Thistle Alpha Platform
Crude Oil Storage Tanks
Decommissioning Programme

FINAL Version – 24 January 2020

EnQuest

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FIGURES AND TABLES

ABBREVIATION	EXPLANATION
~	Approximate
<	Less than
>	More than
AIS	Automatic Identification System
ALARP	As low as reasonably practicable
BEIS	Department for Business, Energy and Industrial Strategy
CMID	Common Marine Inspection Documents
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COLREGS	International Regulations for the Prevention of Collisions at Sea
COS	Crude Oil Storage
CSV	Construction Support Vessel
DP	Decommissioning Programme
DSV	Diving Support Vessel
EA	Environmental Appraisal
EC	European Commission
EnQuest	EnQuest Heather Limited
ENVID	Environmental Impact Identification
ES	Environmental Statement
ESAS	European Seabirds at Sea
FPU	Floating Production Unit
GMG	Global Marine Group
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organisation
in	inch
IPR	Interim Pipeline Regime
ITT	Invitation To Tender
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
km	Kilometre
L	Length
m	Metre(s)
m^2	Square Metre(s)
m^3	Cubic Metre(s)
MARPOL	International Convention for the Prevention of Pollution from Ships

ABBREVIATION	EXPLANATION
MAS	Marine Assurance Standards
MAT, SAT	Master Application Template, Supplementary Application Template
MBES	Multi-Beam Echo Sounder (which is a sonar-based seabed imaging system)
MCV	Monohull Crane Vessel
MPA	Marine Protected Area
MSV	Multipurpose Support Vessel
N,S,E,W	North, South, East, West
n/a	Not Applicable
NCMPA	Nature Conservation Marine Protected Area
NDR	National Data Repository
NFFO	National Federation of Fishermen's Organisations
NIFPO	Northern Ireland Fish Producers Organisation
NMPi	National Marine Plan Interactive
NORM	Naturally Occurring Radioactive Material
NO_X	Nitrogen Oxides
OGA	The Oil and Gas Authority
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris
PL	Pipeline Identification numbers (UK)
PMF	Priority Marine Features
PPC	Pollution Prevention and Control
ppm	Parts per Million
ROV	Remotely Operated Vehicle
ROVSV	Remotely Operated Vehicle Support Vessel
SAC	Special Areas of Conservation
SALM	Single Anchor Leg Mooring
SEEMP	Shipboard Oil Pollution Emergency Plan
SFF	Scottish Fishermen’s Federation
SIMOPS	Simultaneous Operations
SLV	Shear Leg Vessel
SMRU	Sea Mammal Research Unit
SNH	Scottish National Heritage
SOSI	Seabird Oil Sensitivity Index
SO_X	Sulphur Oxides

ABBREVIATION	EXPLANATION
SPA	Special Protection Area
SSCV	Semi-Submersible Crane Vessel
Te	Tonne
THC	Total Hydrocarbon Content
ugg^{-1}	Micro grams per gram
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
W	Width
WGS84	World Geodetic System 1984
WMP	Waste Management Plan

1. EXECUTIVE SUMMARY

1.1 Decommissioning Programme

This document contains a Decommissioning Programme, which concerns:

- Removal of the two Crude Oil Storage (COS) Tanks on the Thistle Alpha jacket.

The remaining Thistle installation infrastructure covered by notices under Section 29 of the Petroleum Act 1998 will be subject to decommissioning programme submissions at a later date. Removal of the tanks will not preclude available decommissioning options for the Thistle A installation.

Although removal of the Thistle COS Tanks is being treated in this document as a standalone project, EnQuest will continue to explore cost saving synergies with other projects.

Installations: In accordance with the Petroleum Act 1998, EnQuest Heather Limited (as operator of the Thistle field), and on behalf of the Section 29 notice holders (Table 1.3.3), is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the Crude Oil Storage tanks as detailed in Section 2 of this document. Partner Letters of Support will be provided directly to OPRED.

The Decommissioning Programme is submitted in compliance with national and international regulations and OPRED guidance notes. The schedule outlined in this document is for a one-year period with removal due to begin in 2019.

1.2 Introduction

The Thistle field was discovered in 1972 in the fourth UK acreage licensing round in block 211/18 and 211/19 (licenses P236 and P104). The field is produced over the Thistle Alpha platform (here after referred to as the Thistle A platform), a fixed installation providing manned production, drilling, and utilities facilities. The Thistle A installation is situated in block 211/18a of the United Kingdom Continental Shelf and operated by EnQuest Heather Limited. The Thistle field is located ~201km North East of Shetland, in a water depth of ~162m.

The Thistle jacket was installed in 1976 with the topsides modules being installed in the following year; Oil production commenced in February 1978. The COS tanks are attached to the lower section of the two main legs and were initially used as buoyancy to aid installation of the Thistle jacket. Subsequently they were used for storing the produced crude oil after the export route via the Single Anchor Leg Mooring (SALM) buoy-offloading system was made redundant. Thistle now exports oil via an 8in oil pipeline PL4555, so the COS tanks are no longer required and are redundant. Over the past few years the COS tank supports have sustained significant fatigue damage and after a programme of inspection and structural integrity assessments, it was concluded that in order to maintain the structural integrity of the Thistle jacket the COS tanks should be removed.

Since Thistle remains in production, a Cessation of Production justification in support of this Decommissioning Programme is not required. The Decommissioning Programme explains the principles of the removal activities and includes an assessment of the key environmental impacts and mitigations.

1.3 Thistle – Overview

1.3.1 Installations

Table 1.3.1: Installations being decommissioned			
Field(s):	Thistle	**Production Type**	Oil
Water Depth (m)	~162m	**UKCS Block**	211/18a
Sub-Surface Installations			
Number	**Type**	**Tank Weight (each)**	
2	Crude Oil Storage Tanks	1,201Te [1]	
Drill Cuttings piles[2]	**Distance to median**	**Distance from nearest UK coastline**	
25,456m^3	~11km	201km NE of Shetland	

1.3.2 Drill Cuttings

Table 1.3.2: Drill Cutting(s) pile information[3]		
Location of Pile Centre	**Seabed Area (m^2)**	**Estimated Volume of drill Cuttings (m^3)**
Beneath north west edge of the platform, surrounding each of the 9-metre diameter main legs	22,492	25,456

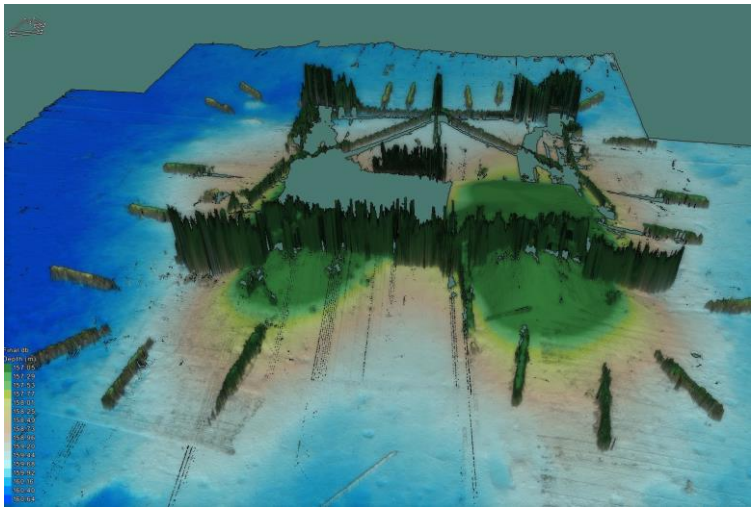


Figure 1.3.1: Image of Thistle Drill Cuttings using MBES

[1] This does not include any allowance for marine growth;
[2] Volume of cuttings pile is indicative only and is subject to further survey;
[3] The drill cuttings pile is not being addressed as part of this decommissioning programme. However, the drill cuttings may experience minor disturbance during COS tank removal operations. The base of the tanks are ~1m above the drill cuttings whilst the lowest support bracings to be cut are a couple of metres above the base of the tanks. The expectation therefore, is that no local dredging activities will be required to remove the COS tanks.

1.3.3 Section 29 Holders

Table 1.3.3: Installation Section 29 notice holders details		
Section 29 Notice Holder	**Registration Number**	**Equity Interest (%)[4]**
EnQuest Heather Limited	02748866	0%
Britoil Limited	SC077750	81.72%
Chrysaor Production (U.K.) Limited	00524868	18.28%
EnQuest Thistle Limited	04487223	0%

1.4 Summary of Proposed Decommissioning Programme

Table 1.4.1: Summary of decommissioning programme	
Proposed Decommissioning Solution	**Reason for Selection**
1. Crude Oil Storage Tanks	
Complete removal and recycling. The COS tanks will be removed and temporarily stored on the seabed. Thereafter, when an appropriate opportunity arises they will be recovered to shore and recycled, unless alternative re-use options are found to be viable. Any permit applications required for work associated with removal of the tanks will be submitted to the regulator as required.	Allows COS tanks to be removed and addresses integrity issues associated with the tanks; maximises opportunity for re-use or recycling or materials
2. Interdependencies	
Both of the COS tanks will be removed. Removal operations will be planned such that any interaction with the existing drill cuttings pile will be minimised. No third-party infrastructure will be disturbed as a result of the decommissioning proposals.	

[4] The Thistle Field is beneficially owned 1% Britoil and 99% by EnQuest. However, the decommissioning liability is shared with the previous Thistle Field owners, Britoil (81.71875%) and Chrysaor Production (U.K.) Limited (18.28125%).

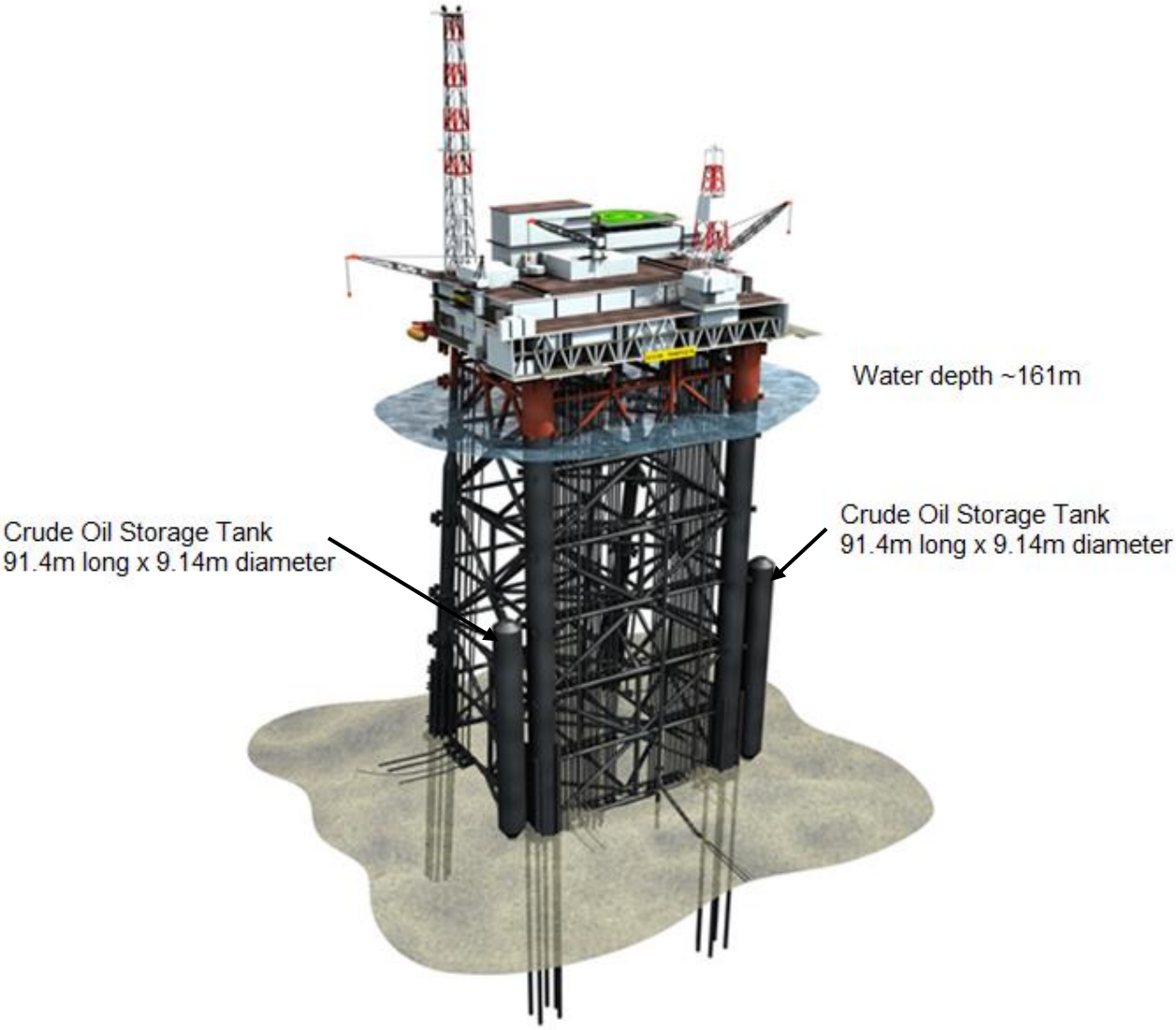


Figure 1.4.1: Thistle 'A' Platform with both COS Tanks on the Jacket

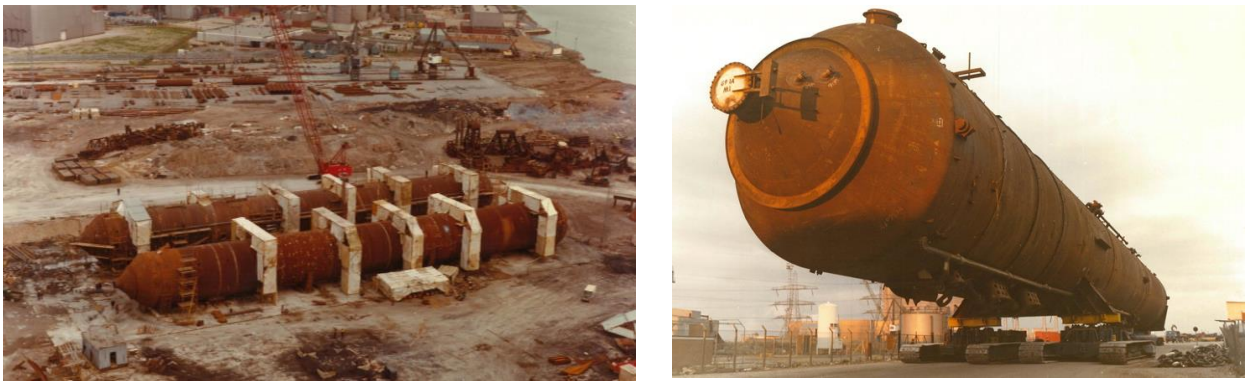


Figure 1.4.2: An Indication of Scale - Thistle A COS Tanks

1.5 Field Locations including Field Layout and Adjacent Facilities

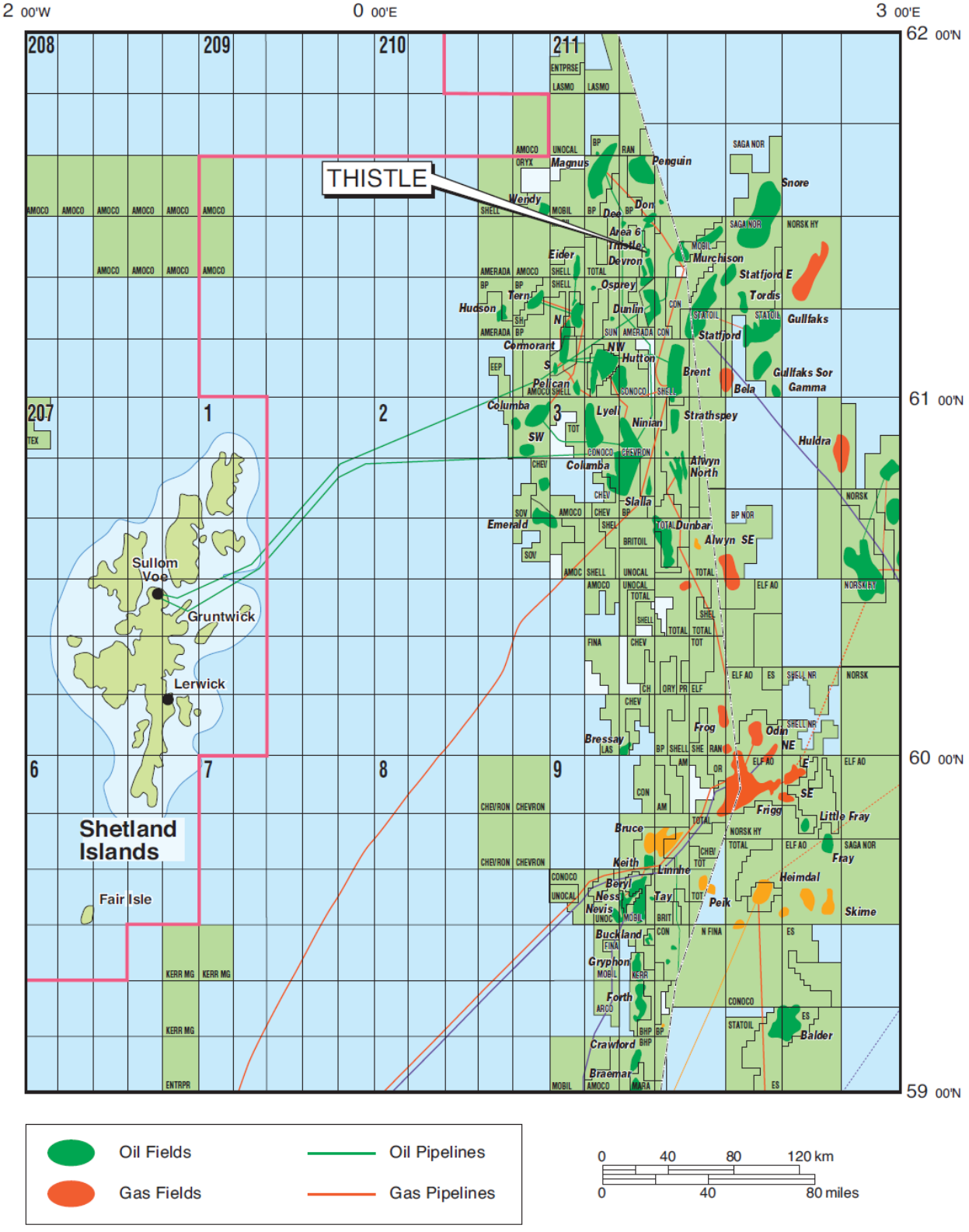


Figure 1.5.1: Field locations in UKCS

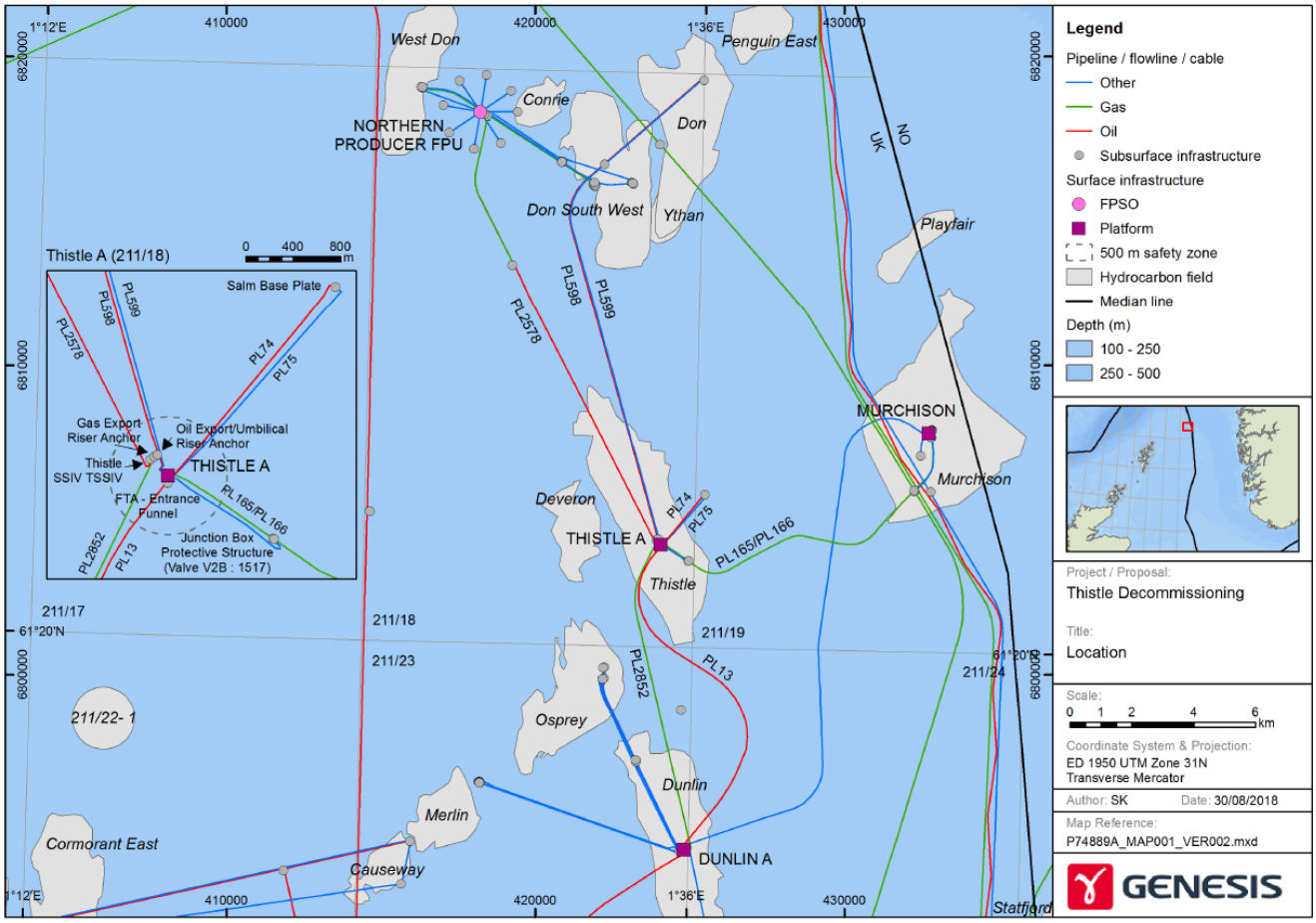


Figure 1.5.2: Thistle Adjacent Facilities[5], [6]

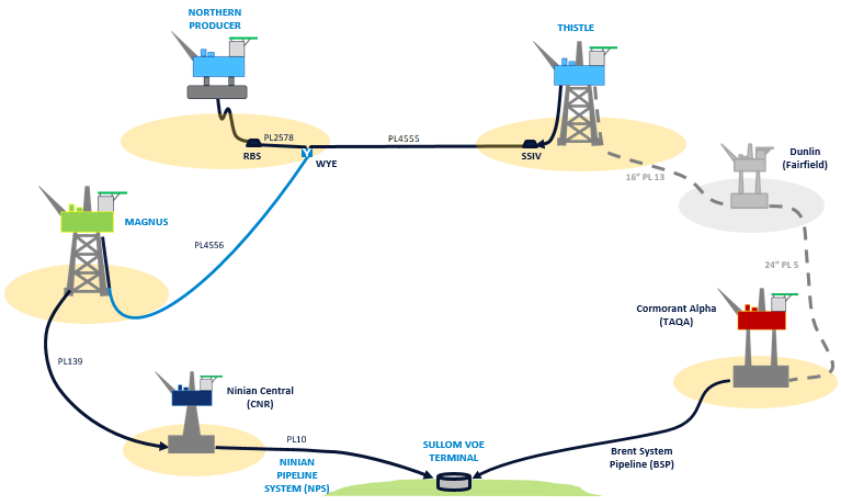


Figure 1.5.3: Dunlin Bypass Pipeline Project

[5] The Murchison installation and pipelines have been decommissioned.
[6] Note this figure does not reflect modifications relating to the Dunlin 'A' bypass project executed in 2019. Please refer Figure 1.5.3.

Table 1.5.1: Adjacent facilities					
Owner	**Name**	**Type**	**Distance/ Direction**	**Information**	**Status**
CNR International (UK) Limited & Wintershall Norsk AS	Murchison	Installation	~9.5km NE of Thistle A	Decommissioning Programme approved August 2014. Footings of jacket remain	Decommissioned
MCX Dunlin (UK) Limited	Dunlin A	Installation	~9.7km S of Thistle A	Originally connected to Thistle via PL13, now bypassed. Decommissioning Programme currently under consideration	Non-operational
TAQA Europa B.V.	Eider A	Installation	~22.5km W of Thistle A		Operational
EnQuest Heather Limited	Thistle	SALM Base	~2.4km NE of Thistle A	Gravity base foundation	Non-operational
EnQuest Heather Limited	Northern Producer	FPU	~15.1km NNW of Thistle A	Tied back to Commingling Wye via PL2578	Operational
EnQuest Heather Limited	Magnus	Installation	~32.2km NNW of Thistle A	Connected to Commingling Wye via PL4556	Operational
EnQuest Heather Limited, Britoil Limited, Chrysaor Production (U.K.) Limited	PL13	Pipeline	16in Oil Pipeline ~12.7km long	Thistle A Platform to Dunlin A Platform. Pipe spool removed at Dunlin A	Out of use
EnQuest Heather Limited, Britoil Limited, Chrysaor Production (U.K.) Limited	PL74	Pipeline	16in Oil Pipeline ~2.4km long	Thistle A Platform to SALM Base	Pipeline currently in IPR. Disused since 1983
EnQuest Heather Limited, Britoil Limited, Chrysaor Production (U.K.) Limited	PL75	Pipeline	16in Water Ballast Pipeline ~2.4km long	Thistle A Platform to SALM Base	Pipeline currently in IPR. Disused since 1983
EnQuest Heather Limited	PL2579	Pipeline	3in Gas Import (Fuel Gas) Pipeline ~15.7km long	Thistle A Platform to Northern Producer	Operational
Fairfield Betula Limited, MCX Dunlin (UK)	PL2852	Pipeline	4in Gas Import Pipeline ~10.3km long	Thistle A Platform to Dunlin A Platform	Out of use

Table 1.5.1: Adjacent facilities					
Owner	**Name**	**Type**	**Distance/ Direction**	**Information**	**Status**
Limited					
EnQuest Heather Limited, Britoil Limited	PL4555 (Includes section of pipeline previously numbered PL2578)	Pipeline	8in Oil Pipeline ~10.6km long	Thistle 'A' Platform to Commingling Wye Structure	Operational
Impacts of decommissioning proposals					
There are no direct impacts on adjacent facilities from the decommissioning works associated with removal of the Thistle COS tanks. As part of the environmental assessment we have considered potential in combination or cumulative effect of activities in the area, including decommissioning and new developments. This has been done using data that are publicly available. However, operational windows tend to include a degree of flexibility, so it is not possible to be precise. However, as part of the operational phase any potential impacts will be mitigated in two ways. The first is via direct communication with the parties involved, and the other is via submission of the MATs and SATs.					

1.6 Industrial Implications

The Thistle COS tanks will be removed using a combination of Semi-Submersible Crane Vessel (SSCV), Diving Support Vessel (DSV), Remotely Operated Vehicle Support Vessel (ROVSV), Construction Support Vessel (CSV) or Multi Support Vessel (MSV).

Where appropriate existing framework agreements may be used for decommissioning activities.

2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Part of Thistle Installation: Crude Oil Storage Tanks

Table 2.1.1: Thistle COS Tanks information					
Name	Facility Type	Location[7]		Part of Jacket / Facilities	
				Weight (Te)	No of units
Thistle COS Tanks A & B (Each tank 91.4m long x 9.14m diameter, gross internal volume 5,970m^3)	Oil Storage Tanks	WGS84 Decimal	61.363036°N 1.579761°E	1,201(each)[8]	2
		WGS84 Decimal Minute	61°21.7821"N 1°34.78567"E		

2.2 Inventory Estimates

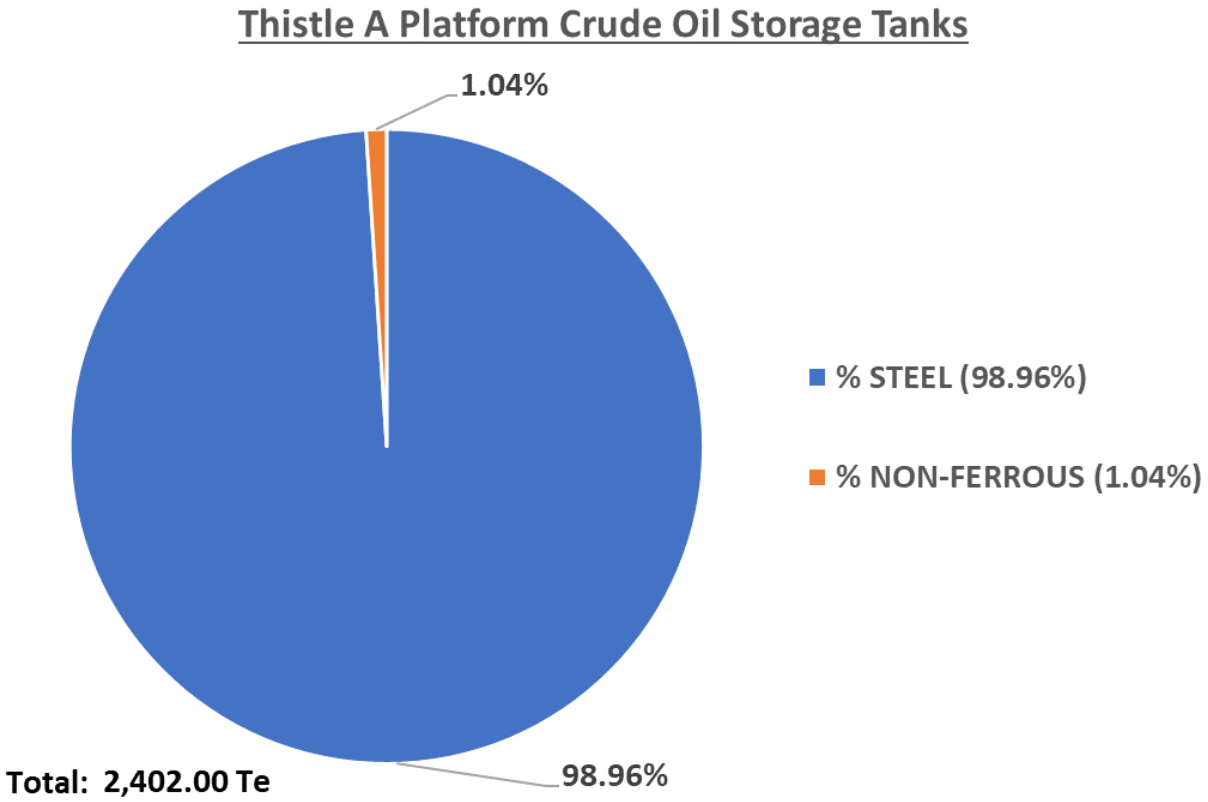


Figure 2.2.1: Pie-Chart of Estimated Inventories For COS Tanks[8]

[7] There is a slight discrepancy between data contained on the OGA NDR database and the Thistle A Safety Case. The figures here are taken from the Thistle A Safety Case.
[8] This does not include any allowance for marine growth

3. REMOVAL AND DISPOSAL METHODS

3.1 Use of Waste Framework Directive

Waste will be dealt with in accordance with the Waste Framework Directive. The re-use of any asset constructed primarily of steel – or parts thereof, would be first in the order of preferred decommissioning options.

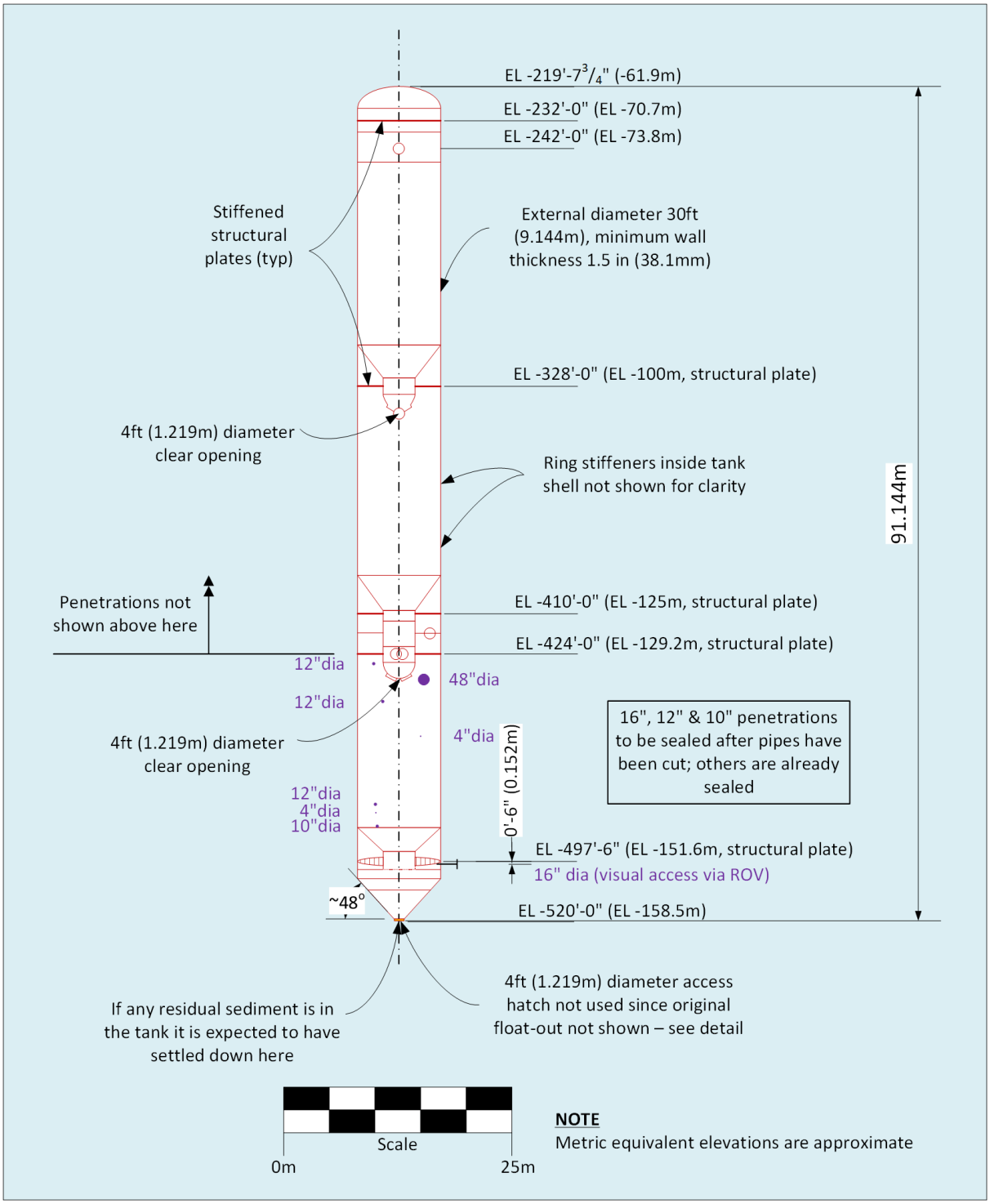


Figure 3.1.1: Schematic of COS Tanks – both similar

3.2 Crude Oil Storage Tanks

Preparation and cleaning: The methods that will be used to vent and purge the COS tanks prior to removal to shore are summarised in Table 3.2.1.

Table 3.2.1: Cleaning of COS Tanks for removal		
Waste type	**Composition of Waste**	**Disposal Route**
On-board hydrocarbons	A quantity of export quality oil in the dome of the tank, a thin film of oil on horizontal surfaces, contaminated seawater and potentially small quantities of contaminated sediment.	Where possible, mobile hydrocarbons will be evacuated to an attendant vessel for processing, with residual materials remaining trapped inside the tanks. After the 16", 12" and 10" penetrations have been sealed it is expected that any sediment will remain sealed inside the tanks.
Other hazardous materials	The presence of NORM will be identified.	NORM, if present, will be disposed of in accordance with the appropriate permit.

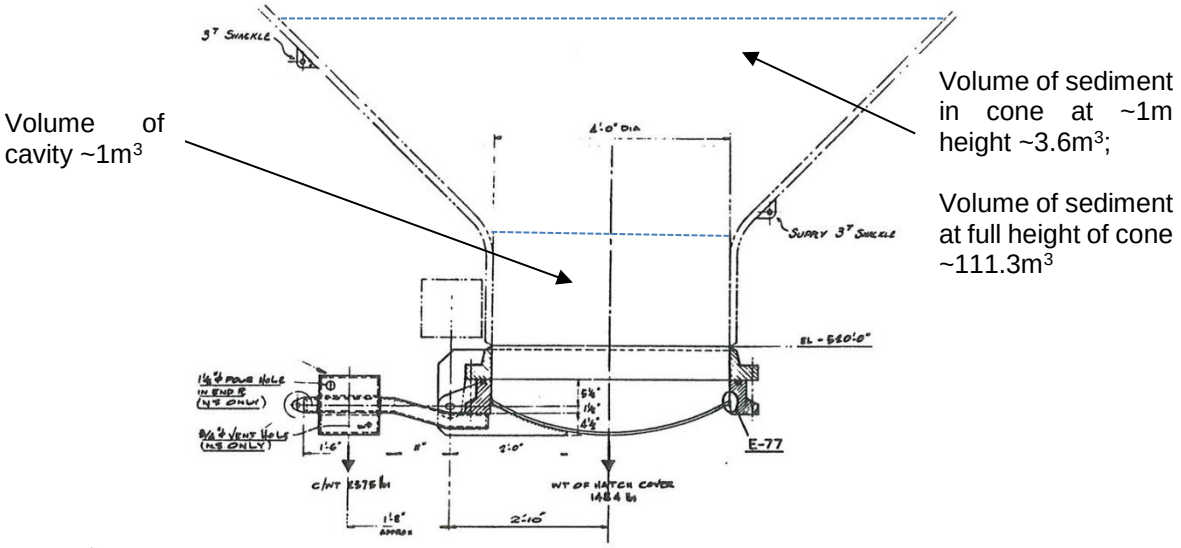


Figure 3.2.1: Detail – location of any sediment in the tank(s), if present[9]

Table 3.2.2: Crude Oil Storage Tank removal method	
1) Semi-Submersible Crane Vessel ☑; 2) Monohull Crane Vessel ☑; 3) Shear Leg Vessel ☑; 4) Jack up Work barge or Multipurpose Support Vessel ☐; 5) Piece small ☑; 6) Complete with jacket ☐; 7) Other ☐	
Method	**Description**
Removal using SSCV	The tanks will be removed from the jacket using a suitable crane vessel and temporarily stored on the seabed. They will be recovered from the seabed later. Current indications are that the recovery operation from the seabed will likely be carried out using a combination of an SSCV and a cargo barge. Once recovered, the tanks will be transported to shore for re-use or for recycling at a licensed facility. Preparatory work including severance of the various supports would be carried out using a DSV. In the unlikely event that shaped charges would be the preferred method of severance this method will be conducted in consultation with EMT and

[9] A recent video survey in Tank A via 16" nozzle (Figure 3.1.1, below EL 497'-6") suggests that any sediment volumes present would be contained within the cone of the tanks rather than reach as far up as the 16" nozzle. On this basis, the volume of sediment inside the tanks is estimated to be in the range of between 0% and 1.8% of 5,970m^3, the total volume of each tank.

Table 3.2.2: Crude Oil Storage Tank removal method	
1) Semi-Submersible Crane Vessel ☑; 2) Monohull Crane Vessel ☑; 3) Shear Leg Vessel ☑; 4) Jack up Work barge or Multipurpose Support Vessel ☐; 5) Piece small ☑; 6) Complete with jacket ☐; 7) Other ☐	
Method	**Description**
	JNCC. To reduce their weight, the seawater contained inside the tanks together with small quantities of any residual hydrocarbons will be allowed to discharge into the sea as the tanks are lifted through the splash zone.
Removal using MCV or SLV	The approach using a MCV or SLV would be similar to removal using an SSCV recognising that the lifting capacity of a MCV or SLV would be much less than that of a SSCV.
Piece small removal	After the COS tanks have been flushed, the tanks will be removed using a piece-small approach, recovering materials either to the construction vessel or to a cargo barge before being taken to shore for recycling at a licensed facility.
Proposed removal method and disposal route	The COS tanks will be released from their supports after pipework and the vessels themselves have been flushed. The tanks will then be removed and temporarily stored on the seabed. The tanks will then be recovered at a later date possibly using a combination of an SSCV and a cargo barge to shore for re-use or for recycling at a licensed facility. The opportunities for re-use are still to be confirmed. A final decision on any decommissioning activities will be made following a commercial tendering process.

3.2.1 COS Tank Removal Sequence – Indicative Only

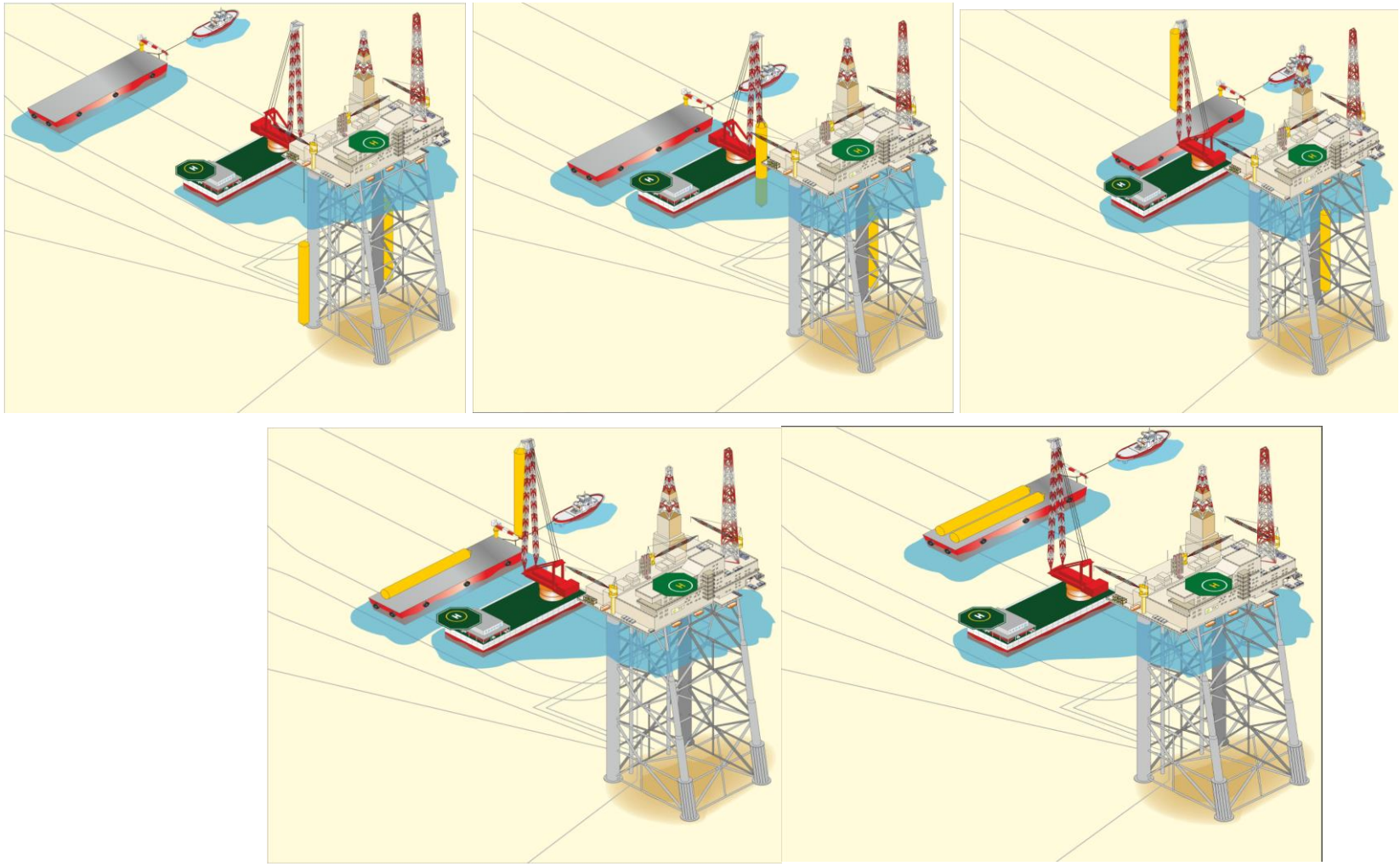


Figure 3.2.2: Indicative Removal Sequence for COS Tanks

3.2.2 COS Tank Wet Storage Location

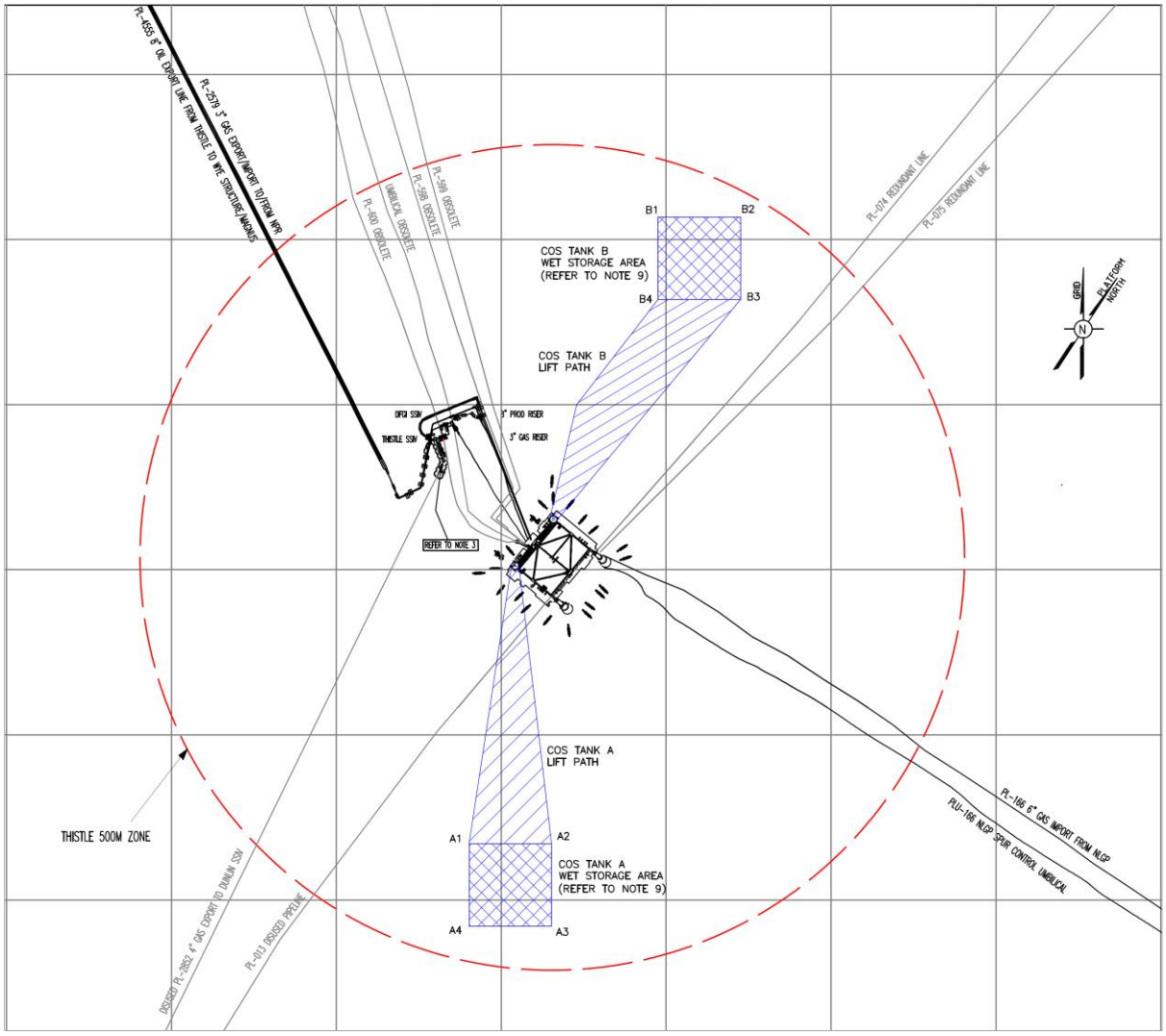


Figure 3.2.3: Thistle A Platform COS Tank Wet Storage Locations[10]

[10] Indicative only and subject to change

3.3 Waste Streams

Table 3.3.1: Waste stream management methods	
Waste Stream	**Removal and disposal method**
Bulk liquids	Best endeavours will be used to remove potentially mobile attic oil before the tanks are disconnected from the jacket. The tanks will be removed from the jacket and placed directly onto the seabed. Any residual fluids will be discharged under appropriate permits. The approach to be taken will be discussed and agreed beforehand with OPRED EMT and ODU. Further cleaning and decontamination will take place onshore prior to recycling or re-use.
Sediment	As the tanks were used for the storage of export quality oil rather than used for separation where quantities of such sediment might be expected to be greater, it is possible that small quantities of potentially contaminated sediment will remain in the bottom of the tanks. Action has, and will be further taken to visually identify the presence of such material, and the nozzles where the connecting pipework is being cut will be sealed. Refer Figure 3.1.1.
Marine growth	Where necessary and practicable to allow access, some marine growth will be removed offshore. The remainder will be brought to shore and disposed of according to guidelines, company policies and any permit requirements.
NORM	Based on production records to date, NORM can be expected. As a precaution, tests for NORM will be undertaken offshore and any NORM encountered will be dealt with and disposed of in accordance with guidelines and company policies and any permit requirements.
Asbestos	No asbestos is associated with the Thistle COS Tanks. However, any such material found will be dealt with and disposed of in accordance with guidelines and company policies.
Other hazardous wastes	Discharge of cleaning chemicals offshore will be managed under appropriate permits. Other hazardous wastes will be recovered to shore and disposed of according to guidelines, company policies and permit requirements.
Onshore dismantling sites	Appropriate licensed sites will be selected. Dismantling site must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options. If a non-UK yard is selected, appropriate Trans-frontier Shipment of Waste licences will be in place.

Table 3.3.2: Inventory disposition			
Inventory	**Total inventory (Te)**	**Planned tonnage to shore (Te)**	**Planned left *in situ* (Te)**
Thistle COS Tanks	2,402	2,402	0

Table 3.3.3: Re-use, recycle & disposal aspirations for recovered material			
Inventory	**Re-use**	**Recycle**	**Disposal (e.g. Landfill)**
Thistle COS Tanks	<5%	>95%	<5%

All recovered material will be transported onshore for re-use, recycling or disposal. In the unlikely event that synthetic materials are encountered the aspiration is that they will be incinerated with the resultant heat being used for energy. It is not possible to predict the market for reusable materials with any confidence so the figures in Table 3.3.3 are aspirational.

4. ENVIRONMENTAL APPRAISAL

4.1 Impact Management

The Environmental Appraisal (EA) carried out in support of this DP is presented in Appendix A. Following an Environmental Impact Identification (ENVID) Workshop and subsequent scoping exercise carried out in line with OPRED Guidance (OPRED, 2018), two aspects were identified for further assessment: seabed disturbance and discharges to sea. Following further assessment, the EA concluded that with the application of industry standard mitigation measures the environmental impacts of the proposed activities are minor. Table 4.1.1 summarises the activities resulting in seabed disturbance and discharges to sea and identifies the proposed mitigation measures.

Table 4.1.1: Environmental impact management

Activity	Main Impacts	Management
Disconnection and laydown of COS tanks resulting in seabed disturbance.	Disconnection of the COS tanks may require relocation/removal of debris items to allow access to cutting points. In addition the COS tanks will be placed on the seabed before uplift and recovery. The principal impacts will include: • Impact on sediment quality; • Disturbance to benthic communities. **Note**: the bottom of the tanks are ~1m above the drill cuttings whilst the bracings to be cut at the tanks are a couple of metres above the base of the tanks such that the expectation is that no local dredging activities will be required.	Work plans and procedures will be put in place for all activities relating to the removal and recovery of the COS tanks. ITT to contractors specifies minimal disturbance to the cuttings pile during the disconnection and laydown. When laid on the seabed the COS tanks will be within the platforms 500m exclusion zone. Although the tanks will be laid outside of the main cuttings pile, previous environmental surveys provide evidence of drill cuttings (e.g. elevated hydrocarbon and barium concentrations) across the 500m zone, such that the tanks are expected to be laid on an area with a thin veneer of cuttings associated with it. Where there is the potential for any seabed disturbance as part of the operations, an approved Marine Licence will be in place in advance of the work.
Disconnection and laydown of COS tanks resulting in discharges to sea.	Potential discharges to the sea as a result of the proposed activities will result in the following impacts: • Short term reduction in water quality due to contaminants entering the water column and impacting local faunal species; • Possible discharges of hydrocarbon residues from inside the tanks should they be laid down onto the seabed; • Potential for surface sheen. **Note:** There will be a requirement to cut drainage holes up to ~1m diameter into the tank shell to allow them to drain as they are being lifted through the splash zone. For the initial lift, drainage holes will be cut in the two upper compartments.	The tanks have previously been flushed and filled with seawater. Best endeavours will be made to remove attic or residual oil from the tanks prior to disconnection, laydown and subsequent recovery. Details on the proposed scopes for disconnecting the tanks along with measures to reduce this to ALARP will be discussed and agreed with OPRED ahead of the operation commencing.

Table 4.1.1: Environmental impact management		
Activity	**Main Impacts**	**Management**
Disconnection and laydown of COS tanks resulting in discharges of sediment to seabed.	Potential discharges of tank sediment as a result of the proposed activities will result in the following impacts: • Minor quantities of sediment from inside the tanks being discharged to the seabed as they are being laid onto the seabed. **Note:** There will be a requirement to cut drainage holes up to ~1m diameter into the tank shell to allow them to drain as they are being lifted through the splash zone. For the initial lift, the drainage holes will be cut further up the tank(s) in the two upper compartments.	While they remain installed on the jacket, visual surveys will be carried out inside the tanks using an ROV camera. The nozzles where the connecting pipework is being cut will be sealed. Other nozzles and penetrations in the lower compartment are already sealed. Refer Figure 3.2.1. Noting that drainage holes will need to be cut into the tanks while they remain on the jacket, the lower section of the tanks will be sealed to minimise the opportunity for egress of tank sediment onto the seabed and into the water column when the tanks are eventually fully recovered through the splash zone.
Recovery of COS tanks through the splash zone to vessel.	Potential discharges to the sea as a result of the proposed activities will result in the following impacts: • Short term reduction in water quality due to contaminants entering the water column and impacting local faunal species; • Possible discharges of hydrocarbon residues from inside the tanks as they are recovered through the splash zone; • Potential for surface sheen.	While installed on the jacket the tanks will have previously been flushed and filled with seawater. Prior to disconnection from the jacket, the concentration of oil in water will be measured to confirm what remains in the tanks. Best endeavours will be made to remove attic oil from the tanks prior to disconnection. Once this has been achieved, any sediment would remain in the tanks along with any oil contaminated seawater, which by this stage is expected to be minimal. Details on the proposed removal of the tanks from the seabed along with measures to reduce any environmental impacts to ALARP will be discussed and agreed with OPRED ahead of the operation commencing.

5. INTERESTED PARTY CONSULTATIONS

5.1 Consultations Summary

During the consultation period (11 December 2019 to 17 December 2019), out of courtesy copies of the Decommissioning Programme were forwarded to the following Statutory Consultees:

- The National Federation of Fishermen's Organisations (NFFO);
- The Scottish Fishermen's Federation (SFF);
- The Northern Ireland Fish Producer's Organisation (NIFPO); and,
- Global Marine Group (GMG).

A meeting was also held in July 2019 with SFF to discuss proposals for removing the COS tanks.

Table 5.1.1: Summary of stakeholder comments		
Who	**Comment**	**Response**
INFORMAL CONSULTATIONS		
NFFO	The decommissioning proposals herein were sent via email to NFFO 11 September 2019	NFFO responded indicating they would defer to the SFF for providing comment on the specific aspects of the project.
SFF	The decommissioning proposals herein were presented to SFF on 18 July 2019	The SFF had no adverse comment to make concerning the decommissioning proposals.
CONSULTATIONS (11 DECEMBER TO 17 DECEMBER 2019)		
Who	**Comment**	**Response**
GMG	The Decommissioning Programme was sent to GMG via email 11 December 2019 or comment	EnQuest communicated directly with Mr Wrottesley on 18 December. As there are no third-party pipelines in the vicinity GMG had no adverse comments with regards to the decommissioning proposals.
NFFO	The Decommissioning Programme was sent to NFFO via email 11 December 2019 for comment	NFFO advised that as the work will be done in Scottish waters and will be executed within the Thistle 500m zone, they would defer to SFF, noting that EnQuest has been liaising with SFF on decommissioning matters.
NIFPO	The Decommissioning Programme was sent to NIFPO via email 11 December 2019 for comment	NIFPO had no adverse comments with regards to the decommissioning proposals.
SFF	The Decommissioning Programme was sent to SFF via email 11 December 2019 for comment	SFF had no adverse comments with regards to the decommissioning proposals.

6. PROGRAMME MANAGEMENT

6.1 Project Management and Verification

An EnQuest project management team will manage the operations of competent contractors selected for all decommissioning activities. The team will ensure the decommissioning is executed safely, in accordance with legislation and EnQuest Health and Safety principles. If required, changes to the Decommissioning Programme will be discussed with OPRED with any necessary approvals sought.

6.2 Post-Decommissioning Debris Clearance and Verification

Independent verification of seabed will not be carried out at this time as the Thistle 500m zone will remain in place. The COS Tanks will temporarily be placed on the seabed and 'wet stored' until their recovery sometime in the future.

Stability analysis will determine whether the tanks need to be afforded additional stability to prevent movement (e.g. placement of clump weights either side of the tanks), and there will need to be an assurance that the tanks can be recovered in future. Appropriate actions will be taken to minimise any potential integrity issues (e.g. use of anode skid).

Following analysis and an integrity assessment, risk-based monitoring will be carried out to confirm:

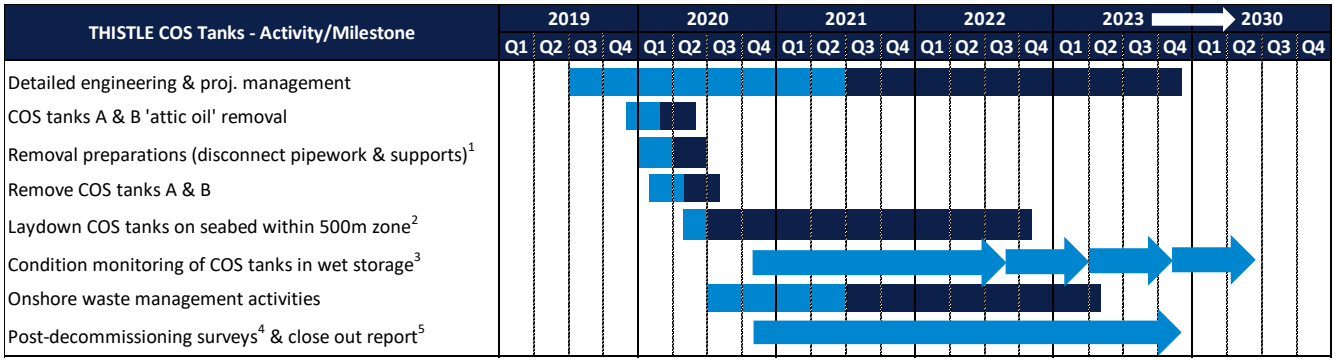
- Structural integrity;
- Movement of the tanks;
- Potential contamination from hydrocarbon residues.

Should interim inspections determine that the tanks are deteriorating more rapidly than anticipated, they will be removed before further delay would unnecessarily complicate the recovery process. The approach will be discussed and agreed with OPRED once more details are known.

6.3 Schedule

A proposed schedule is provided in Figure 6.3.1. The activities are subject to the acceptance of the Decommissioning Programme presented in this document and any unavoidable constraints (e.g. vessel availability) that may be encountered while executing the decommissioning activities. Therefore, activity schedule windows have been included to account for this uncertainty.

The commencement of offshore decommissioning activities will depend on commercial agreements and commitments.



Notes / Key

Most likely period of activity

Activity window to allow commercial flexibility associated with well and infrastructure decommissioning activities

1. Crude Oil Storage tank A pipework has already been disconnected from topsides;
2. This will not be to the detriment of being able to full recover the COS tanks sometime in future;
3. Their condition will be monitored until they are recovered sometime in future;
4. Post-decommissioning jacket survey will be carried out on completion of decommissioning activities '
5. A Decommissioning Close Out report will be prepared and finalised once the COS tanks have been removed and an 'as built' report received from the contractor.

Figure 6.3.1: Gantt-chart of project plan

6.4 Costs

Decommissioning costs will be provided separately to OPRED and OGA.

6.5 Close Out

After the COS tanks have been removed, the Thistle jacket structure will be surveyed locally to where the COS tanks were supported. Any findings will be described in a Close Out report as required in the OPRED Guidance Notes. The report will explain any variance from this Decommissioning Programme.

6.6 Post-Decommissioning Monitoring and Evaluation

After decommissioning has been completed, the jacket integrity will continue to be monitored as per Company procedures. Residual liability will remain with the Section 29 holders identified in section 1.3. Unless agreed otherwise in advance with OPRED, EnQuest will remain the focal point for such matters, such as any change in ownership, for example.

The requirement for legacy and liability management will be described in more detail in the Close Out report.

APPENDIX A ENVIRONMENTAL APPRAISAL

Appendix A.1 Project Activities

As described in Section 1.2, the two COS tanks associated with the Thistle A platform will be removed under this DP submission. The tanks were used to store export quality oil rather than for separation, and have been flushed and filled with seawater. The expectation is that any quantities of sediment remaining in the tanks will be small[11]; this is confirmed by a video survey inside Tank A via the 16" nozzle below EL 497'-6". Similar video surveys are planned for Tank B. Prior to severing the tanks from the Thistle jacket, best endeavours will be made to minimise any residual oil remaining in them. As the platform is currently unmanned, EnQuest propose to remove the attic oil from the two tanks to a vessel. Fluids will be processed with the residual water discharged under permit and any waste oil returned to shore for treatment via the waste hierarchy. During these activities, EnQuest also propose to take measurements of the remaining oil in water concentrations to inform subsequent oil discharge permits. Removal of the attic oil and sampling of the seawater in the tanks are considered preparatory activities and are not considered further in the EA. Following removal of the attic oil it is estimated that ~5.7m^3 of oil will remain in each tank. This is based upon a worst case concentration of 1,000ppm oil in water in a total estimated volume of 5,970m^3 for each tank.[12]

As described in Section 1.3.2, there is a cuttings pile located at the Thistle jacket. ROV footage suggests that the bottom of each tank is at least 1m above the top of the cuttings pile whilst the lowest support bracings to be cut are a couple of metres above the base of the tanks. Given the clearance between the lowest support bracings and the top of the cuttings pile, dredging of the cuttings pile is not required for the severance activities. However, during preparatory activities, in order to reduce the potential for damage to the jacket during removal operations, secondary support will be provided by grout bags. These will rest on the drill cuttings outside of the main pile and will be filled by pumping grout into the bags *in situ*. There will also be a requirement to remove/relocate some debris items which could cause some localised disturbance to the cuttings pile.

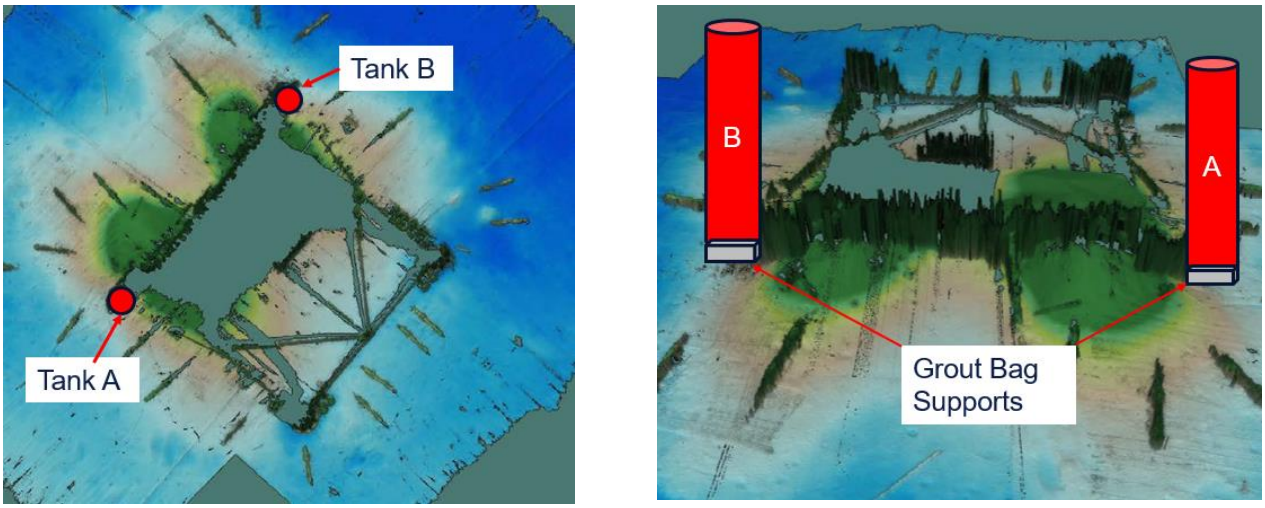


Figure A.1.1: Grout Bags & Drill Cuttings in relation to the COS Tanks, Plan & Side View

[11] A recent video survey in Tank A via 16" nozzle (Figure 3.1.1, below EL 497'-6") suggests that any sediment volumes present would be contained within the cone of the tanks rather than reach as far up as the 16" nozzle. On this basis, the volume of sediment inside the tanks could be in the range of between 0% and 1.8% of 5,970m3, the total volume of each tank.

[12] This estimate of residual oil remaining in seawater is based on a conservative estimate of oil thickness of 1 mm remaining on all the internal surfaces of the tank.

Once the cutting activities have been completed, each tank will be lifted using a crane and wet stored on the seabed for recovery later. The lay down area will be within the existing 500m Thistle platform exclusion zone and therefore will not impact on current fishing activity in the area. Whilst on the seabed it is possible that the local seabed sediment or water column may be exposed to small quantities of some of the tank contents, such as seawater, residual oil and possibly minor quantities of sediment from inside the tanks.

Best endeavours will be made to remove attic oil from the tanks prior to disconnection. Once this has been achieved, any solid residues would remain in the tanks along with any oil contaminated seawater, which by this stage is expected to be minimal. As a worst case the EA assumes that 5.7m^3 of oil will be released from each tank. During recovery operations, drainage holes will be cut in each of the COS tanks such that when being lifted through the splash zone, the contents of the tanks will be discharged to sea before loading onto a barge.

Appendix A.2 Environmental Baseline

This section describes the environmental receptors in the vicinity of the Thistle field that could be impacted by the proposed activities. Enquest will carry out a pre-decommissioning survey at the field closer to the time of decommissioning. To support this Decommissioning Programme, earlier surveys carried out at the Thistle platform and where applicable, results from a pipeline route survey carried out in the area with a sampling point ~700m from the Thistle platform are referenced (Gardline, 2018).

Appendix A.2.1 Metocean Conditions

The mean spring tidal range within the Thistle area ranges from 1.1 – 1.4m, and the annual mean significant wave height ranges between 2.8 – 2.9m (Scottish Government National Marine Plan Interactive (NMPi)). Significant wave height primarily originates from the west (Figure A.2.1).

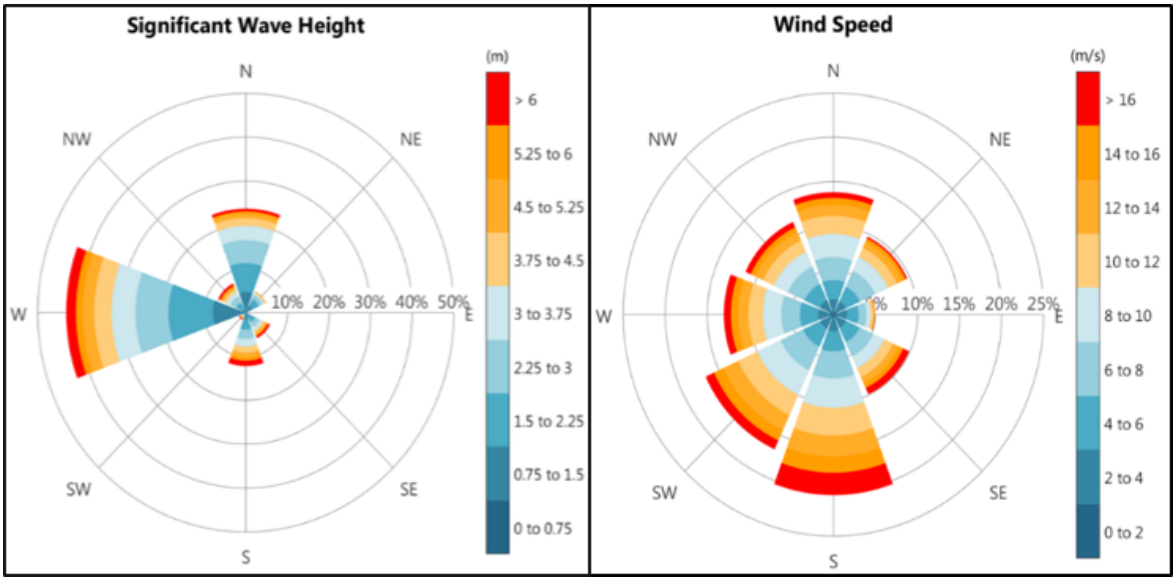


Figure A.2.1: a) Wave rose and b) Wind rose for the Thistle platform area (Data Explorer)

Wind speed and direction directly influence the transport and dispersion of atmospheric emissions. These factors are also important for the dispersion of water borne emissions, including oil, by affecting the movement, direction and break up of substances on the sea surface. Winds in the area originate from all directions though primarily from the south / southwest / west and north (Figure A.2.1).

Water depth at the Thistle field is ~162m. The annual mean seawater surface temperature in the area is

~9.5ºC and the annual mean temperature at the seabed is ~7.5ºC (Scottish Government NMPi). Salinity in the area shows little seasonal variation through the water column with annual mean salinity near the seabed equalling 35.2% and 35.1% in surface waters (Scottish Government NMPi).

Appendix A.2.2 Seabed

Sediments in the vicinity of the Thistle field are classified as sand (Gardline, 2018). Within the Thistle A 500m exclusion zone a clear spatial pattern of increasing silt concentrations with decreasing distance from the platform is evident. During a 1999 survey of the cuttings pile, sample stations within 215m of the platform revealed very poorly sorted fine sands and coarse silt with elevated fines (Gardline, 1999). This elevated predominance was evident to a radius extending 500m from the platform indicating the continued presence of a thin veneer of cuttings.

The cuttings pile at the platform comprises three mounds. The survey carried out in 1999 reported a cuttings pile volume of 25,456m^3 and a footprint of 22,492m^2 (Gardline, 1999). A further survey carried out in 2004 reported the volume of the main cuttings mound to be around 23,641m^3, with an area of 14,798m^2. The two smaller mounds were reported to have a volume of 345m^3 and 485m^3 respectively and an area of 70m^2 and 68m^2 (BMT Cordah Ltd., 2005). Note, given how the results are presented in each survey report, it cannot be assumed that the volume and footprint of impact of the discharged cuttings has decreased based on the values presented above.

In 1999, concentrations of hydrocarbons, n-alkanes and barium within 500m of the platform were above the North Sea background concentrations, a finding indicative of the presence of dispersed cuttings (Gardline, 1999). Within 500m of the platform, hydrocarbon concentrations varied from 12mg.kg^{-1} (500m from the platform) to 8,442mg.kg^{-1} (150m from the platform)[13]. It should be noted that surveys of hydrocarbon concentrations between 1982 and 1999 show a decrease in Total Hydrocarbon Content (THC) concentrations within the 500m zone (survey reports cited in BMT Cordah Ltd., 2005). Due to methodological differences a direct comparison of the samples cannot be carried out, however the results do indicate seabed recovery through natural dispersion, dilution, degradation and the reworking of sediments did occur over this time period (BMT Cordah Ltd., 2005).

A recent (2018) seabed sample taken ~700m northwest of the platform showed a hydrocarbon concentration of 13.4mg.kg^{-1} which is < 50mg.kg^{-1}; the THC concentration above which toxic effects on benthic fauna may become discernible (Gardline, 2018)[14]. This concentration is similar to that recorded at four stations sampled ~800m from the platform in 1999 (ranged from 5.34mg.kg^{-1} to 12.68mg.kg^{-1}).

During the 1999 survey, barium levels taken in samples between 150m and 1,000m from the platform showed elevated levels, indicative of the presence of drill cuttings. A peak value of 78,602µg.g^{-1} was recorded 215m from the platform, whilst beyond 1,000m the average value was 598µg.g^{-1} which is below the UKOOA (2001) 95th percentile (637.50µg.g^{-1}) for the northern North Sea.

During the 2018 survey, barium concentrations at the sample taken ~700m northwest of the platform (1,440µg.g^{-1}) were greater than the UKOOA (2001) 95th percentile for the northern North Sea. However, when compared against the UKOOA (2001) mean value for barium of 2,378.27µg.g^{-1} for areas within 500 - 1,000m of existing platforms, the value is much lower.

In the 1999 survey, concentrations of other metals including zinc, cadmium, tin, mercury, copper and nickel were elevated at stations close to the platform and background levels were reached at 1,000m from the platform (Gardline, 1999). During the 2018 survey, concentrations of these metals at the sample taken ~700m northwest were either below detection levels or were below their respective OSPAR (2005) background concentrations, typical of 'pristine' sediments (Gardline, 2018).

[13] UKOOA (2001) record a mean THC background concentration of 10.82mg.kg^{-1}.
[14] This threshold was adopted by OSPAR (2006) and UKOOA (1999) in the context of oil-based mud contamination.

Appendix A.2.3 Biological Environment

Appendix A.2.3.1 Plankton

The phytoplankton community is dominated by the dinoflagellate genus Ceratium (*C. fusus, C. furca, C. lineatum*), along with higher numbers of the diatom, Chaetoceros (subgenera *Hyalochaete* and *Phaeoceros*) (DECC, 2016). The zooplankton community comprises *C. helgolandicus* and *C. finmarchicus* as well as *Paracalanus spp., Pseudocalanus spp., Acartia spp., Temora spp.* and cladocerans such as *Evadne spp*. Commonly seen jellyfish in the region include *A. aurita* and *Chrysaora hysoscella*.

Appendix A.2.3.2 Benthos

The 1999 survey identified no macrofauna within 150m of the Thistle platform (Gardline, 1999). At 215m from the platform relatively few species were identified and the fauna was characterised by high abundance of opportunistic species including *Capitella capitate*, *Rhaphodrilus nemasoma*, *Chaetezone setosa* and *Caulleriella* spp. Between 500m and 1,000m from the platform the number of taxa ranged from 60 to 72 species per 0.2m^2 whilst faunal densities ranged from 311 to 839 individuals. The diversity and densities recorded in the samples taken between 500m and 100m was similar to that observed at the reference stations taken 5km to 10km from the platform.

Appendix A.2.3.3 Fish and Shellfish

The Thistle field lies within the International Council for the Exploration of the Sea (ICES) Rectangle 51F1. Fish species known to have spawning and nursery grounds in the area are listed in Table A.2.1, whilst Figure A.2.2 shows the extent of some of these spawning and nursery areas. Of the species found in 51F1, cod, ling, saithe, Norway pout, whiting, spurdog, herring, mackerel and blue whiting are considered Scottish Priority Marine Features (PMFs) (JNCC, 2014).

Table A.2.1: Spawning & nursery activity for a selection of fish species within ICES 51F1

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Nursery?
Anglerfish	J	J	J	J	J	J	J	J	J	J	J	J	
Blue Whiting													Yes
Cod	S	S*	S*	S				S	S				
Haddock		S	S	S	S								Yes
Hake	J	J	J	J	J	J	J	J	J	J	J	J	Yes
Herring													Yes
Ling													Yes
Mackerel													Yes
Norway pout	SJ	S*J	S*J	SJ	J	J	J	J	J	J	J	J	Yes
Saithe	S	S	S	S									
Spurdog													Yes
Whiting	S	S	S	S				S	S				Yes

Key: S = Spawning; S* = Peak Spawning; J = Juveniles (i.e. 0 group fish)
Source: Ellis *et al.* (2012); Coull *et al.* (1998); Aires *et al*. (2014)

The Oil and Gas Authority (OGA) has published guidance (Other Regulatory Issues; OGA, 2018) which includes advice from government departments and external agencies on seasonal concerns for fish spawning in relation to offshore activities including drilling activities. There are no identified 'periods of concern' for Block 211/18 for drilling activities.

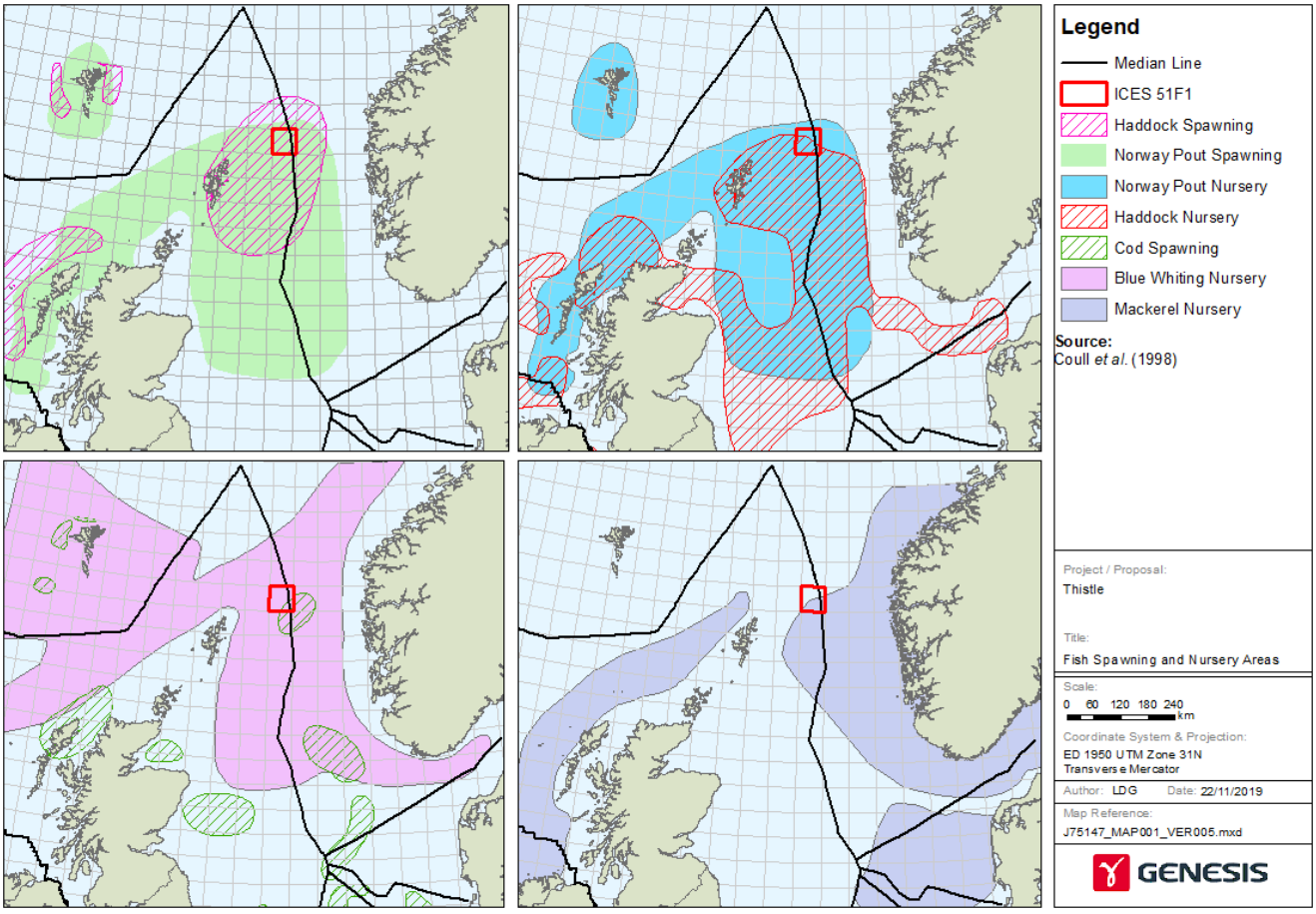


Figure A.2.2: Fish spawning and nursery grounds

Appendix A.2.4 Marine Mammals

Distribution maps based on telemetry data (1991 – 2016) and count data (scaled to the estimated population size in 2015) indicate that both harbour seals and grey seals are unlikely to occur near the Thistle field (SMRU, 2012).

Cetaceans observed around the Thistle area include Atlantic white-sided dolphin, harbour porpoise, long-finned pilot whale and minke whale. Densities are low with the majority of sightings occurring in the summer months (July to August) (Table A.2.2).

Table A.2.2: Marine mammal sensitivities near the Thistle field (Reid et al., 2003)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Atlantic white-sided dolphin							3					
Harbour porpoise					3		3	3				
Long-finned pilot whale							3	3				
Minke whale							2					
Key: 1: High Density, 2; Moderate Density, 3: Low Density												

Appendix A.2.5 Seabirds

Predicted maximum monthly abundance of seabirds in the area based on an analysis of the European Seabirds at Sea (ESAS) data collected over 30 years is shown Table A.2.3 (Kober *et al*., 2010). Kober *et al*. (2010) used continuous seabird density data to generate seabird density surface maps for 57 species using the spatial interpolation technique 'Poisson kriging'. Table A.2.4 summarises the relevant data for the Thistle area.

Based on the seabird oil sensitivity index (SOSI) the sensitivity of birds to surface oil pollution in the area is considered low throughout most of the year (Table A.2.4). Exceptions to this include the winter months (November to January) when the SOSI is considered high.

Table A.2.3: Predicted seabird surface density (max. no. of individuals/km2) (Kober et al., 2010)

Species	Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern fulmar	Breeding												
	Winter												
Northern gannet	Breeding												
	Winter												
Great skua	Breeding												
	Winter												
Black-legged kittiwake	Breeding												
	Winter												
Arctic skua	Breeding												
Razorbill	Breeding												
European storm petrel	Breeding												
Great black-backed gull	Winter												
Lesser black-backed gull	Winter												
Herring gull	Winter												
Common guillemot	Additional												
	Winter												
Glaucous gull	Winter												
Little auk	Winter												
Atlantic puffin	Breeding												
	Winter												
ALL species combined	Breeding												
	Summer												
	Winter												

Key	Species not recorded	≤1.0	1.0 – 5.0	5.0 – 10.0	10.0 - 20.0	20.0 ->30.0

Table A.2.4: SOSI and indirect assessment for Block 211/18 and adj. blocks (JNCC, 2017)												
Block	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
211/12	3*	5	4	5	5*	5*	5	5	5*	N	3*	3
211/13	3*	5	5	5	5*	5*	5	5*	N	N	3*	3
211/14	3*	5	4	4	4*	5*	5	5*	N	N	3*	3
211/17	3*	5	5	5*	N	5*	5	5	5*	N	3*	3
211/18	3*	5	5	5*	N	5*	5	5	5*	N	3*	3
211/19	3*	5	5	5*	N	5*	5	5*	4**	N	3*	3
211/22	5	5	5	5*	N	5*	5	5	4	4*	4*	4
211/23	5	5	5	5*	N	5*	5	5	5	5*	3*	3
211/24	5	5	5	5*	N	5*	5	5	5	5*	3*	3
Key	1 = Extremely High		2 = Very High		3 = High		4 = Medium		5 = Low		N = No Data	
Indirect Assessment – data gaps have been populated following guidance provided by the JNCC (JNCC, 2017). ** Data gap filled gap filled using data from the same block in adjacent months.* *** Data gap filled using data from the adjacent blocks within the same month.*												

Appendix A.2.6 Protected Areas

A network of Marine Protected Areas (MPAs) is in place to aid the protection of vulnerable and endangered species and habitats through structured legislation and policies. These sites include Special Areas of Conservation (SAC) and Special Protection Areas (SPA), designated under the EC Habitats Directive (92/43/EEC) and EC Birds Directive (2009/147/EC) respectively, along with Nature Conservation Marine Protected Areas (NCMPAs) designated under the Marine (Scotland) Act 2010 or the Marine and Coastal Access Act 2009. In addition, Scottish National Heritage (SNH) and JNCC list 81 species and habitats considered PMFs of conservation importance in Scotland's seas.

As can be seen in Figure A.2.3 there are no protected areas in close proximity to block 211/18.

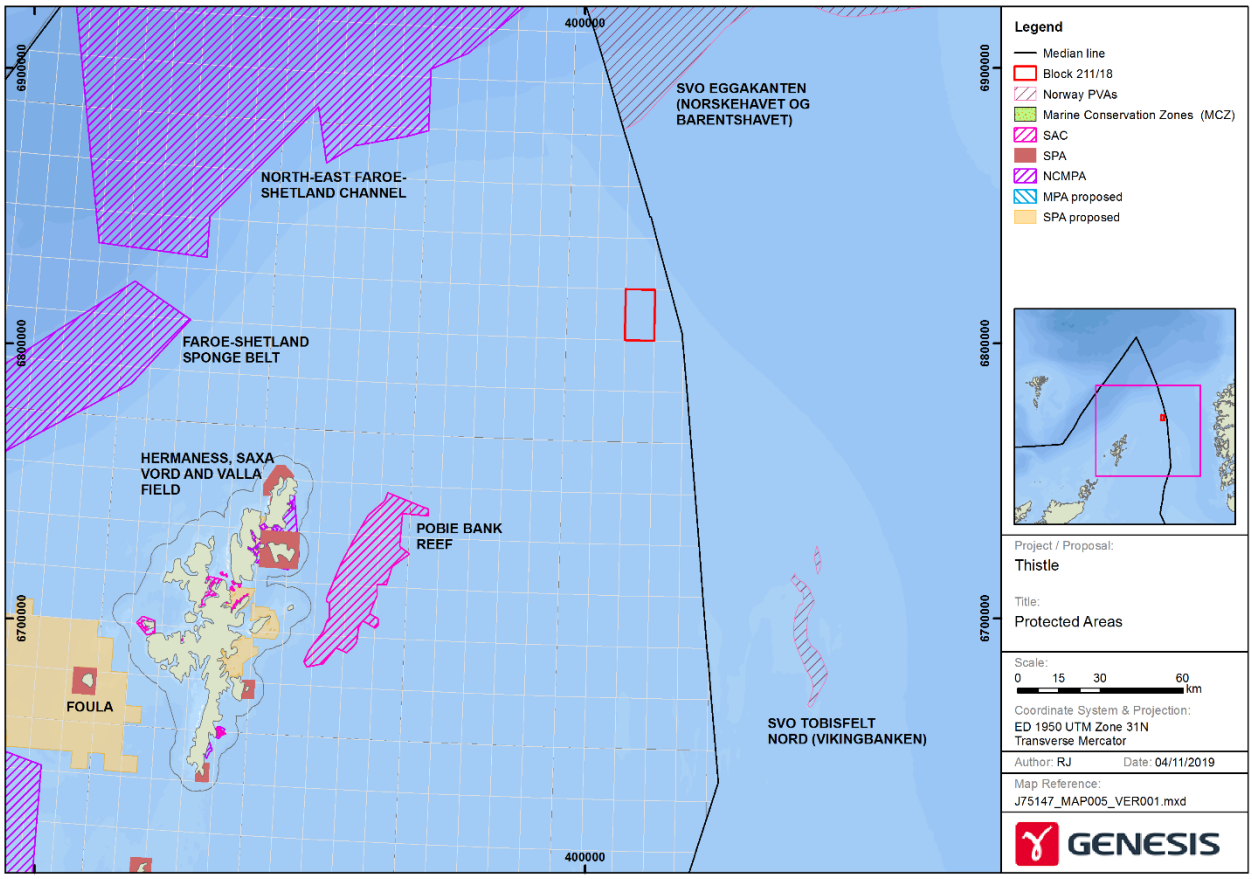


Figure A.2.3: Protected areas around the Thistle field

Appendix A.2.7 Socio-Economic Environment

Appendix A.2.7.1 Commercial Fishing: Fishing Effort

The importance of ICES rectangle 51F1 can be considered medium to high when compared to other areas of the UKCS. Published annual fishing effort figures showed fishing effort to be highest in 2018 with 132 days fished. To put this into context, the total effort for all ICES rectangles in UK waters in 2018 was 125,704 days, as such rectangle 51F1 represents 0.11% of the total UK effort (Table A.2.5). The main gear type used was trawls and the mean fishing effort was 94 days between the years of 2014 – 2018 which constitutes 0.07% of the total UK fishing effort (Scottish Government, 2019).

Table A.2.5: Mean % contribution of 51F1 to Total UK Fishing Effort 2014-18 (Scot Gov't, 2019)

Year	Total Fishing Effort by UK Fishing Fleet (days)		
	UK Total	51F1 Total	% of UK Total
2014	131,478	100	0.08
2015	126,416	102	0.08
2016	133,343	62	0.05
2017	126,934	75	0.06
2018	125,704	132	0.11
Mean (2014 – 2018)	128,775	94	0.07

Appendix A.2.7.2 Commercial Fishing: Fishing Landings

Figure A.2.4 illustrates the annual landings between 2014 – 2018 of demersal, pelagic and shellfish species in ICES rectangle 51F1 and the wider area. The data shows that demersal species are predominantly targeted, but landings are low when compared to the UK total with some ICES rectangles recording over 5,000Te of live weight and £5,000,000 in value (Scottish Government, 2019).

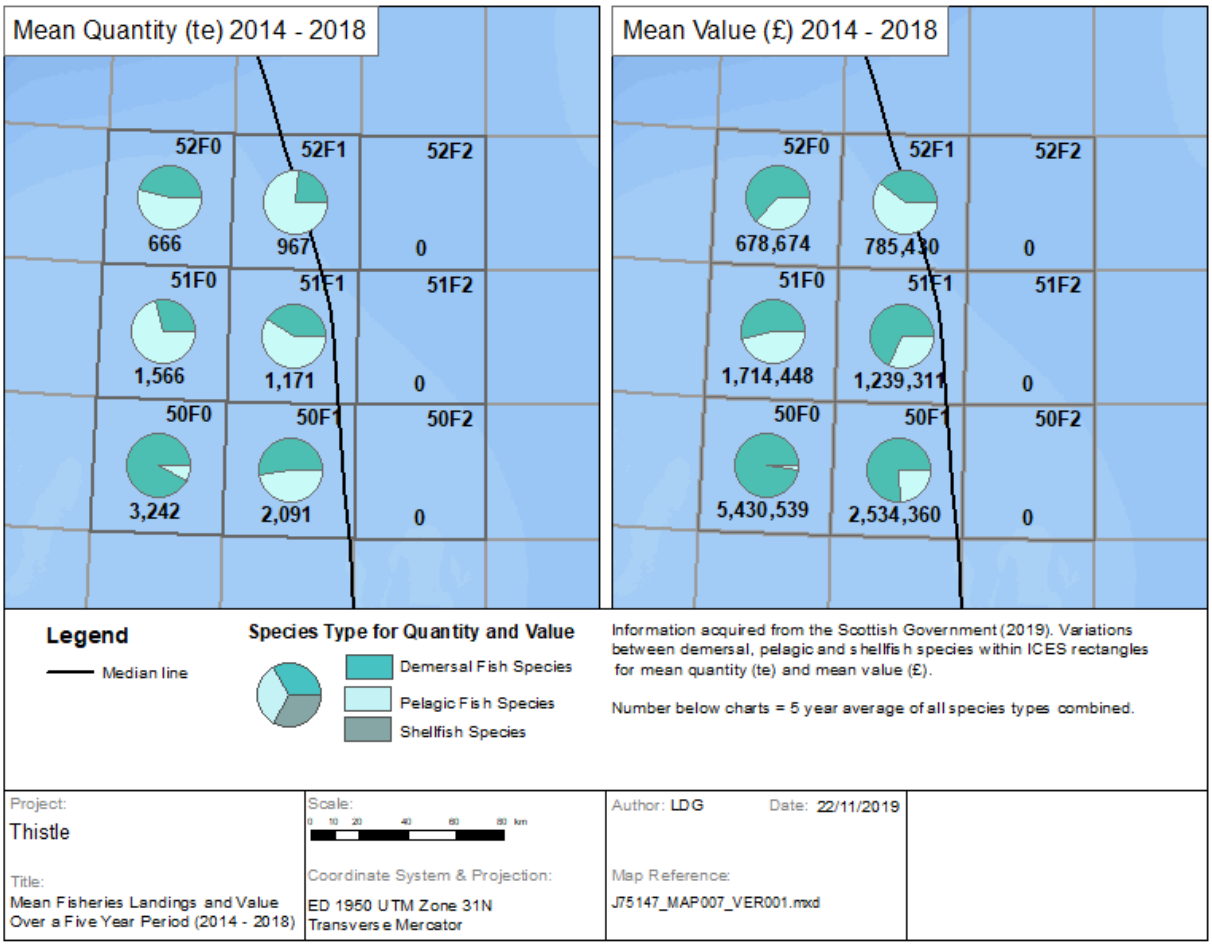


Figure A.2.4: Fish stats for avg. qty & value (Te, £) in 51F1 & locale (Scottish Gov't, 2019)

Appendix A.3 Scoping of Environmental Impacts

Appendix A.3.1 ENVID Method

To determine the significance of the potential impacts associated with the proposed decommissioning activities an ENVID Workshop was undertaken following a structured method as summarised below.

The workshop identified the key environmental and societal sensitivities, discussed all the sources of potential impact and ultimately highlighted those impacts which required further assessment within the EA. The decision on which impacts required further assessment was reinforced by a review of industry experience of decommissioning impact assessment and on an assessment of wider stakeholder interest.

Appendix A.3.2 Assessment of Environmental Risk

The environmental risk was assessed in terms of:

- The consequence of the impact; and
- In the case of planned activities, the likelihood of the impact, whilst in the case of unplanned events the likelihood of an event occurring.

Appendix A.3.2.1 Consequence of Environmental Impacts

The different levels of consequence for any environmental impact are outlined in Table A.3.1.

Table A.3.1: Definitions of environmental consequence (severity categories)

Rank	Severity	Description
5	Major	• Major environmental impact, National plan implemented; • Extensive impact on a sensitive environment; • Wide scale impact on a non-sensitive environment; • Restoration of damage >10 years.
4	Severe	• Severe environmental impact, National plan implemented; • Large scale impact on a sensitive environment; • Extensive impact on a non-sensitive environment; • Restoration of damage within 1 to 10 years.
3	Serious	• Controllable impact, external response required; • Moderate impact on a sensitive environment; • Large scale impact on a non-sensitive environment; • Restoration of damage within weeks or months.
2	Minor	• Minor environmental impact, no lasting effect, local response; • Localised impact on a sensitive environment; • Insignificant impact on a non-sensitive environment; • Restoration of damage within days or weeks.
1	Negligible	• Minimal/contained spill; • No impact on a sensitive environment; • Minimal impact on a non-sensitive environment; • Restoration of damage within days.

Appendix A.3.2.2 Consequence of Socio Economic Impacts

The different levels of consequence of the socio-economic impacts are outlined in Table A.3.2:

Table A.3.2: Definitions of socio-economic consequences					
CRITERION	**1 (NEGLIGIBLE)**	**2 (MINOR)**	**3 (SERIOUS)**	**4 (SEVERE)**	**5 (MAJOR)**
Commercial impact on fisheries and other users.	Neither operations nor end-points would have any effect on commercial fisheries or other users.	Short-term disruption may occur during operations, but similar to existing disruptions caused from time to time by oilfield activities.	Option results in additional areas of ground or water column becoming inaccessible to fishing or other users to extent that up to 1% additional area is lost.	Option results in additional areas of ground or water column becoming inaccessible to fishing or other users to extent that 1 to 10% additional area is lost.	Option results in additional areas of ground or water column becoming permanently inaccessible to fishing to extent where area is lost.
Socio-economic impact to amenities.	No change or impact on amenities.	Short-term localized impact on amenities for some or all of the operations, but would cease and revert to previous condition on completion of operations, without the need for mitigation.	Some impact on local amenities, leading to some actual deterioration in quality of life. Deterioration would exist while actual operations were being carried out. Some mitigation/work would be required when operations were completed to restore amenities to pre-operational condition.	Significant and long-term impact on local amenities, leading to noticeable deterioration in quality of life. Extensive mitigation/work, taking less than 1 year, would be required when operations were completed to restore amenities to pre-operational condition.	Significant and long-term impact on local amenities, leading to noticeable deterioration in quality of life. Extensive mitigation/work, taking between 1 to 5 years, would be required when operations were completed to restore amenities to something resembling pre-operational condition, although full restoration would be unlikely.
Socio-economic impact on communities.	No change or impact on communities.	Short-term localized impact on communities for some or all of the operations, but would cease and revert to previous condition on completion of operations.	Some impact on local communities, leading to some actual deterioration in quality of life. Deterioration would exist while actual operations were being carried out, but would essentially cease as soon as operations were completed, and quickly revert to pre-operation condition.	Significant and long-term impact on local communities, leading to noticeable deterioration in quality of life. This would persist for less than 1 year after actual operations had ceased.	Significant and long-term impact on communities, leading to noticeable deterioration in quality of life. This would persist for several years after actual operations had ceased.

Appendix A.3.2.3 Likelihood

- For planned activities likelihood was defined as “the likelihood of the impact occurring”;
- For unplanned events likelihood was defined as “the likelihood of an event occurring”.

Likelihood was ranked for each activity/event using the description shown in Table A.3.3.

Table A.3.3: Definitions of likelihood categories

Rank	Likelihood	Description
5	Highly Likely	• The incident is highly likely to occur during the period of exposure to the hazard or during the activity completion; • An incident will occur without any additional factors.
4	Likely	• The incident is likely to occur during the period of exposure to the hazard or during activity completion; • An incident may occur if common or frequent adverse factors are present.
3	Possible	• The incident may occur during the period of exposure to the hazard or during activity completion; • An incident may occur if additional adverse reasonably foreseeable factors are present.
2	Unlikely	• The incident is unlikely to occur during the period of exposure to the hazard or during activity completion; • A rare combination of factors would be required for an incident to occur.
1	Very Unlikely	• The incident is very unlikely to occur during the period of exposure to the hazard or during activity completion; • A freak combination of factors would be required for an incident to occur.

Appendix A.3.2.4 Calculating the Environmental Risk

The consequence and likelihood ranking was then combined in order to calculate the environmental risk. The risk assessment matrix used for this is shown in Table A.3.4 and the significance of this is shown in Table A.3.5.

Those activities considered to be of Medium, High and Very High environmental risk were identified for further assessment in the EA.

Table A.3.4: Risk assessment matrix

Likelihood	Risk Assessment Matrix				
Highly Likely [5]	Low	Medium	High	Very High	Very High
Likely [4]	Low	Medium	High	High	Very High
Possible [3]	Low	Medium	Medium	High	High
Unlikely [2]	Low	Low	Medium	Medium	Medium
Very Unlikely [1]	Low	Low	Low	Low	Low
Consequence	**Negligible [1]**	**Minor [2]**	**Serious [3]**	**Severe [4]**	**Major [5]**

	Table A.3.5: Potential environmental risk and significance	
	Environmental Risk	**Potential Impact Significance**
Very High	Very High Risk (intolerable risk), where the level of risk is not acceptable and control measures are required to move the risk to the lower risk categories.	Considered significant.
High	High Risk (intolerable risk), where the level of risk is not acceptable and control measures are required to move the risk to the lower risk categories.	Considered significant.
Medium	Medium Risk – requires additional control measures where possible or management/communication to maintain risk at less than significant levels. Where risk cannot be reduced to 'Low' control measures must be applied to reduce the risk as far as reasonably practicable.	Considered significant.
Low	Low Risk, where the level of risk is broadly acceptable and generic control measures are already assumed in the design process but require continuous improvement.	Not significant.

Appendix A.3.3 Scoping

The results from the ENVID Workshop are presented in Table A.3.6. Applying industry standard mitigation measures, the significance of impact of each of the planned activities was considered to be Low such that any environmental and social impacts are considered to be negligible. Table A.3.6 provides a justification for not assessing further the majority of the aspects identified in the EA, with the exception of:

- Disturbance to the seabed; and,
- Discharges to sea.

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	**POTENTIAL IMPACTS / OBSERVATIONS**	**INDUSTRY-STANDARD MITIGATIONS**	**LIKELIHOOD**	**CONSEQUENCE**	**ENVIRONMENTAL RISK**	**JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES**	**ASSESSED FURTHER IN EA?**
Vessel Use							
Emissions to air. Power generation.	Receptor: Air quality and climate change. Fuel combustion emissions (CO_2, CO, SO_x, NO_x, etc.) from vessels. UK and EU Air Quality Standards not exceeded.	Minimise use of vessels through efficient journey planning and use of relevant vessels for each activity. Prior to contract award EnQuest will review vessel Common Marine Inspection Documents (CMID) as part of vessel assurance (evidence of maintenance). All vessels will be in compliance with EnQuest's Marine Assurance Standards (MAS). Vessels will be MARPOL compliant.	5	1	Low	Total vessel days associated with the proposed activities (including survey vessels, dive support vessels and a heavy lift vessel) is estimated at around 103 days with a fuel use of ~2,354Te. The predicted CO_2 emissions associated with this fuel use is 7,533Te. This equates to ~0.05% of overall CO_2e emissions from shipping in UK waters in 2017 (Committee on Climate Change, 2019). Due to the offshore location of the project area and therefore the absence of populated areas, the consequence of any atmospheric emissions on air quality is considered negligible such that the environmental risk is considered Low. EnQuest acknowledges that the atmospheric emissions associated with the use of vessels will contribute to climate change, however, the relatively short duration of the vessel campaign means the incremental increase in emissions to the atmosphere as a result of the proposed activities is not considered significant. As the environmental risk of vessel emissions is considered Low this aspect is not considered further in the EA.	No
Physical presence. Vessels.	Receptor: Other sea users. Presence of vessels could have the potential to impact on other sea users.	Consultation with Scottish Fishermen's Federation (SFF). Notice to mariners prior to operations starting. Optimise vessel use. Will be working within the existing 500m zone. All vessels engaged in the project operations will have markings and lightings as per the International Regulations for the Prevention of Collisions at Sea (COLREGS).	5	1	Low	As the proposed activities will take place within the Thistle platform 500m exclusion zone the socio-economic consequence of the vessels being on location is considered negligible and the socio-economic risk is considered Low.	No

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	POTENTIAL IMPACTS / OBSERVATIONS	INDUSTRY-STANDARD MITIGATIONS	LIKELIHOOD	CONSEQUENCE	ENVIRONMENTAL RISK	JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES	ASSESSED FURTHER IN EA?
Physical presence. Vessels.	Receptors: Marine mammals and birds. Marine mammals occur in the area and potential presence of birds from coastal SPAs. Possible behavioural changes in marine mammals e.g. could be attracted to the vessel or may move away from the area. Migrating birds could be attracted to the lights on the vessels.	Minimise use of vessel through efficient work planning.	5	1	Low	In addition to being a busy shipping area, the North Sea has well developed fishing and oil and gas industries, such that marine mammals in the region are habituated to the presence of vessels. In addition, the evidence for lethal injury from boat collisions with marine mammals suggests that collisions with vessels are very rare (Cetacean Stranding Investigation Programme, 2011). Out of 478 post mortem examinations of harbour porpoise in the UK carried out between 2005 and 2010, only four (0.8%) were attributed to boat collisions. The environmental consequence of the proposed vessel use on marine mammals is therefore considered negligible and the environmental risk is considered Low and is not discussed further in the EA. The vessels have the potential to cause displacement of seabirds from foraging habitat and may cause flying birds to detour from their flight routes. For example, auk species (e.g. guillemot, little auk) are believed to avoid vessels by up to 200m to 300m but gull species (e.g. kittiwake, herring gull and great black-backed gull) are attracted to the presence of them (Furness and Wade, 2012 and Weise *et al*. 2001). Though evidence suggests that the presence of the vessels could cause some bird species to be displaced from their foraging area, the very small proportion of their overall available habitat that will be occupied by the vessels means the impact is not considered to be noticeable. In addition, given the existing oil and gas vessel activity in the area, it is expected that the impact of the vessels on bird migration routes (e.g. they could be attracted to the vessel lights at night) is not expected to be significant. The environmental consequence of the vessels to birds is therefore considered negligible and the environmental risk is considered Low and is not discussed further in the EA.	No

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	**POTENTIAL IMPACTS / OBSERVATIONS**	**INDUSTRY-STANDARD MITIGATIONS**	**LIKELIHOOD**	**CONSEQUENCE**	**ENVIRONMENTAL RISK**	**JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES**	**ASSESSED FURTHER IN EA?**
Discharges to sea: grey and black water, food waste, ballast water and biofouling.	Receptors: Water quality in immediate vicinity of discharge may be reduced, but effects are usually minimised by rapid dilution in receiving body of water and non-continuous discharge. Possible introduction of invasive species depending on vessel route if International Maritime Organisation (IMO) requirements are not followed.	Minimise use of vessels, through efficient journey planning. EnQuest will review vessel Common Marine Inspection Documents (CMID) as part of vessel assurance and all vessels will be compliant with the Company's Marine Assurance Standards (MAS). Vessels will be MARPOL compliant. All contracted vessels will originate from countries adhering to the International Maritime Organisation (IMO) Convention. The Company's audit procedures will ensure that the contracted vessels ballasting procedures are in line with IMO Convention aimed at preventing associated harmful effects. All discharges of ballast water will be monitored and records maintained. As part of the Company's auditing process, only vessels adhering to the IMO 2011 Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Species will be used. All member states of IMO are signed up to these guidelines.	5	1	Low	All vessels will be IMO and MARPOL compliant such that the environmental consequence of any vessel sewage, ballast water or biofouling is considered negligible and the environmental risk is considered Low and is not discussed further in the EA.	No

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	POTENTIAL IMPACTS / OBSERVATIONS	INDUSTRY-STANDARD MITIGATIONS	LIKELIHOOD	CONSEQUENCE	ENVIRONMENTAL RISK	JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES	ASSESSED FURTHER IN EA?
Underwater noise from vessels.	Receptors: marine mammals and fish. Vessels will use Dynamic Positioning and will have the potential to cause disturbance to marine mammals and fish in the form of temporary displacement from the area. Marine mammals and fish are expected to return once the vessel(s) has left the area.	Minimise use of vessels, through efficient journey planning.	5	1	Low	Any impacts from vessel noise will be behavioural rather than physical, such that they may cause marine mammals or fish to vacate the area, however, they would be expected to return once the vessels have left the field. The environmental consequence of underwater noise associated with the vessels is therefore considered negligible and the environmental risk is considered Low and is not discussed further in the EA.	No
Waste production. General waste from vessels.	Receptor: use of landfill. In addition, there is the potential for impact on communities located in proximity to the landfill site (e.g. from traffic, noise and odour). Following application of the waste hierarchy, minimal quantities of materials will go to landfill.	Prior to contract award EnQuest will review the vessels Waste Management Plans (WMP) which will adhere to the waste hierarchy principle. The Company will ensure vessels are compliant with MARPOL and, as such, meet EnQuest's MAS. As part of their auditing procedures, EnQuest will ensure the contractor adheres to the Waste Duty of Care Code of Practice. Only landfill sites with approved Pollution Prevention and Control (PPC) permits will be used.	5	1	Low	MARPOL Annex V applies to all ships/vessels and generally prohibits the discharge of all garbage into the sea (there are some exceptions which relate for example to food waste and cleaning agents). As vessels will be compliant with MARPOL, the environmental consequence of any discharges from the vessels at sea are considered negligible and the environmental risk is considered Low. Any vessel waste returned to shore will be treated in line with the waste hierarchy therefore minimising waste sent to landfill. In addition, only permitted sites will be used. The environmental and socio-economic consequence of any vessel waste returned to shore is therefore considered negligible, whilst the environmental and socio-economic risk is considered Low. As the environmental risk of any waste from the vessels is considered Low and given that Section 12.8 of OPRED's Guidance Notes (OPRED, 2018) advises that an assessment of wastes returned to shore is not required in the EA (as it is not relevant to the impacts in the marine environment), the onshore impacts associated with vessel waste is not discussed further in the EA.	No

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	POTENTIAL IMPACTS / OBSERVATIONS	INDUSTRY-STANDARD MITIGATIONS	LIKELIHOOD	CONSEQUENCE	ENVIRONMENTAL RISK	JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES	ASSESSED FURTHER IN EA?
Resource use.	Receptor: Fuel.	Scheduling/design to optimise opportunities to use vessels more efficiently (i.e. minimise transits, ensure vehicles are fully loaded). Under MARPOL Annex VI, all vessels will adhere to the Ship Energy Efficiency Management Plan (SEEMP) such that the vessels will have best practices for fuel efficiency in place.	5	1	Low	EnQuest recognise that hydrocarbon based fuel is a finite resource, however, given the relatively short duration of the proposed decommissioning activities and the use of MARPOL compliant vessels, the environmental consequence of the use of fuel is considered negligible and the environmental risk is considered Low and is not discussed further in the EA.	No
Unplanned event: diesel spill. Unforeseen event during operations, for example a collision or fire resulting in a loss of fuel inventory.	Receptors: water quality, sediment quality, fisheries, marine mammals, birds, fish, plankton, benthic communities. Given the nature of diesel, a large volume of any diesel spill would be expected to evaporate rapidly.	Vessel assurance inspections. Pre-hire vessel audits. Emergency response plans in place including SOPEPs (Shipboard Oil Pollution Emergency Plan). SIMOPS (simultaneous operations) will be managed through bridging documents and communications. All vessels engaged in the project operations will have markings and lightings as per the COLREGS whilst the navigational aids will include radar, lighting and Automatic Identification System (AIS).	1	3	Low	The environmental consequence of a loss of diesel inventory is considered serious, however given that such an event is considered very unlikely to occur, the environmental risk is considered Low. In line with Subsection 12.4 of the OPRED Decommissioning Guidance (OPRED, 2018), the impacts of accidental events are not assessed in the EA.	No

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	**POTENTIAL IMPACTS / OBSERVATIONS**	**INDUSTRY-STANDARD MITIGATIONS**	**LIKELIHOOD**	**CONSEQUENCE**	**ENVIRONMENTAL RISK**	**JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES**	**ASSESSED FURTHER IN EA?**
COS tank recovery (including preparatory activities)							
Disturbance to the seabed: Movement of debris to allow access to cutting points. No operational dredging required for access.	Receptors: water column, sediment quality and benthic communities. All activities will take place out with any designated areas.	Cutting work plans will be in place. The Invitation to Tender (ITT) to contractors specifies minimal disturbance to the cuttings pile during the decommissioning activities.	5	2	Medium	The bottom of the tank is ~1m above the top of the cuttings pile such that dredging of the pile to gain access to cutting points is not considered necessary. However, it is expected that some debris may require to be recovered/relocated to allow access for cutting activities and for removal of the tanks. These debris recovery/relocation activities are expected to result in some disturbance of the cuttings pile. The disturbed cuttings are expected to temporarily enter the water column before re-settling on top of the already-contaminated sediment in the immediate vicinity of the Thistle platform. The environmental consequence of this disturbance to the cuttings pile is considered minor such that the environmental risk is considered Medium. This disturbance will therefore be assessed further in the EA.	Yes
Disturbance to the seabed, placement of grout bags to provide secondary support	Receptors, water column, sediment quality and benthic communities All activities will take place outside any designated areas	Work plans will be put in place.	5	2	Medium	The shell of the grout bags will be placed on the seabed (outer edge of the drill cuttings pile) and thereafter filled with grout *in situ*. This will minimise the impact of placing materials directly onto the drill cuttings.	
Disturbance to the seabed: laying down of the COS tanks.	Receptors: benthic communities. All activities will take place out with any designated areas. Potential for COS Tanks being left on seabed for more than ten years. Potential integrity issues leading to problems recovering at a later time.	Lifting procedures in place. Laying down within the 500m zone. Laying down outside the bulk of the cuttings pile. Monitored over the period they are on the seabed to ensure no integrity issues.	5	2	Medium	As the tanks will be laid down on the seabed prior to recovery, there will be some associated disturbance to the drill cuttings extending over the 500m zone. The environmental consequence of this disturbance is considered minor and the environmental risk is considered Medium. This disturbance will therefore be assessed further in the EA.	Yes

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	**POTENTIAL IMPACTS / OBSERVATIONS**	**INDUSTRY-STANDARD MITIGATIONS**	**LIKELIHOOD**	**CONSEQUENCE**	**ENVIRONMENTAL RISK**	**JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES**	**ASSESSED FURTHER IN EA?**
Discharges to sea: associated with removal of attic oil during preparatory activities.	Receptor: Water quality. Reduction due to contaminants entering water column.	Attic oil in the tanks will be removed to a vessel. The oil will be skimmed off and contained for disposal onshore and the associated seawater will be discharged. Best endeavours will be applied to minimise the oil in seawater prior to its discharge. This discharge will be covered by an oil discharge permit.	5	2	Medium	As the discharged seawater will contain some hydrocarbons the environmental consequence is considered minor such that the environmental risk is considered Medium. This scoping exercise recognises the environmental risk as being Medium, however removal of the attic oil is considered to be preparatory activities such that the associated discharges are not considered further in the EA. Rather any impacts will be assessed in detail in the permit applications submitted to support the proposed activities.	No
Discharges to sea: discharges during lay down of the COS tanks on the seabed.	Receptors: Water quality reduction and possible seabed contamination. Water quality reduced due to contaminants entering the water column and impacting local faunal species. Possible seabed contamination due to residual discharges whilst the tanks are on the seabed. Smothering of benthic communities by tank sediment.	Tanks have previously been flushed with seawater. Best endeavours will be made to identify and remove attic/residual oil. Where this would not impede removal or recovery operations, seal contaminated area, for example using pipe plugs inside nozzles.	4	2	Medium	Though the tanks have previously been flushed and filled with seawater, and best endeavours will be made to remove as much attic oil as possible, it is expected that ~5.7m^3 of oil will remain in each of the tanks (i.e. around 1,000ppm). When the tanks are laid on the seabed there may be some discharges of the current tank contents such that some of the oil within the tank may be discharged. The environmental consequence of these discharges is considered minor such that the environmental risk is considered medium. These discharges are therefore assessed further in the EA. The lower part of the tanks will be sealed prior to the tanks being removed from the jacket, so no sediment will be discharged to the seabed.	Yes
Discharges to sea: discharges during recovery of the tanks.	Receptor: Water quality. Potential for surface sheen which could impact on birds.	Tanks have previously been flushed with seawater. Best endeavours will be made to identify and remove attic/residual oil.	5	2	Medium	During recovery, the contents of the tanks will drain out whilst they are being lifted through the splash zone. It is possible that some of the residual oil will also be lost to the environment. It is currently estimated that a maximum 5.7m^3 of oil remains in each tank. The environmental consequence of these discharges is considered minor whilst the environmental risk is considered Medium. These discharges are therefore assessed further in the EA.	Yes

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	POTENTIAL IMPACTS / OBSERVATIONS	INDUSTRY-STANDARD MITIGATIONS	LIKELIHOOD	CONSEQUENCE	ENVIRONMENTAL RISK	JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES	ASSESSED FURTHER IN EA?
Underwater noise from cutting activities.	Receptors: Marine mammals, fish and seabirds due to vibrations and noise in the water column.	Work procedures in place to minimise cutting.	5	1	Low	The consequence of any noise resulting from the cutting activities associated with the decommissioning works is considered negligible such that the environmental risk is considered Low. These impacts are therefore not considered further in the EA. **Note**: as a contingency it is possible that shape charges could be used to sever the support braces between the COS tanks and the jacket legs. If this method of severance is selected, EnQuest will align with JNCC guidelines for minimising the risk of injury (JNCC, 2010). Given the low likelihood of this option being selected, the impacts are not considered further in the EA. However, if during the Contracts and Procurements phase, the option to use shape charges is selected an assessment of the impacts will be carried out and the results will be shared with OPRED prior to mobilisation. A Marine License will be put in place before any such operations are carried out.	No
Processing of Waste.	Receptors: Use of landfill. Potential for impacts on communities located in proximity to the landfill site (e.g. from traffic, noise and odour). Following application of the waste hierarchy, minimal quantities of materials will go to landfill.	Waste management will follow the waste hierarchy: reduce, reuse, recycle. All waste will be handled and disposed of in line with regulations which will be detailed in the WMP.	5	1	Low	The project will have a WMP in place and any materials returned will be treated in line with the waste hierarchy. As the quantities of material to landfill will therefore be minimised, the environmental consequence of returned material is considered negligible and the environmental risk is considered Low. Section 12.8 of OPRED's Guidance Notes (OPRED, 2018) advises that an assessment of wastes returned to shore for treatment or disposal or an assessment of waste management is not required in the EA as it is not relevant to the impacts in the marine environment. For this reason, the processing of waste returned to shore and any onshore impacts associated with the returned material is considered to have a Low environmental risk and is therefore not discussed further in the EA.	No

Table A.3.6: Results of ENVID workshop							
ASPECT / ACTIVITY	POTENTIAL IMPACTS / OBSERVATIONS	INDUSTRY-STANDARD MITIGATIONS	LIKELIHOOD	CONSEQUENCE	ENVIRONMENTAL RISK	JUSTIFICATION FOR SELECTING/DESELECTING THE ASPECT/IMPACT FOR FURTHER ASSESSMENT IN THE ES	ASSESSED FURTHER IN EA?
Unplanned event: Dropped COS tank.	Receptors: Localised seabed disturbance and potential smothering of benthic faunal communities.	Use of specialised contractors. Lifting procedures in place. Rigging equipment maintenance. Oil Pollution Emergency Plan (OPEP) in place.	1	4	Low	Assessed the worst case scenario, whereby the dropped COS tank impacts a live production line. The environmental consequence is considered severe, however given that such an event is considered very unlikely to occur, the environmental risk is considered Low. In line with Subsection 12.4 of the OPRED Decommissioning Guidance (OPRED, 2018), the impacts of accidental events are not assessed in the EA.	No
Unplanned event: Dropped small objects e.g. debris, ballast pipework, scaffold poles etc.	Receptor: Localised seabed disturbance and potential smothering of benthic faunal communities. Possible snagging hazard for fishing gear.	Use of specialised contractors. Lifting procedures in place. Rigging equipment maintenance. Debris clearance surveys.	3	2	Medium	The environmental and socio-economic consequence of dropping small objects is considered minor however it is considered possible that such an event could happen resulting in the environmental risk being Medium. This medium ranking is noted, however in line with Subsection 12.4 of the OPRED Decommissioning Guidance (OPRED, 2018), the impacts of accidental events are not assessed in the EA.	No

Appendix A.4 Impact Assessment

Appendix A.4.1 Seabed Disturbance

During the scoping exercise presented in Section Appendix A.3.3, two activities were identified with the potential to result in an environmental risk to the seabed. This section describes and quantifies the level of seabed disturbance associated with those activities and further assesses the potential impacts.

The following activities were considered to have the potential to result in seabed disturbance with a medium environmental risk:

- Locating grout bags underneath the tanks as secondary support; these will be filled with grout *in situ*;
- Recovery/relocation of debris to allow access to cutting points;
- Laying down of the COS tanks following severance from the jacket.

The area of seabed impact as a result of these activities is summarised in Table A.4.1.

Table A.4.1: Potential area of seabed disturbance

Cause of disturbance	Assumptions made when calculating area of disturbance	Area impacted
Relocation/recovery of debris	It is expected that any debris that may be relocated/recovered is in the immediate vicinity of the COS tanks, however, the extent of debris requiring recovery/relocation and the associated area of seabed disturbance is currently unclear. The EA assumes a worst case area of disturbance of 10m x 10m at each tank location.	2 x 200m^2 As a worst case considered a permanent disturbance taking account of the possibility that the debris will be relocated rather than recovered. **Note:** This area is also within the area impacted by the placement of grout bags.
Placement of grout bags on edge of the drill cuttings, filled *in situ*	Base area of each bag (5m x 5m) plus working area of 5m all way round. 2 x (5+5+5) x (5+5+5)	2 x 225m^2 Considered as a permanent disturbance as the grout bags could be on location long-term.
Laying down of the COS tanks	Tank dimensions: 90m (L) x 10m (W).	1,800m^2 Considered a permanent disturbance as the tank could possibly be laid on the seabed long-term.
Total area impacted		2,250m^2 (1,800+2x225)

The physical disturbance resulting from the recovery/relocation of debris items and the laydown of the COS tanks can cause mortality or displacement of benthic species in the impacted area. In addition, it is expected that some sediment re-suspension will occur during the proposed activities.

The species occurring within the 500m zone are typical of seabed areas covered with drill cuttings (see Section Appendix A.2.3.2). The worst case anticipated footprint of any relocated debris and the two tanks is 2,250m^2, equivalent to 0.25% of the area of the exclusion zone. The area impacted by the grout bags is calculated to be 2% of the area occupied by the drill cuttings. Given the small area of impact any impacts on benthic species as a result of mortality caused by relocating any debris items and the laydown of the COS tanks is considered minor such that the impact is considered insignificant.

As described in Appendix A.2.2, there is evidence of discharged drill cuttings across the 500m exclusion

zone such that any sediments that could become dislodged and re-suspended may have hydrocarbon and metal contaminants associated with them. However, give that there will be no requirement for dredging activities, it is expected that any suspended sediments will settle within close proximity to their original location i.e. over an area already impacted by drill cuttings.

Kjeilen-Eilertsen *et al*. (2004) identified that a burial thickness exceeding 6.5mm could result in a risk of at least 5% to the most sensitive species. Given the limited amount of resuspension anticipated, resettlement of sediments is not expected to result in this level of burial. However, if it does occur, the impact would be to individual animals rather that at a population or species level given the general uniformity of the species diversity in the northern North Sea area. In addition, the impacts are expected to occur within the 500m zone such that any environmental impacts of resuspended sediments are considered minor.

During the ENVID workshop the potential for the proposed activities to result in a medium environment risk with respect to seabed disturbance was identified, resulting in this aspect being assessed further. Further assessment has found the potential impacts on the seabed and the associated benthic communities to be minor, recognising that it is a localised impact and any impacts will be on an area already contaminated with discharged drill cuttings.

Appendix A.4.2 Discharges to Sea

During the scoping exercise presented in Section A.2.2, those discharges identified with the potential to result in an environmental risk to the water column and/or seabed included:

- Discharges of residual contaminants from the COS tanks while they are laid on the seabed;
- Discharges from the COS tanks during recovery as they pass through the splash zone.

Discharges of residual contaminants from the COS tanks while they are laid on the seabed

As described in Section Appendix A.1, it is estimated that there will be a maximum volume of ~5.7m^3 of oil in each tank at the time they are being severed from the jacket. It is possible that some of the tank contents (seawater and residual oil at a concentration of <1,000ppm) may be discharged from the tanks when they are being placed on the seabed. This may occur where the tank has been cut to attach the required lifting points. EnQuest will endeavour to minimise any openings in the tanks and therefore minimise the volume of seawater that may be discharged. In addition, it is expected that current estimates of the residual oil are conservative. As a worst case, assuming 10% of the tank contents are released during the laydown operations, this equates to around 0.5m^3 of oil being released.

Oil in sediment concentrations of 50mg/kg and above are considered to result in discernible impacts on benthic animals. In response to oil exposure, benthic animals can either move, tolerate the pollutant (with associated impacts on the overall health and fitness), or die (Gray *et al*., 1988; Lee and Page, 1997). The response to oil by benthic species differs depending on their life history and feeding behaviour as well as the ability to metabolise toxins, especially PAH compounds. The 1999 survey found that many of the species around 215m from the platform are opportunistic species that occur is areas with oil in the sediments (Gardline, 1999). For example *C. capitata* has been found to be amongst the first colonisers in the aftermath of a spill. This species thrives in the absence of competition and is a non-selective deposit feeder consuming detritus and algae and benefitting from organic pollution.

Given the relatively small volumes of oil that could potentially be discharged from the tanks and enter the sediments, the fact that these impacts would occur within an area already colonised by opportunistic species and the fact that the sediments currently have relatively high levels of hydrocarbon contamination (Refer Appendix A.2.2), the environmental impact of any oil that may end up in the sediment is considered minor.

Discharges from the COS tanks during recovery as they pass through the splash zone

During recovery of the COS tanks from the seabed, the contents of both tanks will likely be discharged whilst they are being lifted through the splash zone. This assessment assumes a worst case whereby 5.7m^3 of oil is released from each tank.

It is possible that these discharges will result in a sheen on the sea surface and that some of the oil will enter the water column and the sediments. However, given the relatively small volumes of oil entrained in the seawater, the probability of a surface sheen forming that is above the level identified to be toxic (sheen of thickness above 3µm) is low. Similarly, the probability of water column and sediment concentrations being above toxic levels, 25ppb and 50mg/kg respectively is unlikely.

Birds are vulnerable to oiling from surface oil pollution through ingestion and hypothermia. The SOSI indicates that birds in the area have a high vulnerability to surface oil pollution in November to January whilst it is low throughout the rest of the year (see Section Appendix A.2.2). Similarly, oil can have an effect on flora and fauna occurring within the water column and on the seabed (including plankton, benthic species, fish, and marine mammals). However, allowing for the relatively small volumes of oil that could be discharged, and the probability that surface, water column and sediment concentrations identified to be toxic are not likely to be exceeded, any impacts are considered to be minor.

Given the location of the Thistle field, there are no impacts on protected areas or designated habitats expected. Also at ~11km from the nearest median line any hydrocarbons that could cross the median line will be below toxic levels.

During the ENVID workshop the potential for the proposed activities to result in a medium environment risk with respect to discharges to sea was identified, resulting in this aspect being assessed further. Further assessment has found the potential impacts to be minor, recognising the relatively small volumes of oil that could be discharged.

Appendix A.4.3 Assessment Against the Scottish National Marine Plan (NMP)

The Thistle field falls within the Scottish NMP area, which comprises plans for Scotland's inshore (out to 12 nm) and offshore waters (12nm to 200nm) as set out under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009. The plan represents a framework of Scottish Government policies for the sustainable development of marine resources and is underpinned by strategic objectives:

- Achieving a sustainable marine economy;
- Ensuring a strong, healthy and just society;
- Living within environmental limits;
- Promoting good governance;
- Using sound science responsibly.

These objectives are to be achieved through the application of 21 'General Planning Principles'. Table A.4.2 identifies which of these 21 Principles are considered relevant to the proposed decommissioning activities.

Table A.4.2: Scottish NMP's general Planning Principles
GEN 1 General planning principle: There is a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of this Plan.
GEN 4 Co-existence: Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision making processes, when consistent with policies and objectives of this Plan.
GEN 5 Climate change: Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.
GEN 9 Natural heritage: Development and use of the marine environment must: a) Comply with legal requirements for protected areas and protected species. b) Not result in significant impact on the national status of Priority Marine Features. Protect and, where appropriate, enhance the health of the marine area.
GEN 12 Water quality and resource: Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply.
GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.
GEN 14 Air quality: Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits.
GEN 21 Cumulative impacts: Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation.

The EA has considered the objectives and marine planning policies of the Scottish NMP across the range of policy topics including biodiversity, natural heritage, cumulative impacts and oil and gas. EnQuest considers that the proposed decommissioning activities are in broad alignment with such objectives and policies.

Appendix A.5 Conclusion

A detailed review of the proposed activities, and the environmental sensitivities of the project area was carried out to determine the potential impact of the removal and subsequent recovery of the COS tanks.

Based on the findings of this EA and the identification and subsequent application of the mitigation measures identified for each potentially significant environmental impact, it is concluded that the proposed activities will result in no significant environmental impacts.

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APPENDIX B CONSULTEE CORRESPONDENCE

Appendix B.1 NFFO – Mr Ian Rowe, via email

From: Ian Rowe <Ian@nffo.org.uk>
Sent: 11 December 2019 11:50
To: Axon, Simon <Simon.Axon@enquest.com>
Cc: Chris Traves <Chris@nffo.org.uk>
Subject: RE: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019
Good morning Simon
Thanks for the information , as this project is in Scottish waters and is to be carried out within the 500m zone and after speaking to Andrew Third at the Scottish fisherman's federation and who are in consultation with yourselves we at the NFFO have no further comment to add.
Kind regards
Ian, Ian Rowe, General Manager, NFFO Services Limited, 30 Monkgate, York, YO31 7PF

From: Axon, Simon <Simon.Axon@enquest.com>
Sent: 11 December 2019 10:20
To: Ian Rowe <Ian@nffo.org.uk>
Cc: Chris Traves <Chris@nffo.org.uk>; Wood, Ian; Muriel, Diana
Subject: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019
Dear Ian,
You may recall our brief flurry of emails back in September 2019 where amongst other items for decommissioning included the Thistle Crude Oil Storage Tanks and how EnQuest is making plans to remove these from the Thistle Alpha platform in September 2020. The platform is located in the northern North Sea.
Unfortunately, for structural reasons the tanks are in a precarious condition and so they need to be removed as soon as possible. Notwithstanding weather conditions the intention is that will be removed early January 2020.
Having used best endeavours to flush the tanks of any mobile hydrocarbons they will be removed from the jacket structure and laid on the seabed within the Thistle A 500m zone (Figure 3.1.2 in the Decommissioning Programme). They will be recovered at a later date.
The attached Decommissioning Programme has today commenced a 1 week consultation process with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). While it will not be subject to a formal Statutory Consultation, and out of courtesy I thought it appropriate to share EnQuest's proposals with you and to give NFFO the opportunity to make comment.
I appreciate that time is short, and you will be busy, but I'd appreciate any feedback by 17:00 Tuesday 17 December as this will allow me to include any comment when the consultation process is complete.
Meantime, please don't hesitate to contact me should you have any queries or concerns.
Simon Axon, Decommissioning Analyst (Reg Compliance)

Appendix B.2 NIFPO – Mr Wayne Sloan, via email

From: Wayne Sloan <waynes@fpoffshoreservices.co.uk>
Sent: 12 December 2019 10:45
To: Axon, Simon <Simon.Axon@enquest.com>
Cc: Wood, Ian; Muriel, Diana
Subject: Re: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019
Good morning Simon,
Many thanks for your email. We have no comments to make at this time.
Kind Regards, Wayne Sloan

From: Axon, Simon
Sent: 11 December 2019 10:20
To: waynes@fpoffshoreservices.co.uk
Cc: Wood, Ian; Muriel, Diana
Subject: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019
Dear Wayne,
EnQuest is making plans to remove the Thistle Crude Oil Storage Tanks from the Thistle Alpha platform located in the northern North Sea early January 2020.
Having used best endeavours to flush the tanks of any mobile hydrocarbons they will be removed from the jacket structure and laid on the seabed within the Thistle A 500m zone (Figure 3.1.2 in the Decommissioning Programme). They will be recovered at a later date.
The attached Decommissioning Programme has today commenced a 1 week consultation process with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). While it is not be subject to a formal Statutory Consultation, out of courtesy I thought it appropriate to share EnQuest's proposals with you and to give NIFPO the opportunity to make comment.
I appreciate that time is short, and you will be busy, but I'd appreciate any feedback by 17:00 Tuesday 17 December as this will allow me to include any comment when the consultation process is complete.
Meantime, please don't hesitate to contact me should you have any queries or concerns.
I trust you're well.
Simon Axon, Decommissioning Analyst (Reg Compliance)

Appendix B.3 SFF – Mr Steven Alexander & Mr Andrew Third via email

From: Steven Alexander <S.Alexander@sff.co.uk>
Sent: 12 December 2019 16:06
To: Axon, Simon <Simon.Axon@enquest.com>
Cc: Andrew Third <A.Third@sff.co.uk>; Wood, Ian; Muriel, Diana
Subject: RE: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019

Good afternoon Simon,

Thank you for the Thistle Crude Oil Storage (COS) Tanks Decommissioning Programme proposals provided.

I can confirm that the Scottish Fishermen's Federation has no adverse comments to offer regarding these particular proposals.

It is noted that all of the planned decommissioning activities will take place within the existing Thistle A Platform's 500 metre safety zone and that prior to severing the tanks from the Thistle jacket and laying them on the seabed for future recovery, best endeavours will be made to minimise any residual oil remaining in the two COS tanks (with proposals to remove the attic oil from the two tanks to a vessel).

Thanks and kind regards,

Steven, Steven Alexander, Offshore Liaison, Scottish Fishermen's Federation, 24 Rubislaw Terrace, Aberdeen, AB10 1XE,

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From: Axon, Simon
Sent: 11 December 2019 10:19
To: Steven Alexander (s.alexander@sff.co.uk) <s.alexander@sff.co.uk>
Cc: Andrew Third <A.Third@sff.co.uk>; Wood, Ian; Muriel, Diana
Subject: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019

Dear Steven,

You may recall our meeting back in July where amongst other items we discussed the Thistle Crude Oil Storage Tanks and how EnQuest is making plans to remove these from the Thistle Alpha platform in September 2020. The platform is located in the northern North Sea.

Unfortunately, for structural reasons the tanks are in a precarious condition and so they need to be removed as soon as possible. Notwithstanding weather conditions the intention is that will be removed early January 2020.

Having used beast endeavours to flush the tanks of any mobile hydrocarbons they will be removed from the jacket structure and laid on the seabed within the Thistle A 500m zone (Figure 3.1.2 in the Decommissioning Programme). They will be recovered at a later date.

The attached Decommissioning Programme has today commenced a 1 week consultation process with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). While it is not be subject to a formal Statutory Consultation, out of courtesy I thought it appropriate to share EnQuest's proposals with you and to give SFF the opportunity to make comment.

I appreciate that time is short, and you will be busy, but I'd appreciate any feedback by 17:00 Tuesday 17 December as this will allow me to include any comment when the consultation process is complete.

Meantime, please don't hesitate to contact me should you have any queries or concerns.

Simon Axon, Decommissioning Analyst (Reg Compliance)

Appendix B.4 GMG – Mr John Wrottesley via email

EnQuest communicated directly Mr Wrottesley on 18 December. As there are no third-party pipelines in the vicinity GMG had no adverse comments with regards to the decommissioning proposals.

From: Axon, Simon
Sent: 11 December 2019 10:21
To: john.wrottesley@globalmarine.group
Cc: Wood, Ian <Ian.Wood@enquest.com>; Muriel, Diana <Diana.Muriel@enquest.com>
Subject: REQUEST: Thistle COS Tanks Decommissioning Programme Proposals - 1 Week Consultation Ends Tuesday 17 December 2019

Dear John,

EnQuest is making plans to remove the Thistle Crude Oil Storage Tanks from the Thistle Alpha platform located in the northern North Sea early January 2020.

Having used beast endeavours to flush the tanks of any mobile hydrocarbons they will be removed from the jacket structure and laid on the seabed within the Thistle A 500m zone (Figure 3.1.2 in the Decommissioning Programme). They will be recovered at a later date.

The attached Decommissioning Programme has today commenced a 1 week consultation process with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). While it is not be subject to a formal Statutory Consultation, out of courtesy I thought it appropriate to share EnQuest's proposals with you and to give GMG the opportunity to make comment.

I appreciate that time is short, and you will be busy, but I'd appreciate any feedback by 17:00 Tuesday 17 December as this will allow me to include any comment when the consultation process is complete.

Meantime, please don't hesitate to contact me should you have any queries or concerns.

Simon Axon, Decommissioning Analyst (Reg Compliance)