.

The risk of introducing non-indigenous species from vessels can be mitigated by exchange of ballast water in open waters, by implementing a ballast water treatment system or by regular removal of marine fouling from the vessels sides prior to departure.