Energistyrelsen

TotalEnergies E&P Danmark A/S (TEPDK)
Britanniavej 10, 6700 Esbjerg
Geoteknisk forundersøgelse i Dagny (Nordsøen)
att. Anders Ryegaard

Kontor/afdeling
CCS

Dato
9. august 2024

J nr. 2024 - 7659

/AMMKR

Tilladelse til geotekniske forundersøgelser ved Dagny i Bifrost CCS-projektområde, Nordsøen

Energistyrelsen meddeler hermed tilladelse til, at TotalEnergies EP Danmark A/S (herefter ''TEPDK'') kan udføre geoteknisk forundersøgelse ved Dagny i CO_2-lagrings-licensområde C2023/03.

TEPDK er for samme område indehaver af tilladelse af 3. februar 2023 til efterforskning og anvendelse af undergrunden til geologisk lagring af CO_2 i henhold til § 23 i lov om anvendelse af Danmarks undergrund (undergrundsloven).

Nærværende tilladelse til at udføre geoteknisk forundersøgelse indebærer, at Energistyrelsen godkender udstyr, program og udførelsesmetode til den geotekniske forundersøgelse i henhold til undergrundslovens § 28.

Eftersom projektet er omfattet af § 1, stk. 2 nr. 6 i offshorehabitatbekendtgørelsen[1], har Energistyrelsen foretaget en vurdering af, om projektet i sig selv, eller i forbindelse med andre planer og projekter, kan påvirke et internationalt naturbeskyttelsesområde væsentligt, jf. bekendtgørelsens § 3, stk. 1. Energistyrelsen har endvidere foretaget en vurdering vedrørende beskyttelse af visse arter, jf. § 5, stk. 1.

Tilladelsen er gyldig fra d. 9. august 2024 til og med d. 30. november 2024.

Tilladelsen forudsætter, at rettighedshaveren gennemfører arbejdet inden for de fysiske og miljømæssige rammer samt forudsætninger, der fremgår af ansøgningen og væsentlighedsvurderingen, jf. Environmental Significance Assessment Report (ESAR) bilag 2.

Godkendelse af udstyr, program og udførelsesmetode
Energistyrelsen godkender hermed udstyr, program og udførelsesmetode for den ansøgte geotekniske forundersøgelse, som det er beskrevet i væsentlighedsvurderingen i bilag 2, jf. undergrundslovens § 28 stk. 1.

[1] Bekendtgørelsen nr. 846 af 26 juni 2024 om administration af internationale naturbeskyttelsesområder og beskyttelse af visse arter ved videnskabelige undersøgelser, forundersøgelser, efterforskning og indvinding af kulbrinter, lagring i undergrunden, rørledninger, m.v. offshore.

Energistyrelsen

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T: +45 3392 6700
E: ens@ens.dk

www.ens.dk

Vilkår for tilladelsen

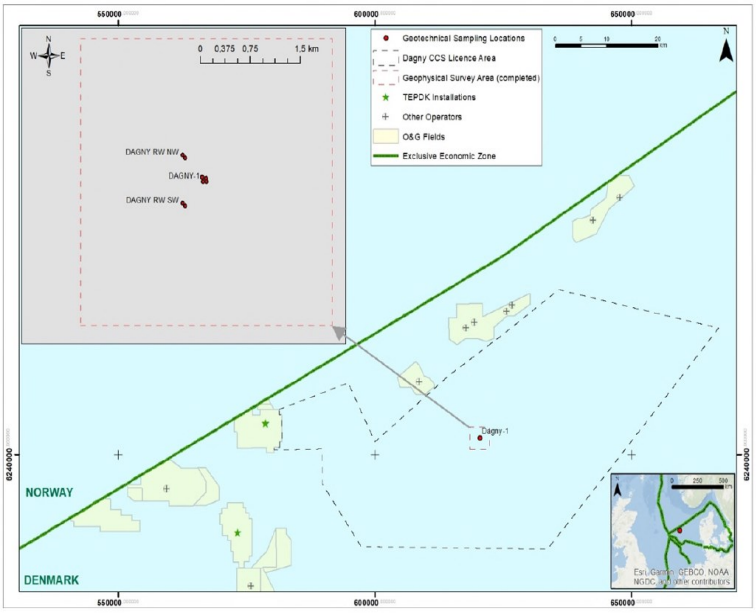
Tilladelsen meddeles på følgende vilkår, jf. undergrundslovens § 28, stk. 4 og § 28 a:

1. Tilladelsen er gyldig fra d. 9. august 2024 til og med d. 30. november. 2024.
2. Undersøgelsen skal udføres i overensstemmelse med *Standardvilkår for forundersøgelser til havs – August 2018*, jf. bilag 3.
3. TEPDK skal udfylde skemaet *NoiseRegisterTemplate*, jf. bilag 4, og senest 3 måneder efter den geotekniske forundersøgelses afslutning indsende skemaet til Miljøstyrelsen: mst@mst.dk med Energistyrelsen sat på i kopi ved ccs-miljo@ens.dk og ammkr@ens.dk.
4. For at sikre og kontrollere at TEPDK efterlever vilkår 2, skal TEPDK redegøre og dokumentere for opfyldelsen her af i det vedlagte skema, bilag 5. Det udfyldte skema skal returneres til Energistyrelsen senest 4 uger efter endt undersøgelsesprogram.

Sagsfremstilling

Faktiske forhold

TEPDK har ved mail den 16. maj 2024, jf. bilag 1, søgt om tilladelse til at foretage geoteknisk forundersøgelse i Nordsøen i perioden midten af juli til slutningen af november 2024. Det fremgår af væsentlighedsvurderingen, jf. bilag 2, at undersøgelserne skal laves med henblik på at sikre positionen for boreriggen ''Dagny-1'' og bestemme havbundens sedimentstratigrafi og ''relief wells'', (RW). Se figur 1 for lokaliteten.



Figur 1 Kort over den forventede lokalitet for den ansøgte geotekniske undersøgelse.

1. Dagny-1 Jack-up borerig lokalitet
   - 1 x 20 m boring med kontinuert udtagning af jordprøver.
   - 1 x 30 m boring med kontinuert CPT.
   - 2 x 20 boring med kontinuert CPT.
2. RW Jack-up borerig NV-lokalitet
   - 1 x 30 boring med kontinuert CPT.
3. RW Jack-up borerig SV-lokalitet
   - 1 x 30 boring med kontinuert CPT.

Det fremgår, at der skal anvendes et High Precision Acoustic Positioning (HiPAP) system i forbindelse med placeringen af CPT-enheden på havbunden. Under borearbejdet bliver der anvendt API-borestænger, havvand eller bionedbrydelige borevæsker (Geargummi eller noget tilsvarende) afhængigt af havbunden.

Derudover fremgår det, at de geotekniske forundersøgelser forventes samlet at vare mellem 5 – 6 dage, hvor mobiliseringen tager 1 – 2 dage, undersøgelsen 2 dage og demobiliseringen 1 – 2 dage, vejrforsinkelser undtaget. Undersøgelsesområdet er beliggende omkring Dagny-1 (N 6242893, E 620421; ED50-31N).

Miljømæssige forhold
TEPDK har i henhold til offshorehabitatbekendtgørelsens § 3, stk. 1 og 2 samt § 5, stk. 1, udarbejdet en væsentlighedsvurdering for relevante Natura 2000-områder og bilag IV-arter, baseret på den tilgængelige litteratur. Væsentlighedsvurderingen beskriver, hvorvidt den geotekniske forundersøgelse kan påvirke internationale naturbeskyttelsesområder (Natura 2000-områder) og bilag IV-arter væsentligt.

Det fremgår af ansøgningsmaterialet, at det nærmeste Natura 2000-område fra undersøgelsesområderne er Doggerbanke (DE1003301), som befinder sig 72 km væk fra undersøgelsesområdet. Doggerbanke har blandt andet arterne spættet sæl (1365) og marsvin (1351) som udpegningsgrundlaget.

Det bliver beskrevet i væsentlighedsvurderingen, at HiPAP-systemet vil generere undervandsstøj, som potentielt kan påvirke bilag IV-arter. Det bliver beskrevet, at støjen er fokuseret i en stråle (10 – 15°) i frekvensområdet 21 – 33 kHz, og at støjpåvirkningen er kortvarig og begrænset til området under undersøgelsesfartøjet. TEPDK har vurderet, at afstanden for TTS (midlertidigt høretab) er 9 m og afstanden for PTS (permanent høretab) er 2 – 5 m for marsvin, mens adfærdsændringsafstanden er 36 – 42 m for alle hvaler og sæler.

TEPDK vurderer i deres fremsendte materiale, at støjpåvirkningen vil være begrænset til undersøgelsesområdet, og at den ikke vil påvirke Natura 2000-området

Doggerbanke. Samtidig vurderer TEPDK, at undervandsstøjen ikke vil have en negativ påvirkning på bilag IV-arter[2].

Myndighedshøring
Væsentlighedsvurderingen har været i myndighedshøring fra d. 18. juni til og med d. 22. juli hos Forsvarsministeriets Ejendomsstyrelse, Miljøstyrelsen, Slots- og Kulturstyrelsen, De Nationale Geologiske Undersøgelser for Danmark & Grønland og Søfartsstyrelsen om eventuelle bemærkninger til ansøgningen.

Energistyrelsen har inden for høringsfristen modtaget 4 høringssvar, hvoraf det fremgår, at de pågældende styrelser ikke har bemærkninger til vurderingen.

Retsgrundlag
Undergrundsloven
Klima-, energi- og forsyningsministeren kan meddele tilladelse til efterforskning og anvendelse af undergrunden til geologisk lagring af CO_2 i henhold til undergrundslovens § 23.

Arbejder, som udføres i forbindelse med virksomhed omfattet af undergrundsloven, herunder boringer, nedsænkning af skakter og indsættelse af stoller, må kun iværksættes, såfremt klima-, energi- og forsyningsministeren godkender udstyr, program og udførelsesmåde. Klima-, energi- og forsyningsministeren kan fastsætte vilkår ved godkendelser jf. undergrundslovens § 28, stk. 4 og 28 a.
Klima-, energi- og forsyningsministeren har delegeret sin beføjelse til at træffe afgørelse efter undergrundsloven til Energistyrelsen, jf. Bekendtgørelse om Energistyrelsens opgaver og beføjelser[3] § 3, stk. 1, nr. 1.

Offshorehabitatbekendtgørelsen
Offshorehabitatbekendtgørelsen finder blandt andet anvendelse på ansøgninger om godkendelse af arbejder, der udføres i forbindelse med virksomhed omfattet af undergrundsloven efter undergrundslovens § 28, stk. 1, jf. bekendtgørelsens § 1, stk. 2, nr. 6.

Før der kan træffes afgørelse om godkendelse efter undergrundslovens § 28, stk. 1, skal Energistyrelsen vurdere, om projektet i sig selv, eller i forbindelse med andre planer og projekter, kan påvirke et internationalt naturbeskyttelsesområde væsentligt, jf. bekendtgørelsens § 3, stk. 1. Ansøgeren skal i den forbindelse indsende fornødne oplysninger om projektet i forhold til påvirkning af internationale naturbeskyttelsesområder, jf. § 3, stk. 2. Hvis det vurderes, at projektet vil medføre en væ-

[2] Lovbekendtgørelse nr. 1392 af 4. oktober 2022 om naturbeskyttelse.
[3] Bekendtgørelse nr. 1366 af 28. september 2022 om Energistyrelsens opgaver og beføjelser.

sentlig påvirkning skal der foretages en nærmere konsekvensvurdering under hensyn til bevaringsmålsætningen for det pågældende område, jf. bekendtgørelsens § 3, stk. 3.

Endvidere skal Energistyrelsen, før der kan træffes afgørelse om godkendelse efter undergrundslovens § 28, stk. 1, i medfør af bekendtgørelsens § 5, stk. 1, foretage en vurdering af, om det ansøgte kan:

1. Medføre en forsætlig forstyrrelse i det naturlige udbredelsesområde for de dyrearter, der er optaget i habitatdirektivets bilag IV, litra a), i alle livsstadier og i særdeleshed i perioder, hvor dyrene yngler, udviser yngelpleje, overvintrer eller vandrer,
2. Beskadige eller ødelægge yngle- eller rasteområder i det naturlige udbredelsesområde for de dyrearter, der er optaget i habitatdirektivets bilag IV, litra
   a), eller
3. ødelægge de plantearter, som er optaget i habitatdirektivets bilag IV, litra b), i alle livsstadier.

Energistyrelsens begrundelse og vurdering

Vurdering af ansøgningen i forhold til offshorehabitatbekendtgørelsen

Energistyrelsen vurderer på baggrund af det fremsendte materiale, at TEPDK's redegørelse for potentielle påvirkninger på det internationale naturbeskyttelsesområde Doggerbanke og de dyrearter, som er beskrevet på bilag IV i habitatdirektivet[4]; spættet sæl, marsvin og vågehval, er fyldestgørende, jf. offshorehabitatbekendtgørelsen § 3, stk. 2.

Det er Energistyrelsens vurdering, at den geotekniske forundersøgelse, hverken i sig selv eller kumulativt med andre projekter, vil have en væsentlig påvirkning på internationale naturbeskyttelsesområder. Dette skyldes, at undersøgelserne er af tidsmæssigt begrænset omfang, og at de foregår i en afstand på 72 km fra Doggerbanke. Derudover har Energistyrelsen lagt vægt på, at den påvirkning af havbunden, som de geotekniske undersøgelser vil medføre, er midlertidig, kortvarig, og af begrænset omfang.

Energistyrelsen vurderer således, at TEPDK ikke skal foretage en nærmere konsekvensvurdering af den ansøgte geotekniske undersøgelse, jf. offshorehabitatbekendtgørelsen § 3, stk. 3, da det vurderes, at undersøgelsen ikke vil have en væsentlig påvirkning på et Natura 2000-område.

[4] Council Directive nr. 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Energistyrelsen vurderer på baggrund af det fremsendte materiale, at den ansøgte undersøgelses ikke vil medføre en forstyrrelse af bilag IV-arter i deres naturlige udbredelsesområde. Ligeledes vurderer Energistyrelsen, at undersøgelserne ikke vil beskadige eller ødelægge yngle- eller rasteområder i udbredelsesområder for bilag IV-arter jf. bekendtgørelsen § 5, stk. 1.

For at begrænse påvirkningerne af omgivelserne herunder for at varetage hensynet til havmiljøet og havpattedyr, fastsætter Energistyrelsen vilkår om, at TEPDK skal følge de vedhæftede standardvilkår for forundersøgelserne til havs, jf. vilkår 3.

Vurdering af ansøgningen i forhold til undergrundsloven

Energistyrelsen vurderer på baggrund af det fremsendte materiale, at TEPDK's redegørelse for valg af udstyr, program og udførelsesmåde er tilfredsstillende.

Energistyrelsen har i sin vurdering lagt vægt på, at specifikationerne for det anvendte udstyr samt beskrivelserne af undersøgelsesprogrammet og udførelsesmåden er rimelige og nødvendige i forhold til undersøgelsernes formål og omfang. Energistyrelsen vurderer på baggrund af oplysningerne i ansøgningsmaterialet, at udstyret, programmet og udførelsesmetoden i forbindelse med de geotekniske undersøgelser kan godkendes, jf. undergrundslovens § 28, stk. 1.

Vurdering af ansøgningen i forhold til Danmarks Havstrategi II og havstrategiloven

Efter § 18 i havstrategiloven[5] er Energistyrelsen ved udøvelse af beføjelser i medfør af undergrundsloven bundet af de miljømål og indsatsprogrammer, der fastsættes efter § 12 og § 13 i havstrategiloven.

Energistyrelsen er forpligtet til at fremme havstrategiens miljømål ved varetagelse af styrelsens beføjelser inden for rammerne af den gældende lovgivning. Dette indebærer blandt andet, at Energistyrelsen ved udøvelsen af beføjelserne i henhold til undergrundsloven, herunder i forbindelse med godkendelse efter § 28, stk. 1, skal tage havstrategien i betragtning.

Det er Energistyrelsens vurdering på baggrund af det fremsendte materiale, at den ansøgte undersøgelse ikke vil forårsage væsentlige påvirkninger af havmiljøet, og at den ikke vil påføre en belastning eller påvirke kriterier og mål for de 11 deskriptorer omfattet af havstrategilovens bilag 2. Derudover, har Energistyrelsen lagt vægt på, at der for havstrategiens 11 deskriptorer vil være ingen eller ubetydelige påvirkning, samt at den gode miljøtilstand kan opretholdes.

På baggrund af overstående er det Energistyrelsens vurdering, at den ansøgte undersøgelse ikke vil være i konflikt med opnåelsen af de fastsatte miljømål eller på

[5] Lovbekendtgørelse nr. 123 af 1. februar 2024 om havstrategi.

anden måde være strid med retningslinjerne i indsatsprogrammet under Danmarks Havstrategi II.

Øvrige bemærkninger
Denne tilladelse fritager ikke TEPDK for at indhente de i medfør af lovgivningen i øvrigt nødvendige tilladelser og godkendelser. Det bemærkes ydermere, at såfremt arbejdet ikke afsluttes inden den angivne dato, skal Energistyrelsen orienteres om dette.

Hvis der tages kontakt til andre myndigheder vedrørende aktiviteterne for denne tilladelse, skal Energistyrelsen informeres og sættes i kopi (cc) på korrespondancen. Følgende mailadresser skal orienteres: ccs-miljo@ens.dk og ammkr@ens.dk.

Tilladelsen inklusiv bilag 2 og 3 vil blive offentliggjort på Energistyrelsens hjemmeside.

Klagevejledning
Klage over denne afgørelse kan indbringes for Energiklagenævnet, jf. undergrundslovens § 37 a, stk. 1.

Enhver med væsentlig og individuel interesse kan klage over denne afgørelse, jf. § 37 a, stk. 2. Lokale og landsdækkende foreninger eller organisationer, der har beskyttelse af natur og miljø som hovedformål, eller som efter deres formål varetager væsentlige rekreative interesser, er klageberettigede for så vidt angår de miljømæssige forhold, jf. undergrundslovens § 37 a, stk. 3. Disse foreninger eller organisationer skal senest samtidig med klagen fremsende deres vedtægter til Energiklagenævnet som dokumentation for, at de er lokale eller landsdækkende, og at deres formål opfylder de angivne krav.

Klagen skal være indgivet skriftligt til Energiklagenævnet inden 4 uger fra tidspunktet, hvor afgørelsen er offentligt bekendtgjort. Hvis klagefristen udløber på en lørdag eller en helligdag, forlænges fristen til den følgende hverdag, jf. Undergrundslovens § 37 a, stk. 4.

Energistyrelsen gør opmærksomhed på, at klagen kan indgives til Energiklagenævnet på fire forskellige måder:

- Klageportalen for Nævnenes Hus på Energiklagenævnets hjemmeside[6],
- Digital post (e-Boks).
- E-mail til ekn@naevneneshus.dk eller
- Almindelig post til Energiklagenævnet, Nævnenes Hus, Toldboden 2, 8800 Viborg.

[6] naevneneshus.dk/start-din-klage/energiklagenaevnet/

Kopi sendes til:

- Miljøstyrelsen
- De Nationale Geologiske Undersøgelser for Danmark og Grønland, GEUS
- Søfartsstyrelsen
- Fiskeristyrelsen
- Forsvarsministeriets Ejendomsstyrelse
- Moesgaard museum
- Slot- og Kulturstyrelsen

Med venlig hilsen
Amanda Mc Keever
CCS
Energistyrelsen

Bilag

- Bilag 1: Ansøgningen i form af mail fra TEPDK
- Bilag 2: CCS Dagny Geotechnical Survey - Environmental Significance Assessment Report.
- Bilag 3: Standardvilkår for forundersøgelser til havs – august 2018
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TotalEnergies EP Danmark A/S 12-06-2024
Rev.2

CCS Dagny Geotechnical Survey

Environmental Significance Assessment Report

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List of Acronyms and Abbreviations

BD	Birds Directive
CPT	Cone Penetrometer Testing
EEZ	Exclusive Economic Zone
ESAR	Environmental Significance Assessment Report
GES	Good Environmental Status
HD	Habitats Directive
HiPAP	High Precision Acoustic Positioning
MSFD	Marine Strategy Framework Directive
OD	Outer Diameter
PCPT	Pore-Pressure Cone Penetration Test
PTS	Permanent Threshold Shift
RW	Relief Well
SCI	Site Of Communitarian Importance
SELcum	Cumulative Sound Exposure Levels
SPL	Sound Pressure Level
TTS	Temporary Threshold Shift
USBL	Ultra-Short Baseline

1. Introduction

TotalEnergies EP Danmark A/S (TEPDK) is planning to undertake a geotechnical survey to ensure the rig positioning for drilling the proposed Dagny-1 appraisal well and the proposed relief well (RW). The geotechnical survey is proposed to occur between mid-July and the end of November 2024 depending on vessel availability and weather constraints and is expected to take up to approximately 5-6 days including mobilization, surveying and demobilization, but excluding any weather downtime. This survey is necessary to gather more detailed information in few specific locations resulting from the analysis of the geophysical survey data. Sampling locations are therefore located inside the area previously investigated (in May-June 2024) during the geophysical survey (WSP, 2024 and Tilladelse til Geofysisk forundersøgelse i Dagny (Nordsøen), J nr. 2024 – 2431, 22-04-2024).

An environmental significance assessment report (ESAR) is prepared based on the Offshore Habitat Order (BEK No. 786 of 14/06/2023 “Executive Order on the Administration of International nature conservation areas and the protection of certain species during preliminary studies, exploration and extraction of hydrocarbons, underground storage, pipelines, etc. offshore”) in order to evaluate if the proposed activities are able to affect designated international nature protection areas within or outside the Danish territory and/or the protection of certain animal species.
The Offshore Habitat Order applies to surveys requiring approval under section 28(1) of the Danish Subsoil Act (Consolidation Act. No. 1461 of 29 November 2023), cf. section 1(2) n. 7 of the Offshore Habitat Order.
The ESAR has been developed as a stage 1 of an appropriate assessment according to the Habitats Directive art. 6 and it deals with the N2000 network and its objective of conservation representing the international designated protected areas. It also considers the most common Habitats Directive Annex IV species outside the N2000 sites, the Marine Strategy Framework Directive (MSFD) which is implemented in Danish law through the Marine Strategy Act (Consolidation Act no. 123 of 01/02/2024) and the associated national monitoring program (NOVANA).

2. Project Description

TEPDK will undertake the geotechnical survey to ensure the rig positioning for drilling the proposed Dagny-1 appraisal well and the proposed relief well (RW).

- Dagny-1 Jack-Up Rig location (Figure 2):
  - 1 x 20 m borehole with continuous soil sampling,
  - 1 x 30 m borehole with continuous CPT testing,
  - 2 x 20 m boreholes with continuous CPT testing.

- RW Jack-Up Rig NW location (Figure 3):
  - 1 x 30 m borehole with continuous CPT testing.

- RW Jack-Up Rig SW location (Figure 4):
  - 1 x 30 m borehole with continuous CPT testing.

The proposed geotechnical survey activities will take place in the southwestern part of the Denmark Exclusive Economic Zone within the geophysical area surveyed in May-June 2024 (WSP, 2024). The location of the geotechnical survey is shown in Figure 1. The grey box in the upper left side of the figure, shows details of the proposed geotechnical sampling locations inside the geophysical survey area. This is to highlight the spatial relationship between the proposed geotechnical survey and the completed geophysical survey.
All geotechnical activities will be within the CCS license area; there will be no impact on Danish land.

TEPDK will drill geotechnical boreholes with either continuous cone penetrometer testing (CPT) or continuous soil sampling to determine the geotechnical engineering properties of soils and to delineate soil stratigraphy around the proposed jack up rig positions. This geotechnical survey should provide a detailed description and analysis of mechanical properties of sub-seabed soils around the proposed wells to perform jack-up leg penetration / punch through risk analysis and any other necessary geotechnical engineering work requested to ensure the safety of the activities.
A high precision acoustic positioning (HiPAP) system will be used to accurately position the seabed frame and drill string on the seabed.
The survey vessel and the geotechnical drilling operations will follow international conventions regarding waste management and gaseous emissions and will adhere to Danish and TEPDK environmental targets in response to EU legislation.

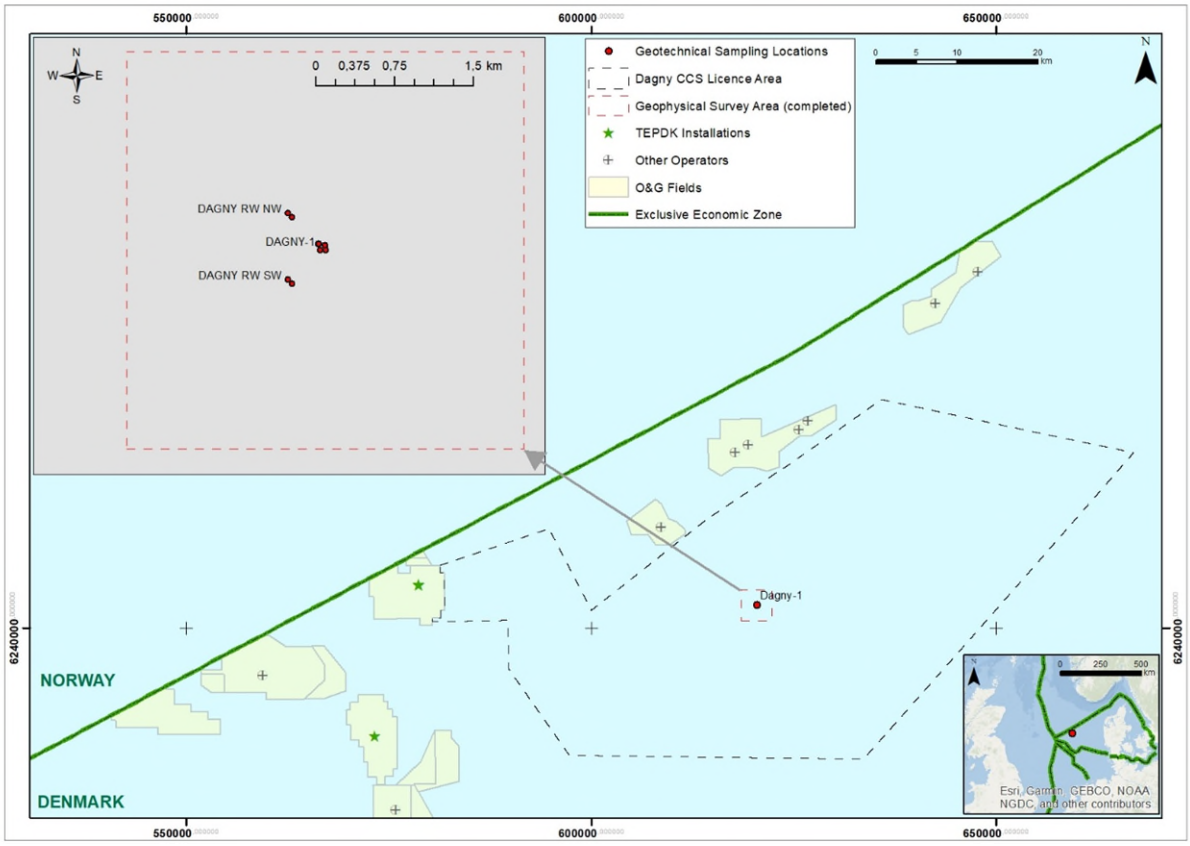


Figure 1. Dagny-1 geotechnical survey location in the DUC

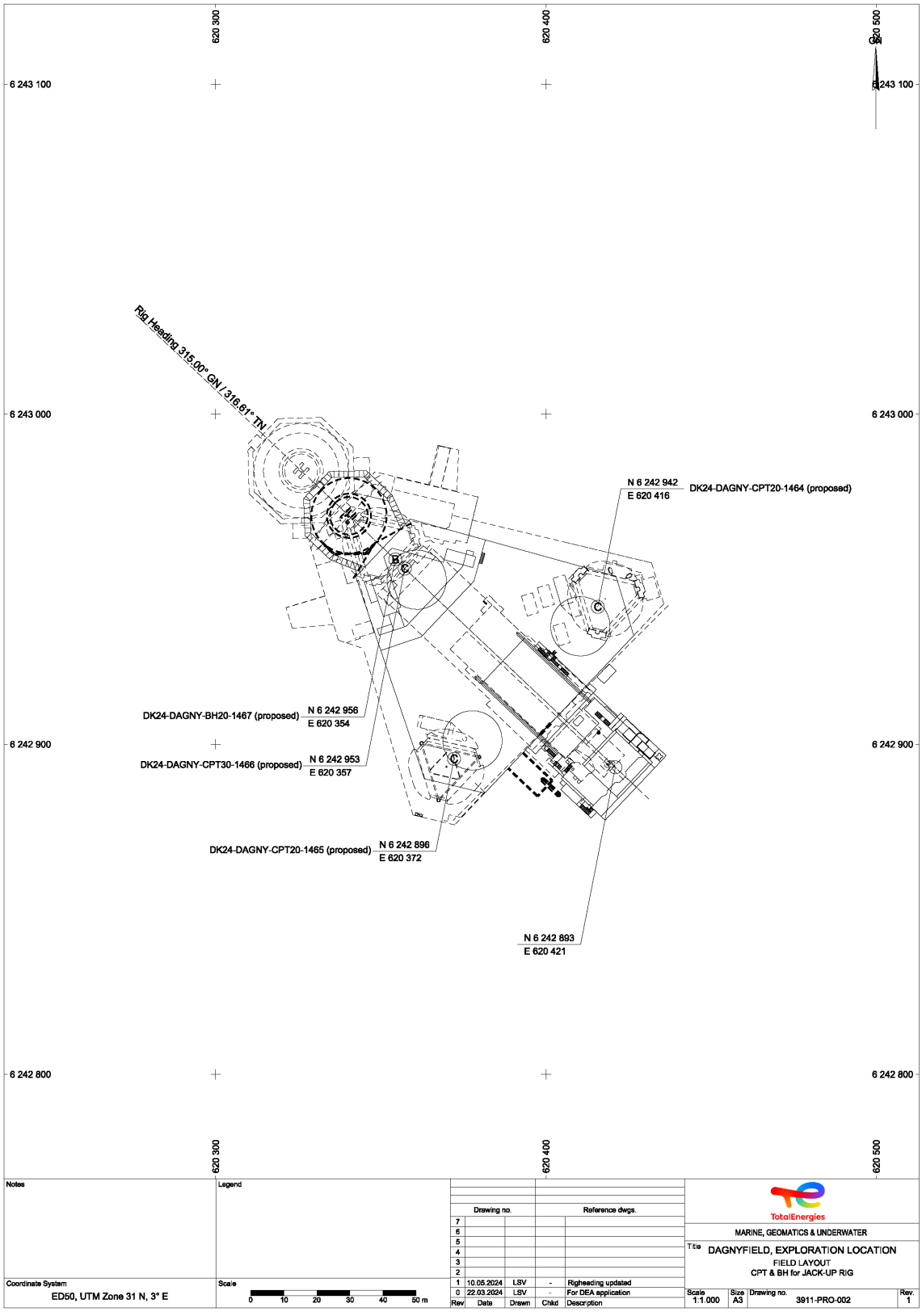


Figure 2. CPT Boreholes and Sampling Borehole locations for Dagny-1 appraisal well jack-up rig position

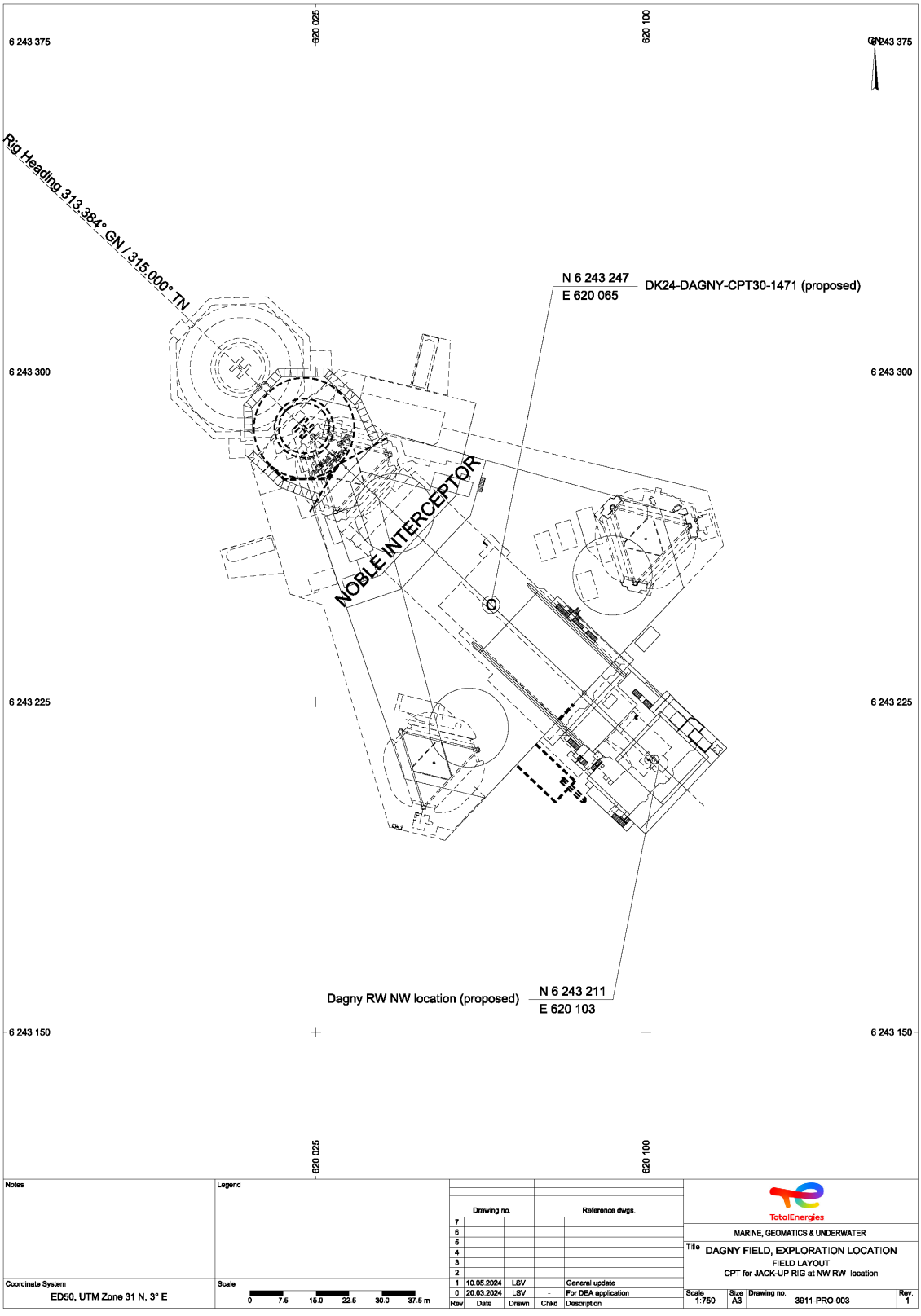


Figure 3. CPT Boreholes locations for jack-up rig at Relief Well NW position

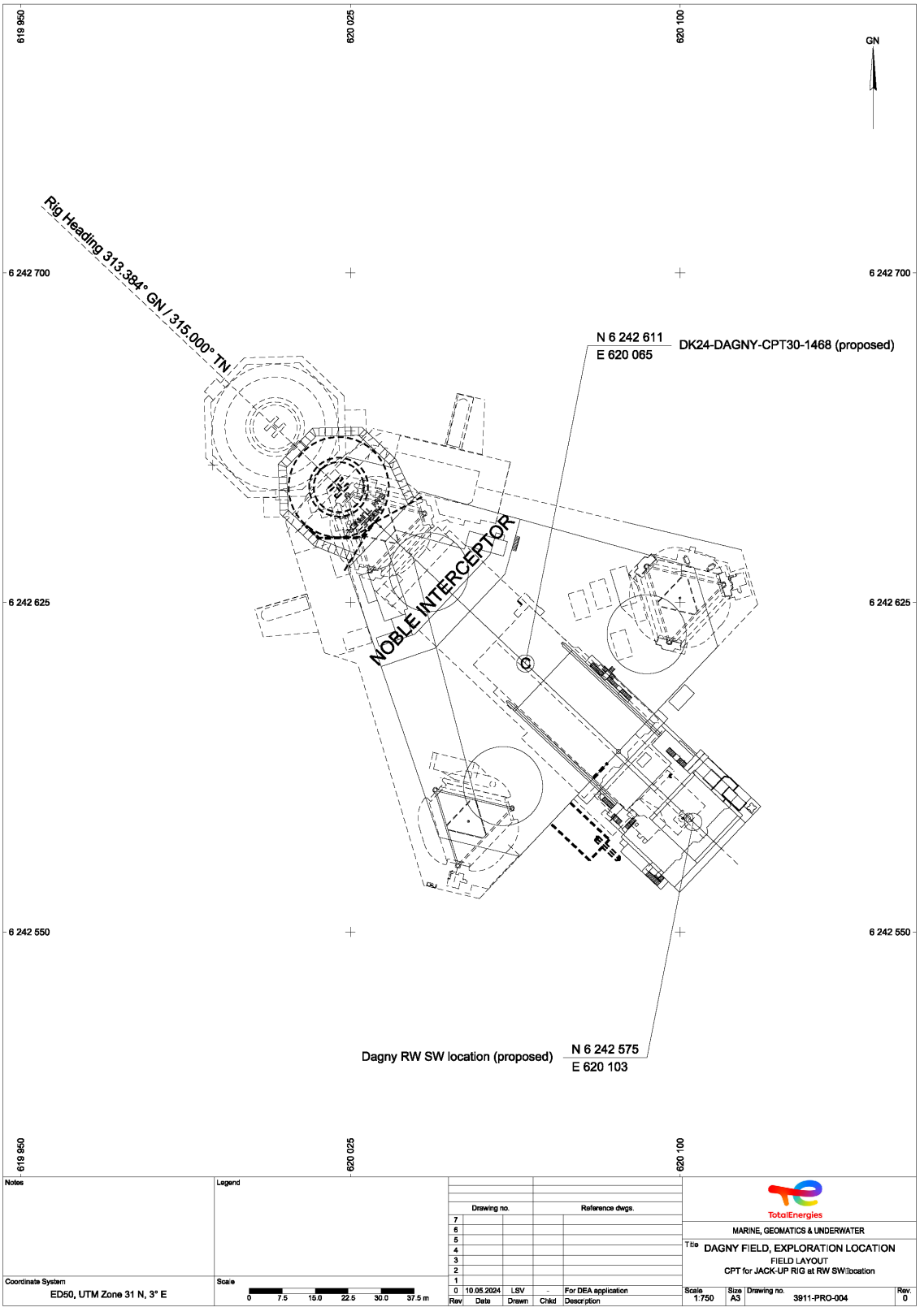


Figure 4. CPT Boreholes locations for jack-up rig at Relief Well SW position

2.1. Drilling

The geotechnical survey will be performed by one vessel (Figure 5) in drilling mode using an API drill pipe, and seawater or a biodegradable drilling fluid (Guar gum or similar) depending on the nature of the ground conditions. Typically, seawater should be enough in clays and rock; in sands, guar gum is needed to avoid the drilled hole from collapsing. About 3 kg of Guar gum mixed in 1 m^3 of seawater per drilled meter could be used as a contingency measure. A total consumption of about 450 kg of Guar Gum and 150 m^3 of seawater could therefore be expected to drill a total of 150 m during the geotechnical campaign. Guar gum is commonly used to thicken and stabilize food products. In this case, it is used to create a low solid, biodegradable drilling fluid.
A seabed frame will be lowered to the seabed to serve as a guide and reaction frame to the drill string. Upon completion of a borehole (12.5 cm (5") in diameter and 123 cm^2 in area), the drill pipe is withdrawn and the seabed frame lifted into the moon pool of the ship. Operations will be conducted on a continuous basis, 24 hours per day, and 7 days per week.

Figure 5. Typical geotechnical drillship

2.2. CPT testing

In situ CTP or PCPTs (Pore-pressure Cone Penetration Test) since cone is equipped with a pore pressure transducer to measure the water pore pressure, will be performed in some of the boreholes using a wireline downhole jacking unit with a 3-metre stroke (Figure 6). After the borehole has been advanced to the required test level, it is cleaned by mud flushing. The tool is lowered by its umbilical cable inside the drill pipe and to the bottom, where it seats just behind the drill bit and latches under its own weight. The test sequence is then activated from a surface control cabin and the cone penetrometer is pushed into the soil by pressurizing the umbilical at a constant rate of 2 cm/s. Throughout the test, the measurements of cone resistance, sleeve friction and pore pressure, if measured, are displayed graphically in the control cabin. These data are simultaneously recorded by computer. This facilitates detailed data processing, interpretation and presentation both offshore and onshore.

Cone Penetration Tests will be performed using, as base case, penetrometers with a 10 cm^2 cone, which measure cone resistance, sleeve friction, and pore pressure. The downhole PCPT stroke length with this cone is 3 m. Upon reaching the maximum achievable stroke, or the limiting thrust capacity of 90 kN, the test is terminated, and the system depressurised. The test can also be terminated at any time at the discretion of the operator in case the safety of the operation is at stake. The drill string is lifted to extract the cone and test rod out of the ground and the WISON® unit is retrieved.

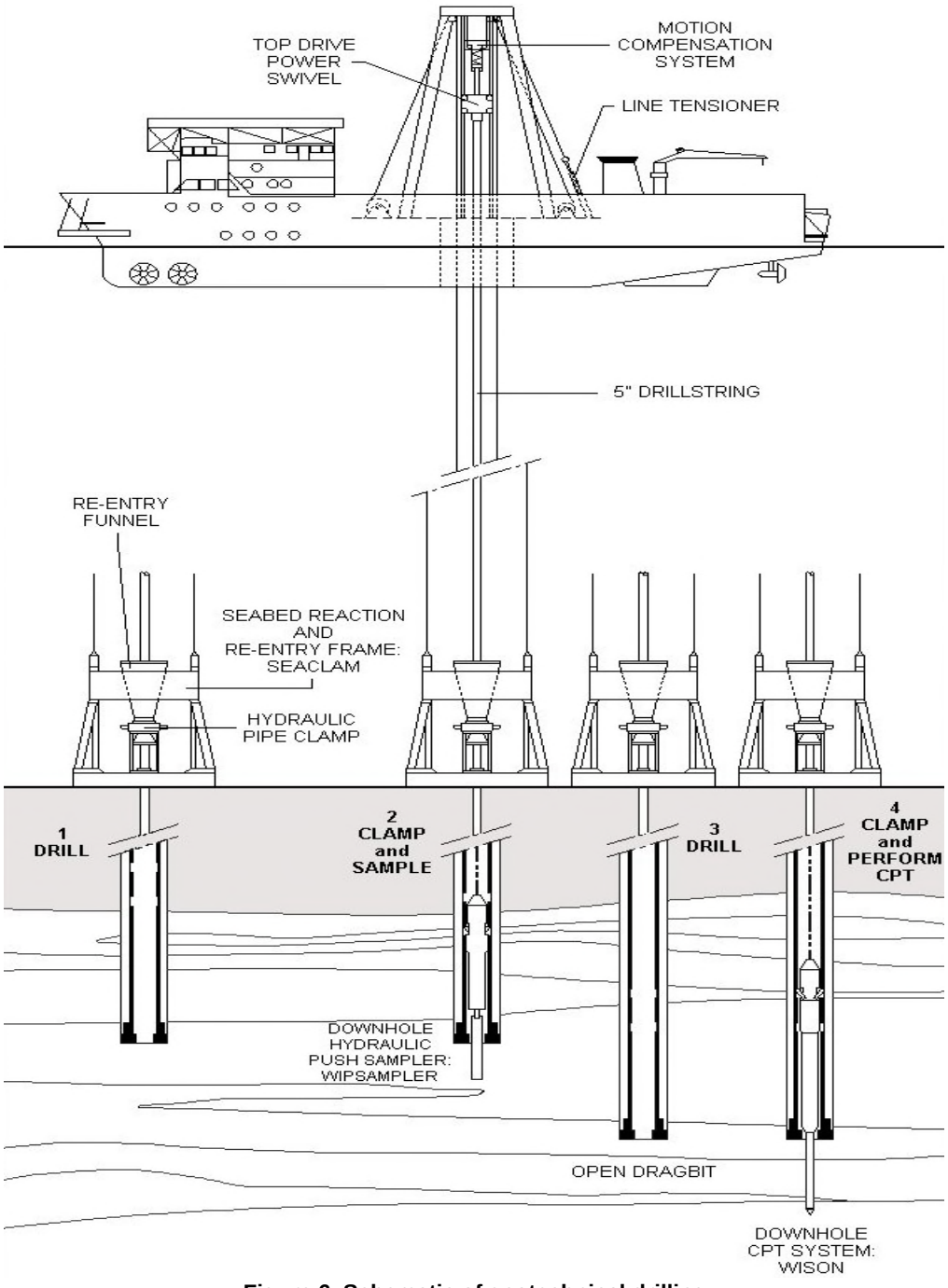


Figure 6. Schematic of geotechnical drilling

2.3. Sampling

Downhole sampling will be performed in some of the boreholes using a push sampler, which consists of a downhole jacking unit to which 1 m long sample tubes are attached.
A range of thin-walled and thick-walled Shelby tubes will be used depending on the soil conditions encountered. These are to be without core catchers for cohesive sediments and with a range of core catchers for non-cohesive soils.
Push sample tube are of 63 mm to 76 mm outer diameter (OD).
For use in very dense granular soils, where 63 mm – 76 mm OD tubes have been unable to achieve the necessary recovery, tubes of 53 mm OD and various lengths are then used.
Each sample will have a maximum volume of 0.0045 m^3 of soil based on the conservative OD of 76 mm (and 45 cm^2 in area).

2.4. Offshore Laboratory Testing

Recovered samples are processed in the offshore laboratory, where the specified laboratory testing is conducted, and the remaining core and materials are preserved and sealed for shipment to the onshore laboratory.

2.5. Acoustic Equipment and Noise Specifications

The HiPAP (High Precision Acoustic Positioning system) system (USBL) will accurately position the seabed frame on the seabed. To achieve the accuracy, the HiPAP system uses a spherical shaped transducer design and a new signal processing technique. The position calculation is based on range and/or direction measurements from the onboard transducer to the subsea transponder This new technique enables narrow beams to be generated in all directions within the lower half of the transducer using only electronic beam control. The HiPAP system measures angles and range by using a unique processing technique that provides very high accuracy (Kongsberg Maritime AS, 2005).

The contractor undertaking the survey is still to be confirmed. Consequently, the equipment brands and models and specifications have yet to be confirmed; however, Table 1 lists the acoustic equipment and noise specifications that are standard for this survey application and likely to be used.

Table 1. Potential acoustic survey equipment.

Equipment	Fitted to	Operating frequency (kHz)	Source Level SPL (dB rel. 1 µPa)
USBL			
HiPAP 502 system (USBL transducer)	Vessel	20.5 - 29.6	207
Standard transponder	Seabed frame	20.0 - 32.0	188

The acoustic sonar energy, referred to as underwater noise from here on in this report, is focused in narrow beams or swathes below the survey vessel. This minimizes lateral fugitive underwater noise. Any such underwater noise attenuates quickly with increasing distance from the survey vessel and the sound source.

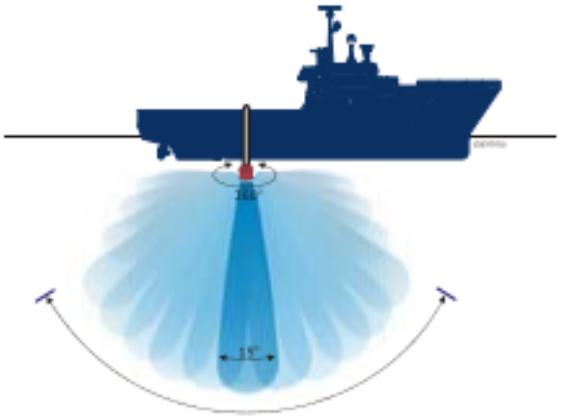


Figure 7. Indicative HiPAP system with directional beam
Source: Kongsberg Maritime A/S, 2005

The HiPAP system would operate with a focused beam in the 21-33 kHz range depending on the application. Underwater noise is focused beneath the vessel (Figure 7) with lateral fugitive noise attenuating quickly with increasing distance from the hull-mounted sound source on the underside of the vessel.

2.6. Project Schedule

Geotechnical data acquisition is proposed to occur between mid-July and the end of November 2024 depending on vessel availability and weather constraints and is expected to take up to approximately 5-6 days including mobilization (1-2 days), surveying (2 days) and demobilization (1-2 days), but excluding any weather downtime.

3. Natura 2000 and Annex IV species

Natura 2000 is a network of protected areas covering Europe's most valuable and threatened species and habitats. It is the largest coordinated network of protected areas in the world, extending across all EU Member States, both on land and at sea. The sites within Natura 2000 are designated under the Nature Directives i.e. the Birds (BD, 2009/147/EC) and the Habitats Directives (HD, 92/43/EEC). Member States have the responsibility to ensure that the Natura 2000 network is managed sustainably. Figure 8 shows the designated protected areas surrounding the proposed geotechnical survey area.

The nearest Natura 2000 site is the SCI Doggerbank (site code DE1003301), which is beyond the Danish border in the German EEZ. The distances from the survey area to the Doggerbank Natura 2000 site are approximately 72 km. Only the closest Natura 2000 is considered in this assessment for potential interactions with the geotechnical survey activities, as the distances to the other N2000 sites (>100 km) are considered too far (Figure 8). Based on the standard format, the Doggerbank Natura 2000 site comprises a submerged sandbank, which is designated as an HD Annex 1 habitat (cod. 1110), five sea birds (fulmar, gannet, kittiwake, lesser black backed gull, guillemot), the harbour porpoise (*Phocoena phocoena*, HD Annex II and IV species) and the harbour seal (*Phoca vitulina*, Annex II species) representing the objectives of designation, plus other marine species.
White-beaked dolphin (*Lagenorhyncus albirostris*) and minke whale (*Balenoptera acutorostratal*) are the other HD Annex IV species potentially present in the project area. The harbour porpoise is the most common species in the geotechnical survey area, but also the other species may occur.
Annex IV species are protected inside and outside the designated N2000 site according to the Habitats Directive.

Table 2 provides a seasonal sensitivity matrix of selected marine species, including Annex IV species, that may be present in the area. The geotechnical survey activities are planned to occur for up to 6 days from mid-July to the end of November 2024 (red dotted outline in Table 2) depending on vessel availability and weather conditions. No impact is expected for marine species breeding onshore, and negligible impact for marine mammals spawning or breeding in the water column is expected considering the survey activities will have negligible potential impacts. Also, the most sensitive period for harbour porpoises calves is almost completed avoided.

Table 2. Seasonal sensitivities of marine mammals

Species Name ***(Scientific Name)***	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**Spawning / Breeding Location**
MARINE MAMMALS													
Harbour seal (*Phoca vitulina*)													Onshore
Harbour porpoise (*Phocoena phocoena*)						*	*						Water column
Minke whale (*Balaenoptera acutorostrata*)													Water column
White-beaked dolphin (*Lagenorhynchus albirostris*)													Water column

* Most calves/pups (In the North Sea, the calving season is from April to September, with most new-borns occurring in June and July (Sonntag, Benke, Hiby, Lick, & Adelung, 1999)).

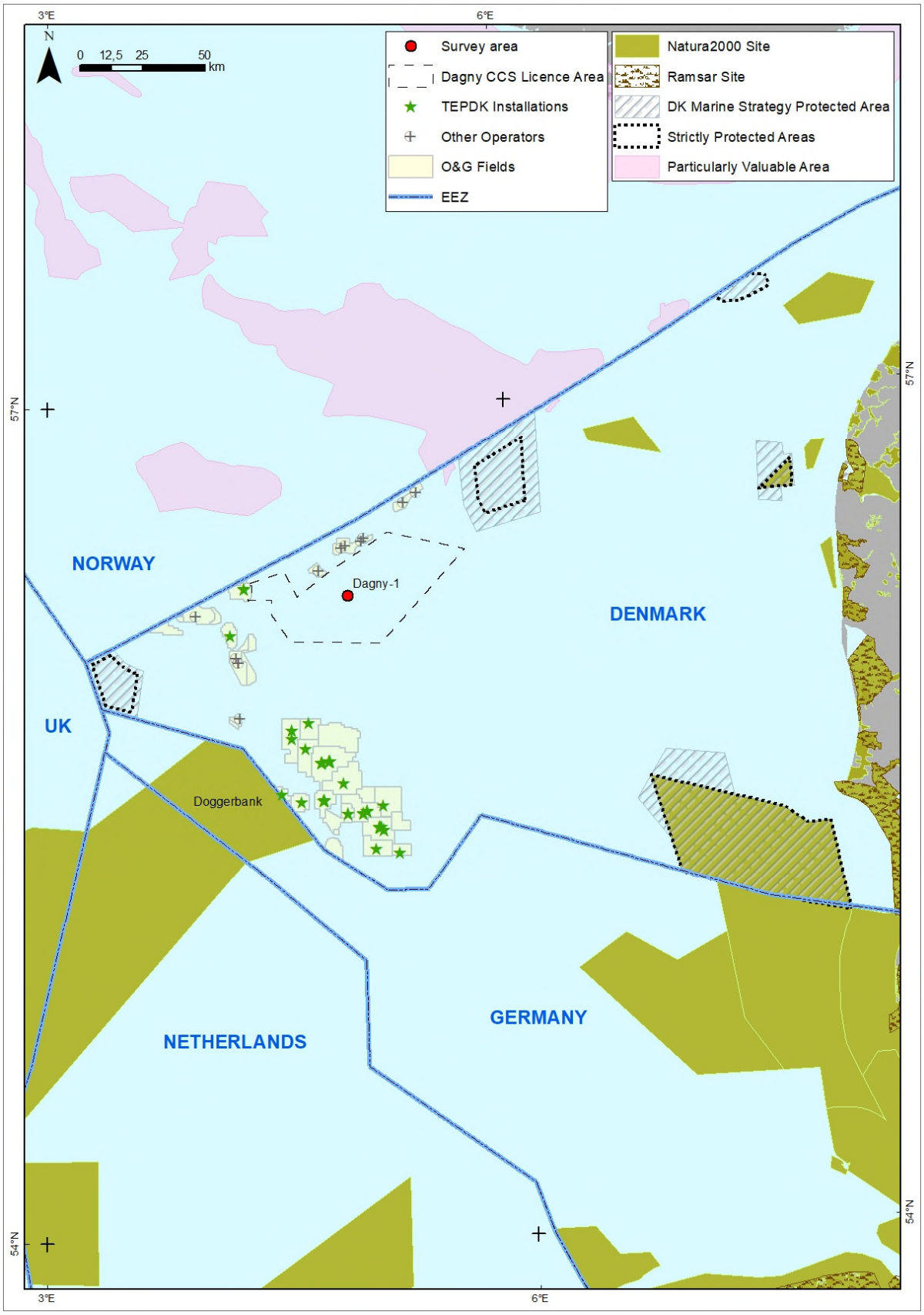


Figure 8. Natura 2000 network and other protected areas

4. Potential Interactions and Impacts on Natura 2000 Sites and Annex IV Species

The potential links between human activities, their associated pressures and their potential impacts on marine habitats and species protected under the EU Habitats Directive have been identified as suggested by the European Economic Interest Group (2017). The pressures (Table 3) relevant to the project activities, i.e., geotechnical boreholes, and the vessel operation, were selected and a matrix of the interaction of those pressures with Natura 2000 habitat and species, and Habitat Annex IV species is provided in Table 4. The assessment of the level of interaction is specific to the project activities and follows the guidelines on interactions of activities and pressures in Tables 4 and 5 provided by the European Economic Interest Group (2017).

Table 3. Potential Interaction of Project Activities and Pressures

Pressure/Project Activity	Vessel operation	Drilling	CPT	Sampling
Noise	X	X	X	X
Changes in ambient air quality	X	-	-	-
Changes in chemical composition of seawater	X	X	-	-
Physical disturbance	X	X	X	X
Introduction of non-native species	X	-	-	-
Changes in suspended sediment/turbidity	-	X	X	-
Smothering	-	X	X	-
Seabed loss	-	X	-	X

Table 4. Matrix of Potential Pressures Relevant to Natura 2000 Habitats and Species, and Habitats Directive Annex IV Species.

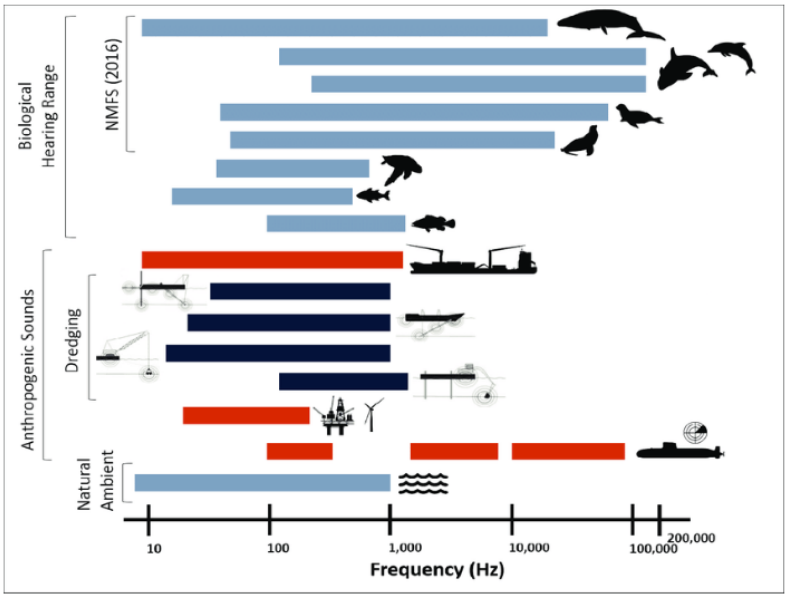
	Natura 2000 and Habitats Directive Annex I Habitat	**Natura 2000Species and Birds Directive Annex I species**					**Natura 2000 and Habitats Directive Annex II and IV Species**		**Habitats Directive Annex IV Species**	
		Seabirds					**Cetaceans**	**Seals**	**Cetaceans**	
	Sandbanks (1110)	**Fulmar** (*Fulmarus glacialis*)	**Gannet** (*Morus bassanus*)	**Kittiwake** (*Rissa tridactyla*)	**Lesser black-backed gull** (*Larus fuscus*)	**Guillemot** (*Uria aalge*)	**Harbour porpoise** (*Phocoena phocoena*)	**Harbour seal** (*Phoca vitulina*)	**White-beaked dolphin** (*Lagenorhyncus albirostris*)	**Minke whale** (*Balenoptera acutorostrata*)
Noise										
Changes in ambient air quality										
Changes in chemical composition of seawater										
Physical disturbance										
Introduction of non-native species										
Changes in suspended sediment / turbidity										
Smothering										
Seabed loss										
	Unlikely interaction									
	No interaction									

Source: European Economic Interest Group, 2017.

4.1. Noise

The temporary increase in underwater noise has the potential to impact marine mammals near the survey activities due to the sensitivity of marine mammal hearing.

This section compares the potential underwater noise from USBL use to known or estimated marine mammal impact thresholds to determine the consequence of received sound levels on Annex IV marine mammals. Figure 9 presents the hearing frequency ranges for selected marine animals and energy frequencies for selected anthropogenic sources. Marine mammal frequency hearing range is generally 0.01-200 kHz.



Source: Suedel *et al*. 2019

Figure 9. Hearing frequency ranges for selected marine animals and energy frequencies for selected anthropogenic sources

The USBL transducer and transponder equipment proposed for the geotechnical survey emit pulses of medium frequency in short 'chirps or pings' of 3 to 40 milliseconds every few seconds (e.g., every 5 seconds). Sound frequencies are approximately 20-33 kHz with sound pressure levels (SPL) of approximately 207 and 188 dB re 1 µPa respectively (Table 1).

Woodside (Xodus Group, 2020) addressed underwater noise from similar USBL activities in an Appropriate Assessment according to the EU Habitats Directive for a geotechnical survey off the Irish west coast. The USBL SPL was 204-206 dB re 1 µPa[1], which is equivalent to the geotechnical survey USBL SPL; therefore, the Xodus Group (2020) results are representative for the geotechnical survey.

An empirical spreading loss equation, estimated based on field measurements in Warner and McCrodan (2011), was then applied to these source levels to estimate the radii at which different pressures were received (Austin *et al,* 2012). Table 5 presents the radii estimates.

[1] USBL noise is impulsive. Source sound levels are normally described in decibel (dB) re 1 µPa at 1 m from the source. In practice, it is not usually possible to measure at 1 m from an active noise source that is physically distributed over an area of several square metres. However, this method allows different source levels to be compared and reported on a standardised scale (Xodus Group, 2020).

Table 5. Ranges to SPL isopleths for USBL systems (from Austin et al. (2012), (Xodus Group, 2020))

SPL (dB re 1 µPa)	Radius (m)
200	2-5
190	5-9
180	7-8
170	18-30
160	36-42

SPL thresholds for the onset of Temporary Threshold Shift (TTS), Permanent Threshold Shift (PTS) and behavioural disturbance have been used as the criteria in this assessment, as data is readily available for marine mammal thresholds and acoustic equipment output; however, other threshold values may also be used.

Table 6 presents the Southall et al. (2019) underwater acoustic SPL thresholds for the onset of PTS and TTS. Table 6 also shows the Southall et al. (2007) conservative SPL threshold for the onset of behavioural disturbance in marine mammals, which is used as it is an integration of the highly variable data for individual marine mammal species and the onset of behavioural impacts due to impulsive noise.

Table 6. TTS, PTS and behavioural SPL thresholds for marine mammals

Hearing Group	TTS Onset Thresholds Peak SPL (dB re 1 µPa)	PTS Onset Thresholds Peak SPL (dB re 1 µPa)	Behavioural Disturbance RMS SPL (dB re 1 µPa)
LF Cetaceans	213	219	160 (Conservative for all species)
MF Cetaceans	224	230	
HF Cetaceans	196	202	
Pinnipeds in Water	212	218	

The sound propagation results for the USBL equipment and the radii of the potential TTS, PTS and behavioural disturbance thresholds are summarised in Table 7. All results presented are for the underwater noise generated within the acoustic beam from the hull-mounted transducer, as it is directed towards the seabed frame. Fugitive lateral underwater noise may also occur outside the acoustic beam but at much lower and quickly diminishing levels.

The PTS SPL threshold for HF cetaceans, e.g., the harbour porpoise, may be reached within 2-5 m of the acoustic beam (202 dB re 1 µPa SPL threshold compared with a calculated SPL of 200 dB re 1 µPa). The TTS SPL threshold for HF cetaceans may be exceeded within 5-9 m of the acoustic beam. PTS and TTS SPL thresholds for LF, MF cetaceans and pinnipeds are unlikely to be exceeded.

The behavioural disturbance SPL threshold for all marine mammals may be exceeded 36-42 m from the acoustic beam.

Table 7. Sound propagation results: Potential TTS, PTS and behavioural onset distances for USBL impulsive sound

Hearing Group	**TTS Onset Thresholds Peak SPL (dB re 1 uPa)**	**PTS Onset Thresholds Peak SPL (dB re 1 uPa)**	**Behavioural Disturbance RMS SPL (dB re 1 uPa)**
LF Cetaceans	Not exceeded	Not exceeded	36-42 m
MF Cetaceans	Not exceeded	Not exceeded	36-42 m
HF Cetaceans (Harbour porpoise)	9 m	Not exceeded but marginal (2-5 m)	36-42 m
Pinnipeds in Water (Harbour seal)	Not exceeded	Not exceeded	36-42 m

These distances are derived based on the assumption that a marine mammal individual remains stationary within the acoustic beam when the USBL is operating, which is unrealistic. Any marine mammals are likely to move away from the sound source upon hearing the onset of the USBL activity, hence the first pulse would provide the highest sound received, with each subsequent pulse contributing less to their exposure as they move away from the source. These results interpreted from the Woodside geotechnical survey appropriate assessment (Xodus, 2020) are representative of the geotechnical survey.

Furthermore, it is highly unlikely that a marine mammal would be within the geotechnical survey areas and within the acoustic beam during USBL operation, because:

- The acoustic beam has a very narrow maximum diameter of approximately 10-15° (Kongsberg, *undated*);
- The survey has a very short duration (2 days);
- The vessel stands stationary on the survey point and is easy to be bypassed; the density of marine cetaceans in the survey area is <1 individual / km^2 (Waggit *et al*., 2019) and pinnipeds are infrequent visitors to the seas 200 km from the Danish coast;
- The additional noise emanating from the survey vessel, which would act as a deterrent; the survey vessel would be operating noisy dynamic positioning (DP) thrusters to remain in position during the activity; and
- The low level of fugitive acoustic noise from the USBL is also likely to deter any marine mammals from approaching the USBL acoustic beam where the highest levels of underwater noise may be encountered.

The potential impact on marine mammals due to the use of USBL during the geotechnical survey is **not significant**.

Xodus Group (2020) also compared calculated cumulative sound exposure levels (SELcum) for 200 pings of the USBL system with the relevant threshold values from Southall (2007, 2019). The greatest distance to the TTS threshold was 170 m for HF cetaceans and 70 m to the PTS threshold, also for HF cetaceans. These distances are greater than for the SPL thresholds; however, it is unlikely that a marine mammal would remain in the focused acoustic beam for 200 pings (equivalent to several minutes). The minimising factors for marine mammal impacts, previously listed in the five bullets, would also apply to these results and any potential impacts on marine mammals would still be **not significant**.

4.2. Impact Assessment for Project Activities

The assessment of the proposed survey activities considered the potential impacts on the relevant impact mechanism, pressures and associated potential impacts, and are presented in Table 8.

Table 8. Assessment of potential impacts from geotechnical survey activities

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
1.1	Vessel operation	Use of propellers	Underwater noise	Modification of the sea sound level	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	A survey vessel will be used for the geotechnical survey. The propellers and thrusters are likely to cavitate around the blades whilst moving or operating thrusters under load to maintain a vessel's position, e.g., dynamic positioning. Underwater noise from vessels is broadband with the highest source spectrum levels occurring at low frequencies (below 200 Hz) (Nachtsheim et al, 2023). The noise will not be impulsive. Mobile species such as cetaceans and seals are expected to move away from sound source and return once the activities have ceased. The survey will take approximately 6 days and the vessel noise is limited to this time frame. Vessel noise is not expected to have a significant impact on selected Annex IV species due to the type of noise and short duration of vessel activities. Activities will be about 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
1.2	Vessel operation	Burning of diesel fuel in diesel engines	Changes in ambient air quality	Reduction in ambient air quality due to GHG emissions and potential	N2000 Seabirds	Gaseous, including GHG emissions (e.g., NO_x, SO_x, CO_2, CH_4 and particulates) from the survey vessel burning diesel fuel will occur intermittently for approximately 6 days during mobilization, operation and demobilization. The impact on GHG and climate change from gaseous emissions is **not significant,** considering that the activities will use one vessel and are of short duration and due to the well-

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
				contribution to climate change		mixed airshed of the offshore environment. Thus, considering the large distance of the survey area to the Doggerbank, potential impact on air quality to seabirds inside the Natura2000 site due to vessel emissions is **not significant.**
1.3	Vessel operation	Discharges to sea (Drainage discharges from the vessel's bilge water, ballast water)	Changes in chemical composition of seawater	Potential reduction in seawater quality	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	Wastewater discharges from the survey vessel will be managed according to MARPOL 73/78 – Annex I Regulations for the Prevention of Pollution by Oil. The dilution and assimilative capacity of the water would be expected to minimize any adverse impacts from these vessel discharges. The potential impact on selected Annex IV species is therefore **not significant**. Activities will be performed 72 km from the Doggerbank, the absence of significant seawater quality reductions and the large distance from sensitive ecological features for the selected HD Annex IV species makes the potential impact on receptors due to potential water quality reduction **not significant.**
1.4	Vessel operation	Artificial lighting during night activities	Physical disturbance	Modification of the night lighting level	N2000 Seabirds	The survey vessel will not enter the Doggerbank that is 72 km away. The vessel's artificial lighting, if operating at night, might disturb seabirds and cause behavioural changes. Only 1 vessel will perform the activity and this will not increase or modify the marine traffic in the North Sea. The location and limited vessel lighting represents a **not significant** impact on seabirds that are objective of conservations for the N2000 site**.**
1.5	Vessel operation	Interference from vessel movements	Physical disturbance	Traffic increasing and collisions	N2000 Cetaceans N2000 Seals	One vessel will be used for 6 days in a limited area. Its movement will not increase the marine traffic (e.g., general cargo, fishing and other O&G vessels) and potential impact on selected Annex IV species is **not significant**.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
					HD Annex IV Cetaceans	Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
1.6	Vessel operation	Vessel movement and handling	Introduction of non-native species	Introduction of invasive species from vessel ballast water exchange and hull fouling	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	Non-indigenous / invasive marine species may be introduced to the local environment in vessel ballast water and hull fouling. Such species can out-compete and displace native marine species, disrupt food chains and imbalance the local marine ecosystem. The vessel has been operating solely in the North Sea and is unlikely to present a source of non-native / invasive species during the proposed survey activities. The vessel follows the IMO Ballast Water Management Convention and is unlikely to have non-native / invasive marine species in its discharged ballast water. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, and selected Annex IV species, will not be affected. The potential impact on selected receptors is **not significant.**
1.7	Vessel operation	Solid waste from food, drainage from cleaning, maintenance	N/A	N/A	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	All marine litter to be produced by the survey vessel involved in the activities will be returned to land for appropriate management as per TEPDK´s waste management plan applicable to all offshore activities. Therefore, no pressure or potential impacts are identified.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
2.1	Drilling	Using USBL system	Underwater noise	PTS, TTS behavioural disturbance	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	An USBL system will be used to locate the seabed frame. Using USBL system may impact marine animals up to 170 m from the sound source; however, these impacts assume that an individual remains within the acoustic beam, which his unrealistic. Any marine mammal is likely to move away from the sound source upon hearing the onset of the USBL activity. Furthermore, it is highly unlikely that a marine mammal would be within the survey area and within the acoustic beam during USBL operation, because: • The acoustic beam has a very narrow maximum diameter of approximately 10-15° (Kongsberg, *undated*); • The survey has a very short duration (2 days); • The vessel stands stationary on the survey point and is easy to be bypassed; the density of marine cetaceans in the survey area is <1 individual / km^2 (Waggit *et al*., 2019) and pinnipeds are infrequent visitors to the seas 200 km from the Danish coast; • The additional noise emanating from the survey vessel, which would act as a deterrent; the survey vessel would be operating noisy dynamic positioning (DP) thrusters to remain in position during the activity; and • The low level of fugitive acoustic noise from the USBL is also likely to deter any marine mammals from approaching the USBL acoustic beam where the highest levels of underwater noise may be encountered. The potential impact on selected Annex IV species due to the use of USBL during the geotechnical survey is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
2.2	Drilling	Drilling	Underwater noise	PTS, TTS behavioural disturbance	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	The drilling unit is mounted onboard. Underwater noise from drilling occurs below the seabed. It is a not impulsive broadband noise occurring at low frequencies (below 200 Hz) and it is further attenuated by the seabed. A 30 m borehole takes maximum 8 hr. Drilling will last less than 2 days across the 6 locations. Drilling noise is not expected to have a significant impact on selected Annex IV species due to the type of noise and short duration of activities. Activities will be about 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
2.3	Drilling	Discharges to sea (use of drilling fluid)	Changes in chemical composition of seawater	Potential reduction in seawater quality	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	Biodegradable drilling fluid (Guar gum or similar) would be used, as a contingency measure, depending on the nature of the ground conditions. Typically, seawater should be enough in clays and rock; in sands, Guar gum is needed to avoid the drilled hole from collapsing. Approximately 3 kg of Guar gum mixed in 1 m^3 of seawater per drilled meter could be used. A total consumption of about 450 kg of Guar Gum and 150 m^3 of seawater is therefore expected to drill a total of 150 m during the geotechnical campaign. Guar gum is commonly used to thicken and stabilize food products. In this case, it is used to create a low solid, biodegradable drilling fluid. Guar gum is biodegradable and, if used, discharge will be subdivided in small quantities at the different sampling locations; moreover, the dilution and assimilative capacity of the water would be expected to further minimize any adverse impacts from this discharge.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
						The potential impact on selected Annex IV species due to the discharge of biodegradable drilling fluid is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
2.4	Drilling	Lowering and positioning the seabed frame	Physical disturbance	Potential reduction of mammal movement	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	The drilling unit will be lowered from the vessel to the seabed and it will remain in place for a few hours at each sampling point. This equipment could impact marine mammal movement however, these impacts assume that an individual will pass below the vessel, which is unrealistic. Any marine mammal is likely to move away from the survey area during operation. Moreover, the density of the selected marine mammals in the survey area is <1 individual / km^2 (Waggit *et al*., 2019) and pinnipeds are infrequent visitors to the seas 200 km from the Danish coast. The potential impact on selected Annex IV species due to the presence of the seabed frame is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
2.5	Drilling	Borehole drilling	Changes in suspended sediment/turbidity	Water quality decline	N2000 Habitat 1110	The drilling unit will temporarily interact with the seabed during activities. Sediment may be entrained in the water column, but volumes will be negligible and will quickly disperse in the water column.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
					N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	Annex IV selected species will not be impacted. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating submerged sandbanks, harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
2.6	Drilling	Borehole drilling	Smothering	Decline in benthic habitat quality	N2000 Habitat 1110	The drilling unit may temporarily smother benthic habitat and benthic organisms for a few hours per test. Benthic animals are likely to re-colonize quickly any disturbed habitat after the activities are complete (e.g., IOGP (2021), states recovery can be well advanced within a year). Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating submerged sandbanks will not be affected. Thus, the potential impact on receptors due to a decline in benthic habitat quality is **not significant.**
2.7	Drilling	Drilling string penetration	Sediment loss	Decline / loss in benthic habitat quality	N2000 Habitat 1110	String penetration will disturb the seabed locally but no habitat will be lost. Drilling will temporarily disturb seabed for 123 cm^2 (0,0123 m^2) at each sampling location. Any disturbed seabed is likely to recover quickly after the activities are complete (e.g., IOGP (2021), states recovery can be well advanced within a year). Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating submerged sandbanks will not be affected.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
						Thus, the potential impact on receptors due to decline in benthic habitat quality is **not significant.**
3.1	CPT	Using USBL system	Underwater noise	PTS, TTS behavioural disturbance	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	An USBL system will be used to locate the penetrometer. The potential impact on selected Annex IV species due to the use of USBL during the geotechnical survey is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.** For details refer to item nr. 2.1.
3.2	CPT	Lowering and positioning the penetrometer	Physical disturbance	Potential reduction of mammal movement	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	The penetrometer will be lowered from the vessel to the seabed and it will remain in place for few hours at each sampling point. The potential impact on selected Annex IV species due to the presence of the seabed frame is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus that N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.** For details refer to item nr. 2.3.
3.3	CPT	Penetrometer testing	Changes in suspended sediment/turbidity	Water quality decline	N2000 Habitat 1110	The CPT unit will temporarily interact with the seabed during activities. Sediment may be entrained in the water column, but volumes will be negligible and will quickly disperse in the water column.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
					N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	Annex IV selected species will not be impacted. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating submerged sandbanks, harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.**
3.4	CPT	Penetrometer testing	Smothering	Decline in benthic habitat quality	N2000 Habitat 1110	The CPT unit may temporarily smother benthic habitat and benthic organisms for a few hours per test. Any disturbed seabed is likely to re-colonize quickly after the activities are complete (e.g., IOGP (2021), states recovery can be well advanced within a year). Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating submerged sandbanks will not be affected. Thus, the potential impact on receptors due to a decline in benthic habitat quality is **not significant.**
4.1	Sampling	Using USBL system	Underwater noise	PTS, TTS behavioural disturbance	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	An USBL system will be used to locate the penetrometer. The potential impact on selected Annex IV species due to the use of USBL during the geotechnical survey is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.** For details refer to item nr. 2.1.

Item Nr.	Activity	Sub Activities	Pressure	Potential impact	Receptors	Overall Significance
4.2	Sampling	Lowering and positioning the downhole jacking unit	Physical disturbance	Potential reduction of mammal movement	N2000 Cetaceans N2000 Seals HD Annex IV Cetaceans	The downhole jacking unit will be lowered from the vessel to push sample tubes (1 m long and up to 7.6 cm in diameter) into the seabed to take samples at each sampling point. The potential impact on selected Annex IV species due to the presence of the seabed frame is **not significant**. Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating harbour porpoise and harbour seal, will not be affected. The potential impact on selected receptors is **not significant.** For details refer to item nr. 2.3.
4.3	Sampling	Core sampling	Sediment loss	Decline / loss in benthic habitat quality	N2000 Habitat 1110	6 sampling cores, 1 m long and up to 7.6 cm in diameter, will be collected. Sampling will disturb the seabed locally but no habitat will be lost. Sampling will remove approximately 0.0045 m^3 of sediment for each core. Any disturbed seabed is likely to recover quickly after the activities are complete (e.g., IOGP (2021), states recovery can be well advanced within a year). Activities will be performed 72 km from the nearest N2000 site, thus the N2000 objective of conservating submerged sandbanks will not be affected. Thus, the potential impact on receptors due to a decline in benthic habitat quality is **not significant.**

5. Potential Impacts on the Marine Strategy Framework Directive and Novana Program

5.1. Marine Strategy Framework Directive

As reported in the Danish Marine Strategy II (Danish Ministry of Environment, 2019):

> "Targets for achieving good environmental status have been set for each topic. There are 68 environmental targets in the Danish Marine Strategy II, of which 29 are operational environmental targets. The latter are either specific actions to support achievement of the other targets, or they clarify further work to set more precise targets in the future. Both types of environmental targets are legally binding for the authorities. This means, for example, that authorities may not grant authorisation to activities or discharges that are incompatible with achieving the targets."

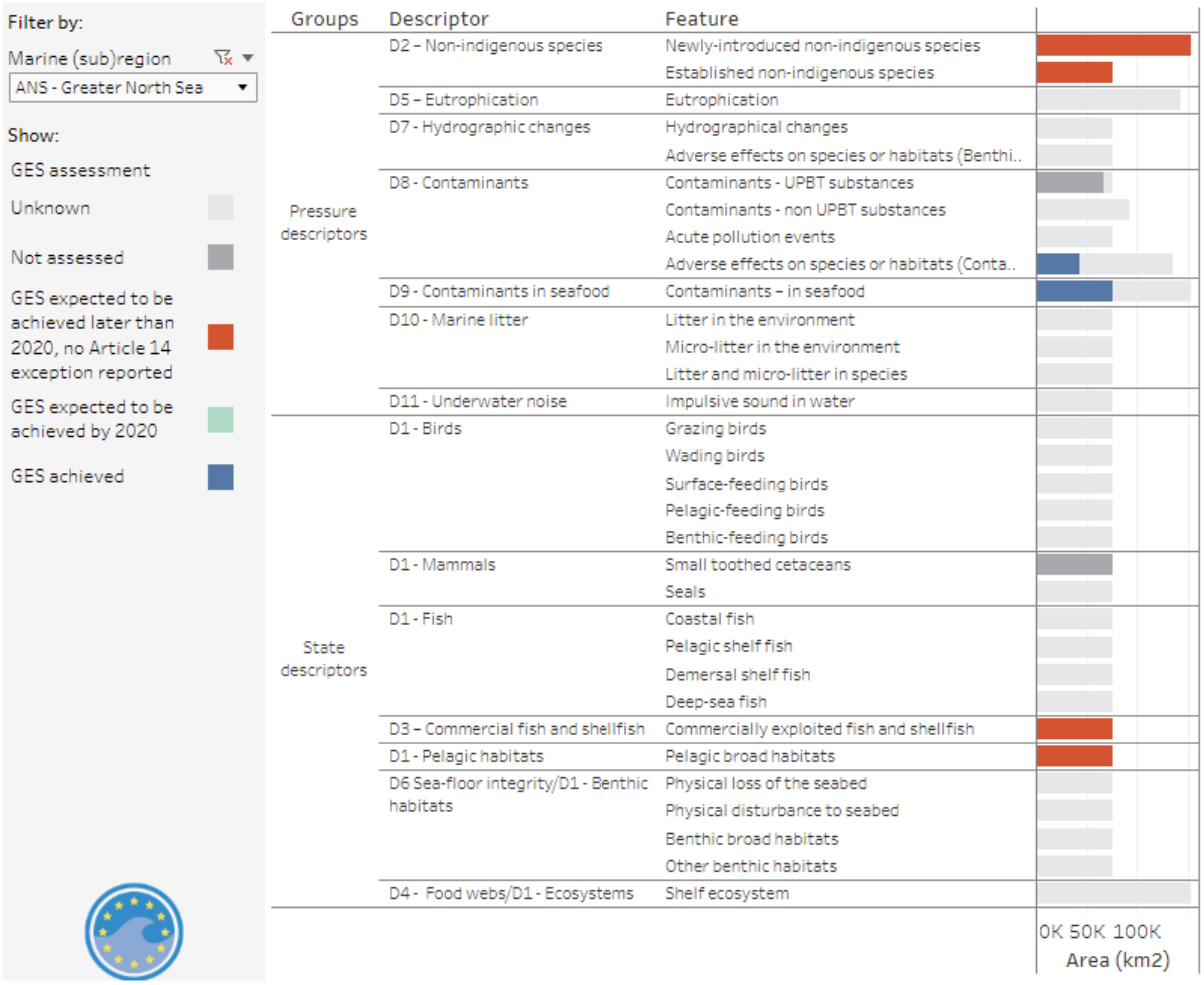
5.2. Current Environmental Status

OSPAR[2] communicated that the overall effect of OSPAR measures and their implementation by Contracting Parties has been to significantly improve the overall quality status of the Greater North Sea where there are high levels of oil and gas activity.

A summary of the good environmental status (GES) for each descriptor in the Greater North Sea area is published in the WISE Portal. Denmark has assessed the environmental status of various features per descriptor under the 2018 update of MSFD Article 8, which were reported to the European Commission (Table 9).

[2] OSPAR: Impacts of offshore oil and gas industry on the marine environment shown to have decreased in the North-East Atlantic: https://www.ospar.org/news/oicassessment. Accessed 21/07/2023.

Table 9. Good Environmental Status Assessment in the Greater North Sea Area



Source: WISE Portal, 2023

Table 10 summarises the state of each descriptor in the North Sea presented in the “Danish Marine Strategy II – Part 1” report (Danish Ministry of Environment, 2019 and 2020). Targets are not defined for all descriptors. The remaining targets are defined as trends that describe a positive development or descriptive target.

Table 10. Extracted Summary of Environmental Status of Descriptors

Descriptor		Status for the North Sea	
		Group	**Status**
D1	Biodiversity (birds)	■ Herbivorous and foraging in water column	■ Stable or increasing
		■ Wading and foraging in the water surface	■ Less than 75% of species are stable or increasing
		■ Overwintering	■ Majority of species are stable, increasing or fluctuating
D1	Biodiversity (marine mammals)	■ Harbour seal	■ GES
		■ Grey Seal	■ Increasing population (no GES in 2013)
		■ Harbour porpoise	■ Stable population with favourable conservation status
D1	Biodiversity (fish that are not exploited commercially)	■ 14 species assessed	■ Less than 25% meet good environmental status ■ Population density- below 50% have good status
D1	Biodiversity (pelagic habitat)	■ Phytoplankton biomass	■ Steady decline (but slight increase in 2012)
		■ Zooplankton	■ Insufficient data to assess development
D2	Non-indigenous species	■ Insufficient data, but likely that GES has not been achieved	
D3	Commercially exploited fish stocks	■ 22 selected stocks of fish, crustaceans and shellfish	■ Ten stocks have GES ■ Eight stocks do not meet good status
D4	Marine food webs	■ Despite assessment of individual sub-elements in the food web, it is currently not possible to assess when the food web, as a whole, will meet good environmental status. However, it is expected that the balance in the marine food web will improve as environmental targets for pressure factors and status under the other topics/descriptors are achieved	
D5	Eutrophication	■ Open marine areas far from the coast	■ GES
		■ Open marine areas close to the coast	■ GES not achieved yet
D6	Sea floor integrity	■ No set threshold values for GES, but analysis indicates that good status is not met for the sea floor in relation to disturbance and similarly in relation to loss for certain habitat types	

Descriptor		Status for the North Sea	
		Group	**Status**
		■ There is insufficient knowledge to assess when good environmental status will be achieved	
D7	Hydrographical changes	■ Threshold values have not yet been set and there is insufficient knowledge to assess when good environmental status will be achieved	
D8	Contaminants (concentrations and species health)	■ PFOS and Benzo(a)pyrene	■ GES
		■ Mercury or the group of brominated flame retardants	■ GES not achieved
D8	Contaminants (acute pollution events)	■ GES cannot be assessed for acute pollution events in the North Sea, as there are large annual variations over the period for oil and chemicals spills from oil and gas installations and therefore not possible to derive a trend over the years.	
D9	Contaminants in seafood for human consumption	■ Concentrations of the heavy metals lead, cadmium, mercury, as well as benzo(a)pyrene in seafood for human consumption	■ GES
		■ Concentrations of dioxins and PCB	■ Above the maximum residue values have been found in mackerel, cod liver and salmon.
D10	Marine litter	■ No set threshold values, there is no scientific basis for assessing quantitatively when good environmental status will be achieved	
D11	Underwater noise	■ No set threshold values for levels of underwater noise compatible with good environmental status	

Source: Danish Ministry of Environment, 2019 and 2020

Project activities will only use 1 vessel for 6 days and the undertaking of 1 borehole with continuous soil sampling and 5 boreholes with continuous CPT testing that may temporarily disturb up to 123 cm^2 of seabed, each. Discharges and gas emissions will be minimal and will be diluted or dispersed rapidly.

The main potential impacts are:

- Underwater noise from vessel propellors that is typical of vessel noise in the area, may disturb protected marine mammals, however, impacts will be of low intensity, short-term and close to the vessel;
- Underwater noise from the HIPAP system used to accurately position the seabed frame for drilling, testing and sampling, may disturb protected marine mammals. Any potential impact will be short-term and constrained to beneath the survey vessel. Vessel noise will also partly override any HiPAP acoustic noise and encourage marine mammals to swim away before the HiPAP system is used at each survey point;

- Underwater noise from drilling occurs below the seabed, it is not impulsive and lasts less than 2 days; no impact is expected;
- The vessel will be local to the North Sea and will not introduce non-indigenous species;
- The drilling string, CPT unit and sampling will have a brief, negligible footprint on and in the seabed. Seabed and benthic fauna communities will not be impacted significantly.

The insensitive and ubiquitous benthic fauna will rapidly recover and the seabed currents will rapidly remove any physical seabed disturbance. Furthermore, any impacts in the survey area will occur about 72 km from the nearest Naura2000 area.

The assessment of the potential impacts from the geotechnical survey activities on the eleven MSFD descriptors is presented in Table 11.

The assessment is based on the impacts described in Section 4.2 for the planned geotechnical survey activities.

Table 11. Potential Impacts of Geotechnical Survey Activities on the MSFD Descriptors

Descriptors Based on the MSFD	Source of Impact	Overall Impact Assessment	Impacts to Environmental Targets
Descriptor 1 - Biodiversity: The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions	1.1 Underwater noise of propellers 1.2 Burning of diesel fuel in diesel engines, change in air quality 1.3-2.3 Discharges to sea, changes in chemical composition in sea water 1.4 Artificial lighting 1.5 Vessel movements 2.1-3.1-4.1 Underwater noise from the HiPAP system 2.2 Underwater noise from drilling 2.4 -4.2 Seabed sediment disturbance 2.5-3.3 Changes in suspended sediment/turbidity 2.6-3.4 Smothering of benthic communities.	**No or negligible impact** ▪ Temporary and focused, but not significant impact from underwater noise. ▪ Discharges to sea are assimilated rapidly, MARPOL followed ▪ Temporary and local disturbance from the vessel's artificial lighting. ▪ Vessels already moving throughout the DUC, negligible change. ▪ Local, short term, rapid dilution. ▪ Insensitive receptor, local impact, rapid recovery. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 2 – Non-indigenous species: Introduced by human activities are at levels that do not adversely alter the ecosystems	1.3 Discharge to sea 1.5 Vessel movements and handling, introduction of invasive species	**No or negligible impact** ▪ The standards and procedures for managing and controlling ships' ballast water and sediments according to the Ballast Water Management Convention (adopted in 2004 and enter into force 8 Sep. 2017) and the guidelines for controlling and managing ships' biofouling to minimize the transfer of invasive aquatic species, by the International Maritime Organization (IMO), will prevent the spread of harmful aquatic organisms from one region to another. ▪ Vessels sourced from the North Sea. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 3 - Commercial fish and shellfish: Populations of commercially exploited fish and shellfish exhibit a population age	1.1 Underwater noise of propellers 1.3-2.3 Discharges to sea, changes in chemical composition in sea water	**No or negligible impact** ▪ Temporary and focused, but not significant impact from underwater noise. ▪ Discharges to sea are assimilated rapidly, MARPOL followed	Populations of commercially exploited fish and shellfish will be unaffected

Descriptors Based on the MSFD	Source of Impact	Overall Impact Assessment	Impacts to Environmental Targets
and size that is indicative of a healthy stock	2.1-3.1-4.1 Underwater noise from the HiPAP system		
Descriptor 4 - Food webs: All elements of the marine food webs occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.	1.1 Underwater noise of propellers 1.3-2.3 Discharges to sea, changes in chemical composition in sea water 1.5 Vessel movements 2.1-3.1-4.1 Underwater noise from the HiPAP system 2.4 -4.2 Seabed sediment disturbance 2.6-3.4 Smothering of benthic communities.	**No or negligible impact** ▪ Temporary and focused, but not significant impact from underwater noise. ▪ Discharges to sea are assimilated rapidly, MARPOL followed. ▪ Vessels already moving throughout the DUC, negligible change. ▪ Local, short term, rapid dilution and seabed recovery. ▪ Insensitive receptor, local impact, rapid recovery. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 5 - Eutrophication: Human-induced eutrophication is minimized, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters.	1.7 Solid waste from food, drainage from cleaning and maintenance	**No or negligible impact** ▪ All wastes will be returned to land for appropriate management.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 6 - Seafloor integrity: Seafloor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.	2.4 -4.2 Seabed sediment disturbance 2.6-3.4 Smothering of benthic communities 2.7-4.3 Seabed loss	**No or negligible impact** ▪ Local, short term, rapid dilution and seabed recovery. ▪ Insensitive receptor, local impact, rapid recovery. ▪ Temporary, local impact during activities, rapid recovery due to seabed currents. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.

Descriptors Based on the MSFD	Source of Impact	Overall Impact Assessment	Impacts to Environmental Targets
Descriptor 7 - Hydrographical conditions: Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.	2.4-3.2-4.2 Physical disturbance	**No or negligible impact** ▪ Temporary positioning of the seabed frame. No impact expected. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 8 - Contaminants: Their concentrations are at levels not giving rise to pollution effects.	1.3-2.3 Discharge to Sea	**No or negligible impact** ▪ Discharges to sea are assimilated rapidly, MARPOL followed. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 9 - Contaminants in seafood: Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.	1.3-2.3 Discharge to Sea	**No or negligible impact** ▪ Discharges to sea are assimilated rapidly, MARPOL followed. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 10 - Marine litter: Properties and quantities of marine litter do not cause harm to the coastal and marine environment.	1.7 Solid Waste	**No or negligible impact** ▪ All marine litter will be returned to land for appropriate management.	Project activities will not affect established environmental targets; good environmental status will be maintained.
Descriptor 11 - Energy including underwater noise: Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	1.1 Underwater noise of propellers 2.1-3.1-4.1 Underwater noise from the HiPAP system 2.2 Underwater noise from drilling	**No or negligible impact** ▪ Temporary and focused but not significant impact from underwater noise. ▪ Temporary but not significant impact from underwater noise. ▪ 72 km distance to the nearest Natura2000 site is excessive.	Project activities will not affect established environmental targets; good environmental status will be maintained.

6. Assessment of the potential effects on NOVANA Program

The marine strategy's monitoring program 2021-2026 is mainly based on monitoring activities of NOVANA - sub-program for seas and fjords 2017-2021 (DEPA, 2017). New activities in the marine strategy's monitoring program 2021-2026, which either supplement already existing monitoring or represent completely new activities within a subject area, have effect since 2021 and will also be incorporated in the future NOVANA program for sea and fjords after its revision made in 2021. The offshore monitoring stations under the NOVANA Program and the geotechnical survey area are shown in Figure 10.

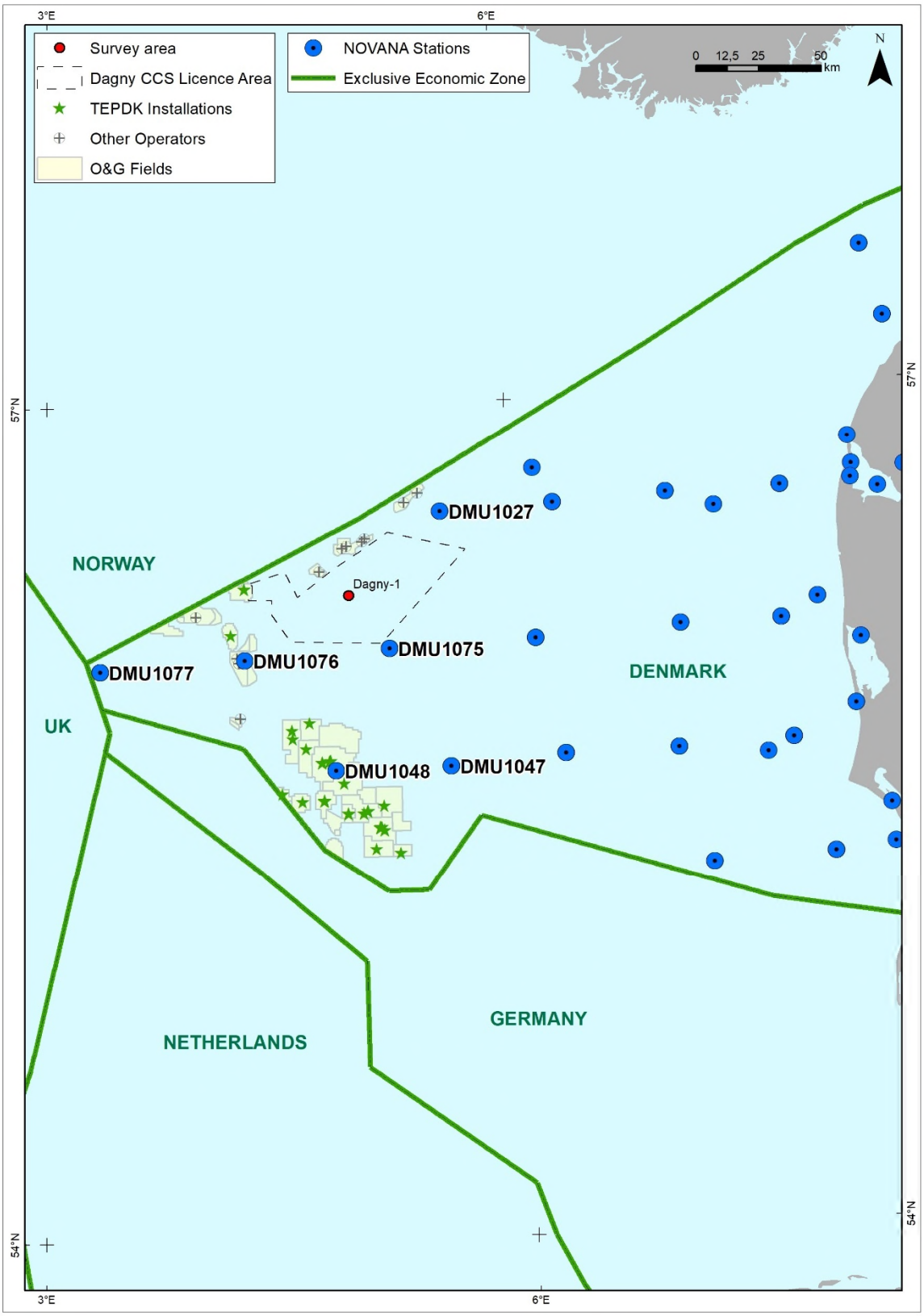


Figure 10. Project location and NOVANA - National Monitoring Program 2017-2021

The survey area is approximately 27 km from the closest NOVANA program station (DMU1075). This station monitored plankton, soft-bottom fauna, hydrographic profile measurements, and nutrients and chlorophyll in water in 2017-2021. Water chemistry samples, including salinity, temperature, sight depth, chlorophyll and fluorescence, and soft-bottom fauna samples were taken in 2021 (Hansen & Høgslund, 2021). The project activities have no significant impact on seawater quality and on seafloor integrity. No significant impact of the geotechnical survey activities on the NOVANA monitoring stations are likely, given the temporary and localized geotechnical survey impacts and the relatively large distances to the nearest monitoring station.

7. Potential Cumulative Effects

Cumulative impacts are the additional impacts that may be generated due to a combination of developments or activities in the DUC, that, when added to the impacts of the geotechnical survey, could cause a greater impact on Natura 2000 areas and/or Annex IV species. Such impacts may arise due to spatial overlap (e.g., an overlap in the spatial extent of air or water quality changes) or temporal overlap of impacts (e.g., noise impacts caused by simultaneous activities at the same time from various sources).

Figure 11 presents a schedule of the relevant activities in the DUC for 2024, other than normal operational activities (e.g., produced water discharges, service vessel movements).
The schedule presents the current approved windows to perform the activities (also considering downtime for bad weather conditions).

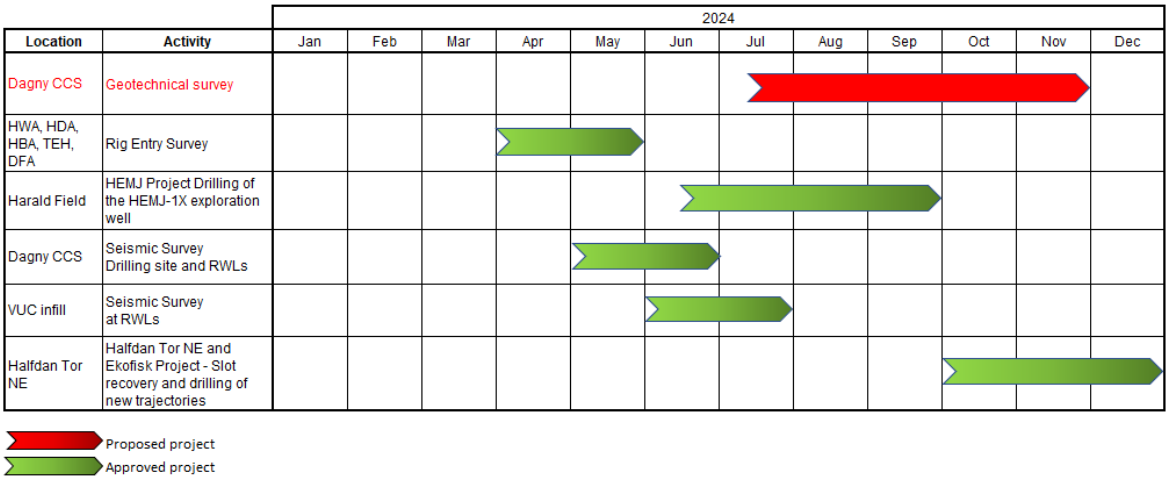


Figure 11. Summary of the relevant activities occurring in the DUC

The Dagny geotechnical survey potentially overlaps with the VUC seismic survey, the drilling of the HEMJ-1X well from the Harald platform and the drilling of the Ekofisk well from the Halfdan platform; however, the VUC survey area is about 60 km away and the two platforms are approximately 40 km and 85 km away respectively from the Dagny geotechnical survey area and no spatial overlap of potential impacts are anticipated considering the survey activities will have negligible potential impacts and close to the vessel.
No cumulative impacts will, therefore, adversely impact the closest designated protected area (which is approximately 72 km away, i.e., Doggerbank (DE1003301) in Germany, and the Annex I habitats, Annex II and IV species and bird species identified under the EU Birds and Habitat Directives.

8. Unplanned Events

This section presents the risk of minor and major accidental events due to the geotechnical survey activities. Major accidental events shall be identified, assessed and reduced to a level As Low As Reasonably Practicable (ALARP) with embedded control measures.

The geotechnical survey vessel may collide with an existing platform, but this is unlikely as the vessel will not be operating near any existing platforms. The vessel may collide with another vessel, but the risk is typical of any vessel operating in or transiting the DUC.

A small lubricant or fuel spill is also a risk during the geotechnical survey. This may cause a minor accidental event with a finite volume of spilled hydrocarbons. TEPDK has an existing Oil Spill Contingency Plan (TEPDK-L2-PRO-HSE-0016) that would be implemented in the unlikely event of a hydrocarbon spill.

The geotechnical survey does not comprise any intervention or work on a well or existing pipeline. No further assessment of potential major impacts is therefore considered necessary.

9. Conclusion

This environmental significance assessment report is prepared based on the Offshore Habitat Order (BEK No. 786 of 14/06/2023 Executive Order on the Administration of International nature conservation areas and the protection of certain species during preliminary studies, exploration and extraction of hydrocarbons, underground storage, pipelines, etc. offshore) to evaluate if the proposed Dagny geotechnical survey will potentially impact designated N2000 areas within or outside the Danish territory and/or the protection of certain Annex IV species.

The current report also considers the Marine Strategy Act (LBK No. 123 of 01/02/2024) and the NOVANA program.

The geotechnical survey, that is proposed to occur between mid-July and the end of November 2024 (depending on vessel availability and weather constraints) and is expected to take up to 5-6 days (including mobilization, surveying and demobilization) will not deliberately disturb or have significant environmental impact on the EU Habitats Directive Annex I habitats, Annex II and IV species, Natura2000 areas, due to the distance (72 km) from the geotechnical survey area to the closest designated protected area, that is the Doggerbank Natura2000 site (in German waters), and the low intensity and local extent of the potential impacts.

Moreover, there will be no significant impacts on the Descriptors set by the EU's Marine Strategy Framework Directive, implemented in Danish law by the Marine Strategy Act (LBK 123 of 01/02/2024) as good environmental status will be maintained and on the NOVANA monitoring program.

The closest international designated protected area (Doggerbank SIC (DE1003301)) is 72 km away in Germany and no transboundary impacts or cross-border effects are expected, due to the low intensity and local extent of the potential impacts.

For the same reasons, no cumulative impacts with any other projects or plans that, together with the Dagny geotechnical survey, may significantly impact designated N2000 sites or marine mammals, will occur.

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STANDARDVILKÅR FOR FORUNDERSØGELSER TIL HAVS

August 2018

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Indhold

Indledning

Dette dokument beskriver standardvilkår, som må forventes at skulle efterleves i forbindelse med de forundersøgelsesaktiviteter til havs, der udføres i henhold til lov om anvendelse af Danmarks undergrund (undergrundsloven), jf. lovbekendtgørelse nr. 960 af 13. september 2011 som ændret ved lov nr. 535 af 29. april 2015 og lov nr. 427 af 18. maj 2016, samt i henhold til tilladelser meddelt af Energistyrelsens efter kontinentalsokkellovens § 2, stk. 1, 1. pkt.

Aktiviteterne kan omfatte marine undersøgelser fra skib som eksempelvis indsamling af seismik, site surveys, havbundsprøver, gravimetri og magnetik. Lignende vilkår må forventes for øvrige forundersøgelser til havs. Energistyrelsen kan dog naturligvis konsulteres for afklaring af omfanget heraf. Dette gælder især for aktiviteter, der omfatter brug af eksplosiver, hvor der må forventes særlige forhold og vilkår.

Dokumentet indeholder ikke vilkår vedrørende boreoperationer. Der henvises i denne sammenhæng til Energistyrelsens vejledning for boringer.

Det skal bemærkes, at der efter en konkret vurdering kan stilles yderligere vilkår i den enkelte godkendelse/tilladelse meddelt inden aktivitetens igangsætning.

Der gøres opmærksom på, at efterlevelse af vilkårene beskrevet heri ikke fritager en rettighedshaver for at indhente andre tilladelser eller godkendelser, der kræves i henhold til dansk lovgivning.

Disse reviderede vilkår erstatter "VILKÅR FOR FORUNDERSØGELSER TIL HAVS, Rev 15. AUGUST 2013".

1. Generelle vilkår

1.1. Rettighedshaverens aktiviteter skal udføres i overensstemmelse med de vilkår, der er angivet i tilladelsen.

1.2. Væsentlige ændringer i det godkendte undersøgelsesprogram, herunder udvidelse af en igangværende aktivitet, skal fremsendes til Energistyrelsens godkendelse.

1.3. Der må ikke efterlades udstyr permanent på havbunden uden forudgående godkendelse heraf.

1.4. Alle undersøgelser skal respektere de gældende sikkerhedszoner for offshore installationer samt for rørledninger og kabler, jf. bekendtgørelse nr. 657 af 30. december 1985 og bekendtgørelse om beskyttelse af søkabler og undersøiske rørledninger (Kabelbekendtgørelsen) nr. 939 af 27. november 1992.

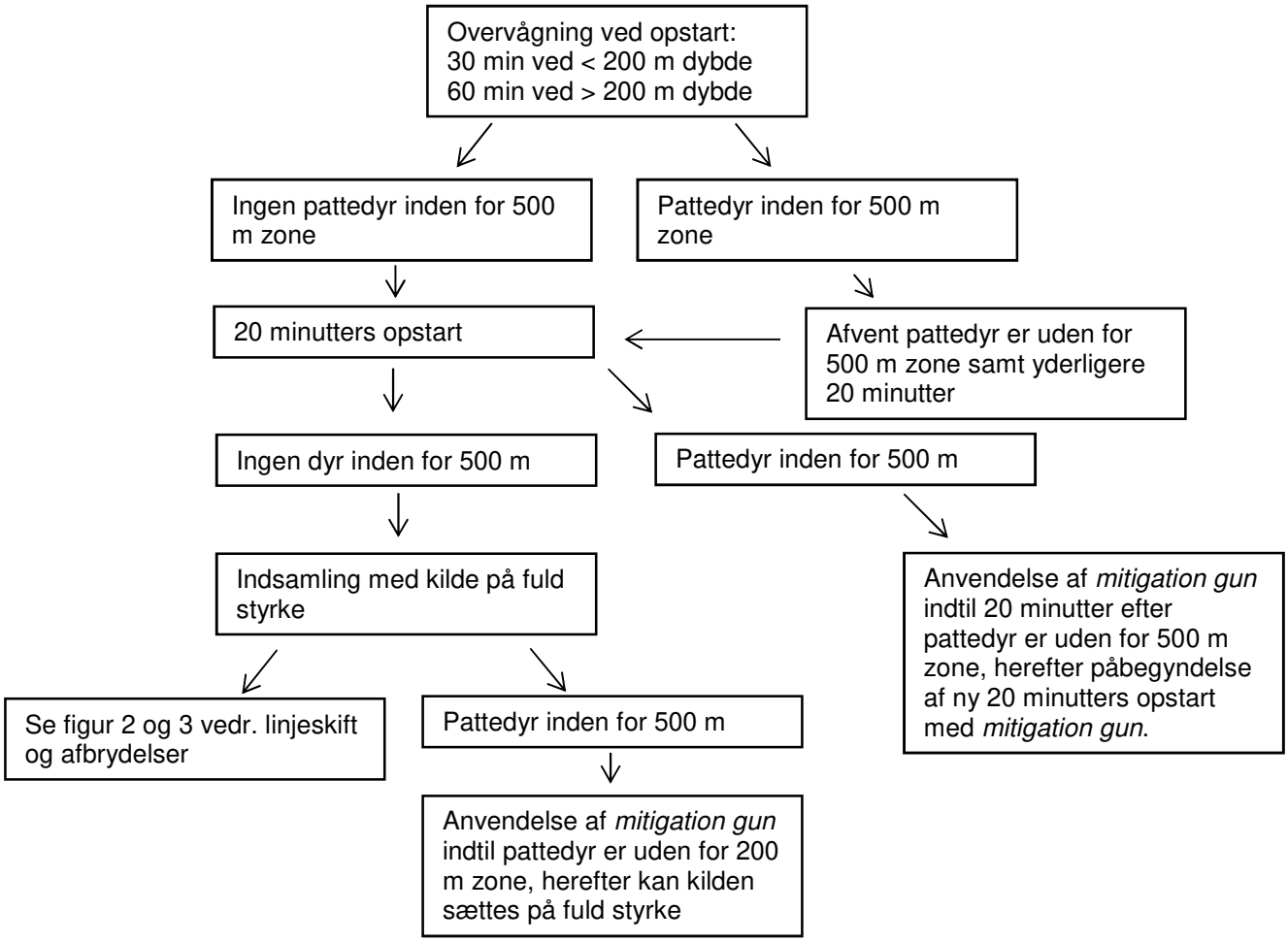
2. Afværgeforanstaltninger

2.1. I forbindelse med alle typer undersøgelser skal der tages de nødvendige forholdsregler, som forhindrer mulig skade på havpattedyr.

2.2. Alle aktiviteter skal udføres med fokus på at minimere emissioner. Dette indebærer, at alle kildeniveauer ikke må være højere end hvad en succesfuld gennemførelse af undersøgelsen kræver. Således må eksempelvis et *air gun array* ikke være større end nødvendigt for en given undersøgelse.

2.3. For seismiske undersøgelser gælder desuden vilkårene beskrevet i afsnit 2.3.1 til 0. Proceduren for opstart kan dog blive justeret i forhold til den enkelte aktivitet, afhængig af resultater fra lydmodelleringen medsendt ansøgningen. Dette vil i så fald fremgå af godkendelsen.

2.3.1. Af hensyn til beskyttelsen af havpattedyr skal der anvendes *soft start* procedure i overensstemmelse med fremgangsmåden beskrevet i figur 1.



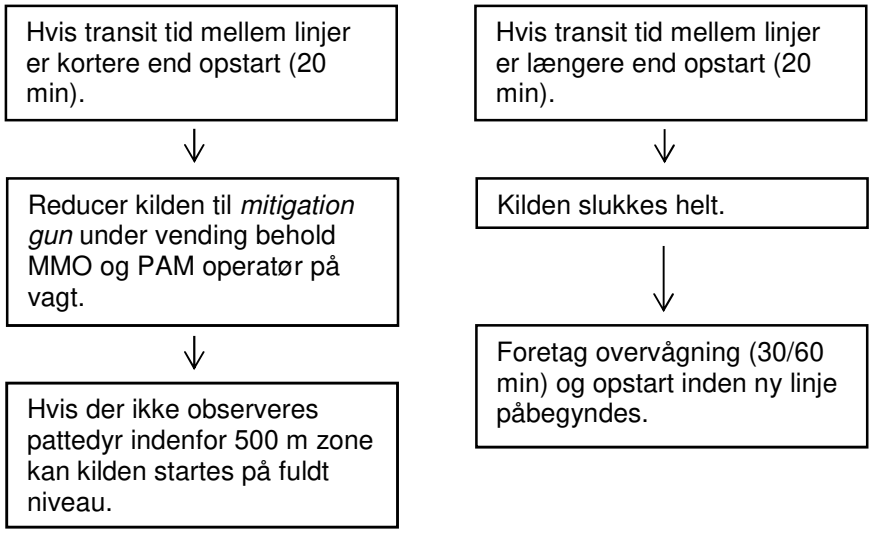
Figur 1, procedure for opstart (*soft start*)

2.3.2. Overvågning i forbindelse med opstart af kilden skal udføres dels af en observatør (*marine mammal observer, MMO*) samt ved brug af *Passive Acoustic Monitoring* (PAM udstyr) jf. desuden afsnit 2.3.4.

2.3.3. Ved brug af flere fartøjer anbefales det, at overvågningen foretages fra det fartøj som trækker kilden. MMO'en skal desuden være positioneret højt og med frit udsyn. Desuden skal der være etableret kommunikation mellem observatører og mandskab før overvågningen indledes.

2.3.4. Opstart af udstyr skal i videst muligt omfang udføres i dagslys. Hvis dette ikke er muligt, eksempelvis i forbindelse med tåge, kan overvågningen af marine pattedyr under opstarten udføres alene ved brug af PAM.

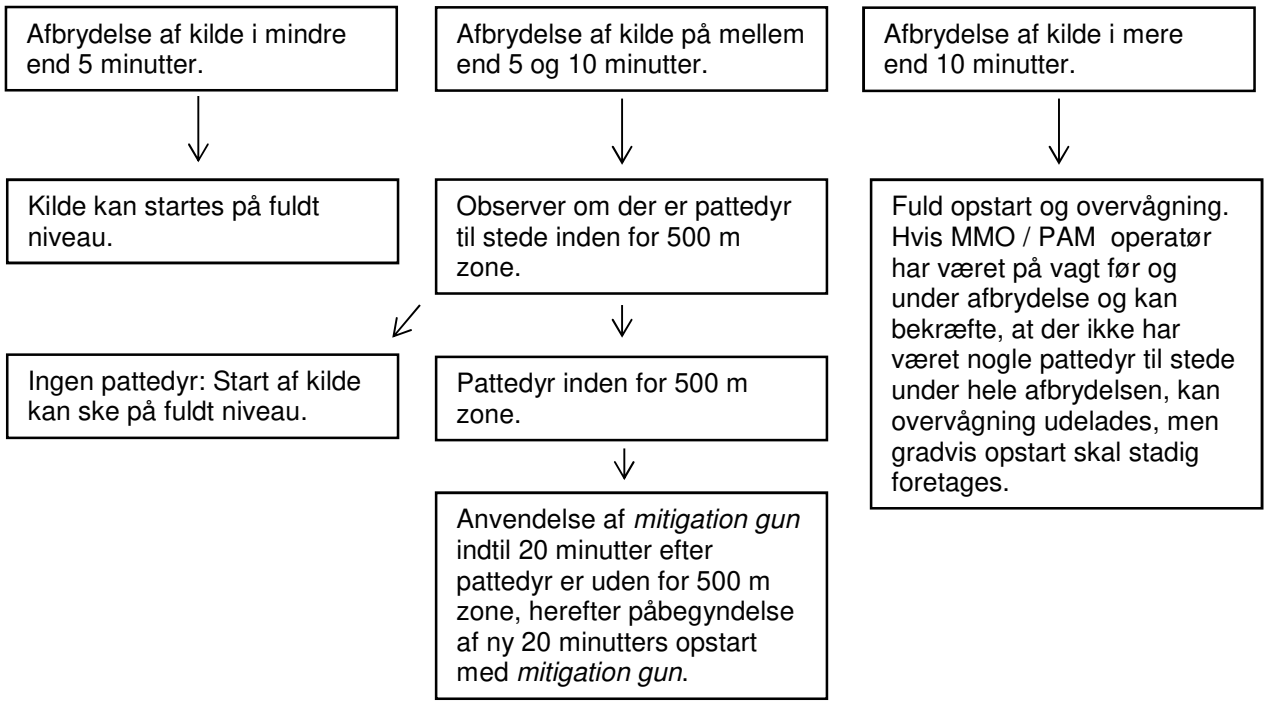
2.3.5. Ved linjeskift skal procedurerne beskrevet i figur 2 følges.



Figur 2, procedure ved linjeskift

2.3.6. Ved ikke-planlagte afbrydelser skal procedurerne beskrevet i figur 3 følges. Hvis det estimeres, at nedlukningen vil vare længere end hvad det tager at lave en fuld opstart, bør en *mitigation gun* ikke anvendes under afbrydelserne.

2.4. Ved observationer af havpattedyr skal følgende oplysninger indrapporteres til Energistyrelsen: Sted, tidsrum, art, antal af individer samt information om reaktion og den igangværende aktivitet hvorunder observationen fandt sted.



Figur 3, procedure ved afbrydelser

3. Koordinering og forhold til andre aktiviteter

3.1. Rettighedshaveren skal udføre undersøgelserne på en forsvarlig måde og sådan at virksomhed, der udøves af andre rettighedshavere samt fiskeriaktiviteter og anden næringsvirksomhed, ikke urimeligt vanskeliggøres. Særligt gælder, at undersøgelser, der gennemføres på områder omfattet af eneretstilladelser efter undergrundslovens § 5 skal gennemføres under hensyntagen til rettighedshavernes aktiviteter i området. Rettighedshaveren skal i god tid inden iværksættelse af forundersøgelsesaktiviteter orientere sådanne berørte rettighedshavere om de planlagte undersøgelsesaktiviteter og skal i fornødent omfang koordinere sin virksomhed med disse. Energistyrelsen kan give påbud om koordinering af virksomheden med andre rettighedshaveres virksomhed.

3.2. Rettighedshaveren skal rette henvendelse til Danmarks Fiskeriforening, Nordensvej 3, Taulov, 7000 Fredericia, tlf.: 70 10 40 40, for en nærmere drøftelse af tilrettelæggelsen af undersøgelserne, således at eventuelle gener for fiskeriet minimeres mest muligt. Danmarks Fiskeriforening kan evt. være behjælpelig med at udpege en fiskerisagkyndig person.

3.3. Rettighedshaveren kan pålægges af Energistyrelsen at medbringe en fiskerisagkyndig person på undersøgelsesskibet. Udgifterne forbundet hermed afholdes af rettighedshaveren. Den fiskerisagkyndiges kvalifikationer skal kunne godkendes af Landbrugs og Fiskeristyrelsen, Nyropsgade 30, 1780 København V, tlf.: 33 95 80 00. En fiskerisagkyndig skal dog ikke

medbringes, hvis fartøjet udelukkende opererer stationært og uden slæbende udstyr (geotekniske operationer o. lign.). Endvidere skal en fiskerisagkyndig ikke medbringes, hvis fartøjet udelukkende opererer inden for sikkerhedszonen på 500 meter omkring en platform.

3.4. Rettighedshaveren skal indgå aftale med den fiskerisagkyndige om arbejdstid, løn, forsikring og lignende. Den fiskerisagkyndige skal under opholdet ombord føre dagbog over sine iagttagelser. Dagbogen skal af den fiskerisagkyndige senest 10 dage efter hjemkomsten sendes til Energistyrelsen. Samtidig sendes kopi til rettighedshaveren og Landbrugs og fiskeristyrelsen.

3.5. Rettighedshaveren skal fremsende information om de planlagte undersøgelser til "Fiskeri Tidende", Nordensvej 3, Taulov, 7000 Fredericia, tlf.:70 10 40 40, e-mail: ft@dkfisk.dk.

4. Rapportering

4.1. For så vidt angår tilladelser efter undergrundsloven skal krav om rapportering og indlevering af data og prøver ske efter vilkårene fastsat i bekendtgørelse nr. 56 af 4. januar 2002 om indsendelse af prøver og andre oplysninger om Danmarks undergrund. Tilsvarende vilkår må forventes for tilladelser meddelt efter kontinentalsokkelloven. Punkterne 4.2 til 4.7 nedenfor gælder ligeledes.

4.2. Mens undersøgelserne udføres, skal rettighedshaveren pr. e-mail afgive ugentlig rapport med information om fremdrift i undersøgelserne samt eventuelle opståede problemer under indsamlingen. Rapporten bør bl.a. inkludere antal km/prøver indsamlet, kort med fremdrift og resterende undersøgelser samt oplysninger om planlagte undersøgelser. Ligeledes bør den omfatte informationer om observationer af marine pattedyr (jf. afsnit 2.4). Ugerapporten skal sendes til:

Energistyrelsen, e-mail: indvindingsekr@ens.dk

og

De Nationale Geologiske Undersøgelser for Danmark og Grønland (GEUS), e-mail: SubsurfaceA@geus.dk

4.3. Den første rapport skal indsendes 8 dage efter undersøgelsens påbegyndelse og skal første gang angive navnet på fiskeriobservatøren om bord, jf. afsnit 3 ovenfor.

4.4. Efterhånden som undersøgelserne udføres og de pågældende data foreligger, indsendes data vederlagsfrit til GEUS og Energistyrelsen efter de regler, der er fastsat i bekendtgørelse nr. 56 af 4. januar 2002 om indsendelse af prøver og andre oplysninger om Danmarks undergrund.

4.5. Efter afslutningen af undersøgelsen skal følgende rapporteres til Energistyrelsen: Start- og slut dato for undersøgelsesperioden og det totale antal linjer/km^2 for 2D/3D seismik. Hvis undersøgelsesperioden foregår henover et årsskifte, skal det totale antal km/km^2 rapporteres for hvert år. Hvis indsamlingen strækker sig over en landegrænse, skal det totale antal km/km^2 rapporteres for hvert land. Ved indsamling af 3D seismik skal hjørnekoordinaterne for

undersøgelsen endvidere rapporteres. Linjer/område for undersøgelsen skal desuden rapporteres til Energistyrelsen i et arcGIS format med ED50 som geografisk reference system.

4.6. For andre typer af forundersøgelser end seismik skal lignende information om undersøgelserne som beskrevet i afsnit 4.5 også rapporteres.

4.7. Ved støjende undersøgelser som eksempelvis seismiske surveys som anvender luftkanoner, eksplosiver, boomer eller sparker som lydkilde, skal der laves en støjregistrering, som det fremgår af *Noise_Register_Template.* Registret skal udfyldes og returneres til Energistyrelsen efter indsamlingen er afsluttet. Energistyrelsen kan i tvivlstilfælde tage stilling til, om den konkrete undersøgelse skal omfattes af registrering.

5. Oplysning om salg og bytte af data

5.1. Rettighedshaveren skal efter anmodning meddele fuldstændige oplysninger om salg eller bytte af indsamlede data til Energistyrelsen.

6. Myndighedsrepræsentation

6.1. Repræsentanter for Energistyrelsen og GEUS skal have adgang til at være til stede ved alle undersøgelser. Alle udgifter i forbindelse med rejse og ophold for disse repræsentanter skal afholdes af rettighedshaveren.

7. Fortrolighed

7.1. For forundersøgelser, der gennemføres under en eneretstilladelse efter § 5 i lov om anvendelse af Danmarks undergrund, gælder de i eneretstilladelsen fastsatte bestemmelser om fortrolighed.

7.2. For forundersøgelsestilladelser, der meddeles efter undergrundslovens § 3 i forbindelse med en forundersøgelse, som efter Energistyrelsens vurdering udgør en nødvendig udvidelse af en forundersøgelse, der udføres i henhold til en eneretstilladelse efter § 5 i lov om anvendelse af Danmarks undergrund, gælder de i eneretstilladelsen fastsatte bestemmelser om fortrolighed.

7.3. For øvrige forundersøgelsestilladelser efter undergrundslovens § 3 gælder det, at de i medfør af afsnit 4.4 indsendte oplysninger kan videregives også til andre end offentlige myndigheder efter udløbet af fortrolighedsperioden, som regnes fra det tidspunkt, hvor oplysningerne er tilvejebragt og tilgængelige for rettighedshaveren. Fortrolighedsperioden er 5 år. Ved tilladelser, der meddeles til forundersøgelser, som udføres alene med henblik på videresalg af de tilvejebragte oplysninger, er fortrolighedsperioden dog 10 år.

7.4. For tilladelser meddelt efter §24 i undergrundsloven og kontinentalsokkellovens § 2, stk. 1, 1. pkt. forbeholder de danske myndigheder sig ret til at anvende de indsamlede data i forbindelse med offentliggørelsen af egne forskningsresultater, samt at videregive oplysninger i forbindelse med de i afsnit 7.5 punkt A til D beskrevne forhold.

7.5. Fortroligheden som beskrevet i afsnit 7.3 og 7.4 er ikke til hinder for, at oplysningerne m.v. videregives, når:

A. ingen berettiget interesse hos rettighedshaveren tilsiger, at de hemmeligholdes.

B. rettighedshaverens interesse i tavshedspligtens opretholdelse findes at burde vige for hensynet til væsentlige offentlige interesser.

C. der meddeles oplysninger af generel karakter i forbindelse med afgivelse af offentlige udtalelser, årsberetninger eller lignende om efterforsknings- og indvindingsforhold samt miljømæssige forhold.

D. det sker som led i et samarbejde med andre landes myndigheder og under forudsætning af, at oplysningerne er undergivet tilsvarende tavshedspligt i det pågældende land.

8. Forskellen mellem *Standardvilkår for forundersøgelser til havs, maj 2018* og *JNCC guidelines for minimising the risk of injury to marine animals from geophysical surveys, August 2018.*

Nedenfor er nævnt de væsentligste forskelle mellem den danske "Standardvilkår for forundersøgelser til havs, maj 2018" (herefter benævnt DKSV) og den engelske "JNCC guidelines for minimising the risk of injury to marine animals from geophysical surveys", august 2018 (herefter benævnt JNCC).

Den danske vejledning og standard vilkår reflekter danske forhold og administrative praktisk på området.

Under hver underoverskrift listes vilkårenes forskelligheder:

1. Generele vilkår

Ifølge DKSV må udstyr ikke efterlades på havbunden uden forudgående godkendelse heraf. Derudover skal alle undersøgelser respektere de gældende sikkerhedszoner, der relatere sig til offshoreinstallationer, rørledninger og kabler.

JNCC indeholder ikke ovennævnte begrænsninger, men de følger af EU's habitatdirektiv, der definerer "Areas of importance" som særligt vigtige områder for beskyttede havpattedyr .

2. MMO/PAM operatører

JNCC kræver, at alle MMO og PAM operatører har gennemgået uddannelse og har et minimum af 20 ugers erfaring.

DKSV sætter ingen krav til MMO og PAM operatører.

2.3.1 Soft start

Opstartsproceduren er sammenlignelig for DKSV og JNCC. Forskellen består i, hvis der opdages havpattedyr på dansk territorium indenfor 500 meter under operationen, skal der ifølge DKSV anvendes mitigation gun, indtil pattedyret er udenfor en 200 meters zone. Herefter kan kilden sættes på fuld styrke. JNCC indeholder intet krav om at indsamlingen ophører, såfremt havpattedyr opdages, mens der indsamles seismik.

2.3.5 Linjeskift

DKSV: Varighed af linjeskift <20 min: kilden reduceres til *mitigation gun* under vending og MMO og PAM operatør er på vagt. Hvis der ikke observeres pattedyr indenfor en 500 m zone, kan kilden startes på fuldt niveau.
>20 min: Kilden slukkes helt. Overvågning og opstart foretages inden ny linje påbegyndes.

JNCC: Varighed < 40 min: Airgun affyring kan fortsætte, såfremt energien reduceres til 180 m3. Optagelsesintervallet (SPI) øges for at give en længere varighed mellem skud med en SPI, der ikke overstiger 5 minutter. Effekten øges og SPI'en sænkes i ensartede trin i løbet af de sidste 10 minutter af linjeskiftet, inden dataindsamling genoptages.
Varighed > 40 min: Affyring stoppes og fuld 20 min. soft start procedure initieres. Denne stoppes dog, hvis der observeres havpattedyr.

2.3.6 Ikke planlagte afbrydelser

DKSV: Afbrydelse af kilde i < 5 min: kilde kan startes på fuldt niveau.
Afbrydelse af kilde i 5–10 min: Observer om der er pattedyr indenfor 500 m zone. Hvis der intet pattedyr er, kan kilden startes på fuldt niveau. Hvis der er pattedyr indenfor 500 m zone, anvendes mitigation gun indtil efter 20 min efter pattedyr er udenfor 500 m zone, herefter påbegyndelse af ny 20 min opstart med mitigation gun.
Afbrydelse af kilde i > 10 min: Fuld opstart og overvågning. Hvis MMO/PAM operatør har været på vagt før og under afbrydelsen og kan bekræfte, at der ikke har været nogle pattedyr til stede under hele afbrydelsen, kan overvågningen udelades, men gradvis opstart skal stadig foretages.

JNCC: Afbrydelse af kilde < 10 min: intet krav om soft start, airguns kan genstartes og undersøgelsen kan genoptages på samme energiniveau som før afbrydelsen, såfremt ingen havpattedyr er blevet set i området. Såfremt der er tale om en planlagt afbrydelse af under 10 minutters varighed, skal MMO / PAM-operatørerne begynde at overvåge 20 minutter før den planlagte pause og fortsætte i pauseperioden.
Afbrydelse af kilde > 10 min: Observation om tilstedeværelse pattedyr samt soft start før opstart. Såfremt der er tale om en planlagt afbrydelse, anvendes samme procedure.

3. Andre aktiviteter

DKSV nævner fiskeri som en vigtig faktor i forhold til koordinering af andre aktiviteter. Undersøgelser skal udføres således, at virksomhed, der udøves af andre rettighedshavere samt fiskeriaktiviteter og anden næringsvirksomhed, ikke urimeligt vanskeliggøres. Der skal blandt andet rettes henvendelse til Danmarks Fiskeriforening for nærmere drøftelse af tilrettelæggelsen af undersøgelserne, idet der i nogle tilfælde skal medbringes en fiskerisagkyndig person på undersøgelsesskibet. Derudover skal rettighedshaveren fremsende information om de planlagte undersøgelser til "Fiskeri Tidende".

4. Rapportering

Ifølge DKSV skal indlevering af data og prøver ske efter vilkårene i bekendtgørelse nr. 56 af 4. januar 2002 om indsendelse af prøver og andre oplysninger om Danmarks undergrund. Derudover

skal rettighedshaveren ugentligt indsende en rapport pr. e-mail med information om fremdrift og evt. problemer samt indsende oplysninger, hvis der observeres havpattedyr. Efter endt undersøgelse skal start og slut dato samt det totale antal linjer/km2 for 2D/3D seismik eller lignende sendes til Energistyrelsen. Ved støjende undersøgelser skal der udføres en støjregistrering, som også sendes til Energistyrelsen. Regler om fortrolighed følger reglerne i undergrundsloven og/eller kontinentalsokkelloven, såfremt tilladelsen er givet efter disse.

JNCC ønsker en risikovurdering (indhold fremgår af rapporten) tilsendt før undersøgelsens igangsættelse, samt en MMO rapport indsendt efter endt undersøgelse. Derudover anbefales det at kontakte regulatoren i undersøgelsesperioden, såfremt spørgsmål og/eller problemer skulle opstå.