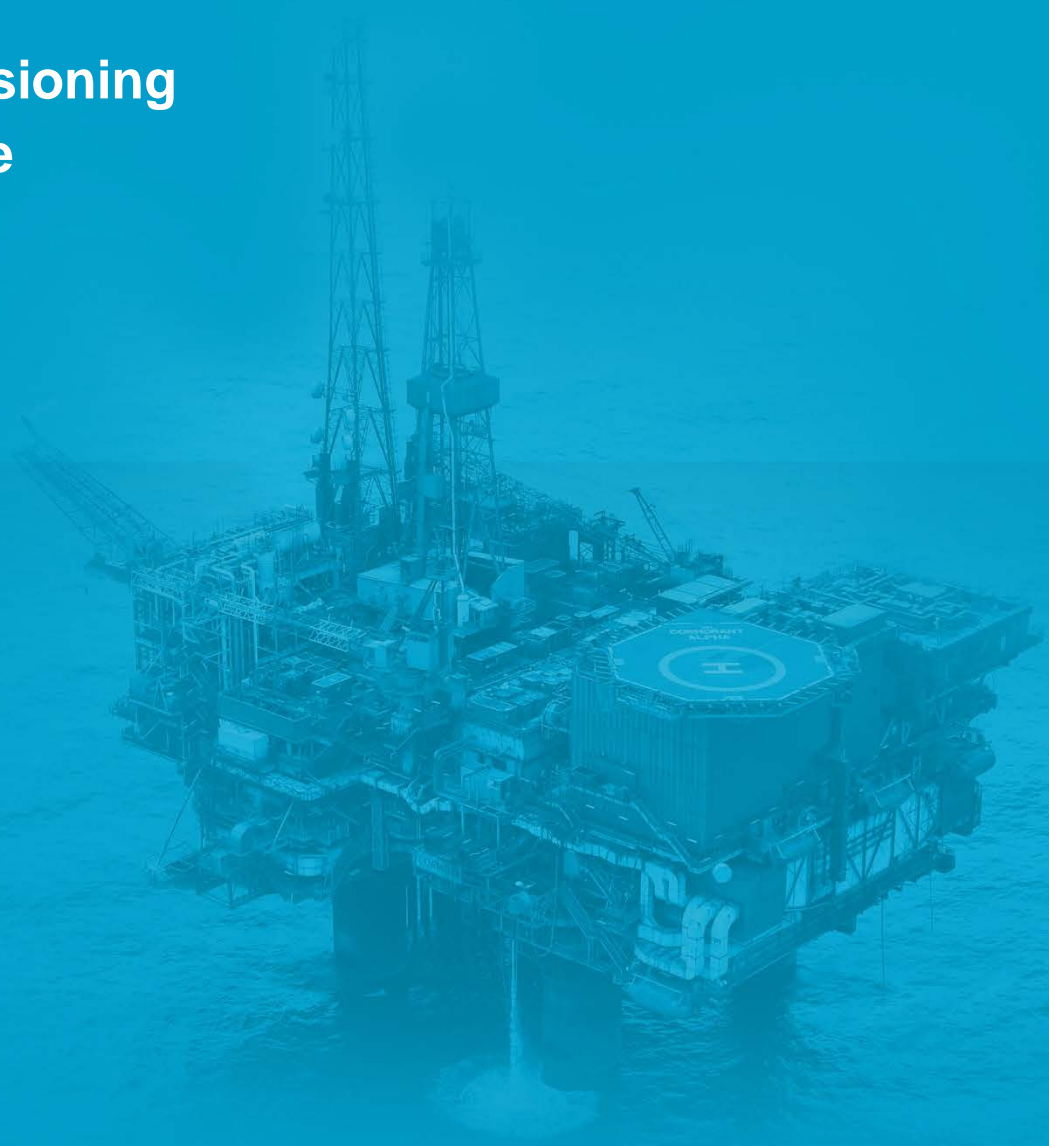


CORMORANT ALPHA TOPSIDE

Decommissioning Programme



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CONTENTS

CONTENTS	3
ABBREVIATIONS	4
FIGURES	6
TABLES	7
APPENDICES	7
1. EXECUTIVE SUMMARY	8
2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED	24
3. REMOVAL AND DISPOSAL METHODS	29
4 ENVIRONMENTAL APPRAISAL OVERVIEW	40
5 INTERESTED PARTY CONSULTATIONS	49
6 PROGRAMME MANAGEMENT	50
7 SUPPORTING DOCUMENTS	53
APPENDICES	54

ABBREVIATIONS

ABBREVIATIONS	
Abbreviation	Explanation
ALQ	Additional Living Quarters
ALARP	As Low As Reasonably Practicable
BAT	Best Available Technology
bbls	Barrels
COA	Cormorant Alpha
CON	North Cormorant
CoP	Cessation of Production
DP	Decommissioning Programme
EA	Environmental Appraisal
EDC	Engineer Down & Clean
EL	Elevation
EMS	Environmental Management System
ERRV	Emergency Response and Rescue Vessel
EUNIS	European Nature Information System
CGBS	Concrete Gravity Based Structure
GJ	Gigajoule
HLV	Heavy Lift Vessel
HSE	Health and Safety Executive
HVAC	Heating, Ventilation and Air Conditioning
IPR	Interim Pipeline Regime
JV	Joint Venture (Partner)
km	Kilometres
km ²	Kilometres Squared
Kw	Kilowatt
LAT	Lowest Astronomical Tide
LSA	Low Specific Activity Scale

ABBREVIATIONS (CONT.)	
Abbreviation	Explanation
m	Metres
m ³	Metres Cubed
MM	Million
MSF	Module Support Frame
N/A	Not Applicable
NFFO	National Federation of Fishermen's Organisations
NIFPO	Northern Ireland Fish Producers Organisation Ltd
NLB	Northern Lighthouse Board
NNS	Northern North Sea
NOF	Business Development Organisation
NORM	Naturally Occurring Radioactive Material
OGA	Oil and Gas Authority
OGTC	Oil and Gas Technology Centre
OGUK	Oil & Gas UK
ONE	Opportunity North East
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention
P&A	Plug & Abandon
PETS	Portal Environmental Tracking System
PON	Petroleum Operations Notice
RoI	Reverse of Installation
SCOL	Self-Contained Offshore Lighthouse
SFF	Scottish Fishermen's Federation
SLV	Single Lift Vessel
SL	Single Lift
STOIIP	Stock Tank Oil Initially In Place
SPE	Society of Petroleum Engineers

ABBREVIATIONS (CONT.)	
Abbreviation	Explanation
SVT	Sullom Voe Terminal
TAQA	TAQA Bratani Limited
Te	Tonnes
TFS	Transfrontier Shipment (of Waste)
UKCS	United Kingdom Continental Shelf
UKHO	United Kingdom Hydrographic Office
UMC	Underwater Manifold Centre
WONS	Well Operations and Notifications System

FIGURES

FIGURES		
Figure Reference	Description	Page
Figure 1.1	Cormorant Alpha Platform	11
Figure 1.2	Field Location in UKCS	16
Figure 1.3	TAQA NNS Field Layout	17
Figure 1.4	Adjacent Facilities Interdependency Overview	22
Figure 2.1	Cormorant Alpha Topside	24
Figure 2.2	Cormorant Alpha Topside by Functional Category	27
Figure 2.3	Cormorant Alpha Topside by BEIS Category	28
Figure 3.1	Cormorant Alpha Topside East Elevation	29
Figure 3.2	Cormorant Alpha Topside Modular Construction	31
Figure 3.3	Cormorant Alpha Topside Overview	32
Figure 3.4	Cormorant Alpha Platform: Topside & CGBS	34
Figure 6.1	Cormorant Alpha Decommissioning Project Schedule	50

TABLES

TABLES		
Figure Reference	Description	Page
Table 1.1	Installation to be Decommissioned	12
Table 1.2	Installation Section 29 Notice Holders Details	13
Table 1.3	Summary of Decommissioning Programme	15
Table 1.4	Adjacent Facilities	18
Table 2.1	Surface Facilities Information	24
Table 2.2	Well Information	25
Table 3.1	Cleaning of Topsides for Removal	33
Table 3.2	Topside Removal Methods	36
Table 3.3	Well Plug and Abandonment	37
Table 3.4	Waste Stream Management Methods	38
Table 3.5	Inventory Disposition	39
Table 3.6	Reuse, Recycling and Disposal Aspirations for Recovered Material	39
Table 4.1	Environmental Sensitivities	40
Table 4.2	Environmental Impact Management	43
Table 5.1	Summary of Stakeholder Comments	49
Table 6.1	Provisional Decommissioning Programme Costs	52
Table 7.1	Supporting Documents	53

APPENDICES

APPENDICES		
Appendix	Description	Page
1	Public Notice	54
2	Letters of Support	55

1. EXECUTIVE SUMMARY

1.1 Decommissioning Programme

This decommissioning programme is for the Cormorant Alpha topside installation.

Cormorant Alpha is a fixed installation with a concrete gravity-based structure located in the South Cormorant field in the East Shetland basin of the Northern North Sea Block 211/26a. The field was discovered in 1972 with the platform installed in 1978 and production starting in December 1979.

A CoP (Cessation of Production) applications for the South Cormorant and Pelican (including Cormorant Alpha and the UMC manifold) fields have been prepared and have been submitted to the Oil & Gas Authority (OGA) in Q3 2020. The CoP date for Cormorant Alpha is currently anticipated to be Q4 2023.

This Cormorant Alpha Topside Decommissioning Programme (DP) is supported by an Environmental Assessment which is a separate document and summarised in Section 4.

TAQA recognises that execution of topside removals can allow decommissioning to be executed cost effectively, to the benefit of the taxpayer and without prejudice or compromise to the feasible decommissioning options for the remaining substructure. As such, OPRED has agreed that our proposals for decommissioning the Cormorant Alpha topside can form this separate, topside-only DP. This is discussed further in Section 1.3.

Isolation of the Rundown Lines and Vent Lines within the platform substructure, to facilitate safe execution of topside removal, is also included within the scope of this Decommissioning Programme.

A phased P&A programme, commencing in advance of CoP will minimise the period

between cessation of production and the removal of the topsides as there will only be a small number of wells left to P&A at the time of CoP. This has safety and environmental benefits, as it reduces the length of time that people and equipment are mobilised to the platform to perform maintenance of the topsides to ensure they are in a safe condition for dismantling.

Early planning has commenced and the execution window of 2026 as the earliest possible start date through to project completion in 2028.

It should be noted that this does not include the drilling derrick structure as this has already been covered by a separate decommissioning programme (Ref:1) The modular drilling rig that will be used to P&A the Cormorant Alpha platform wells will be removed prior to topside removal and is therefore not part of the scope of this decommissioning programme.

1.2 Requirement for Decommissioning Programme

In accordance with the Petroleum Act 1998, the Section 29 notice holders of the Cormorant Alpha installation (see Table 1.2) are applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the Cormorant Alpha topside detailed in Section 2.1 of this programme.

In conjunction with stakeholder and regulatory consultation, the decommissioning programme is submitted in compliance with national and international regulations and OPRED guidelines. This decommissioning programme is for an anticipated 11-year schedule, planning for which began in 2019.

1.3 Introduction

The Cormorant Alpha installation lies within the East Shetland Basin of the UKCS in licence block 211/26a in 150m water depth. The Cormorant Alpha Installation consists of a four-leg concrete gravity base structure, weighing 294,655Te. with a steel box girder Module Support Frame (MSF) supporting two levels of modules with a total topsides weight of 25,546.45Te. For a graphical representation of the platform in its entirety, please see Figure 1.1. This illustrates the key structural elements of the platform, as well as a brief description of the key areas and their extent.

The platform serves as a manned drilling, production and metering facility for the Central Cormorant and Pelican fields. Cormorant Alpha also serves as the entry point into Brent System for TAQA and other third-party production. This production is then transported through the Brent pipeline to Sullom Voe Terminal (SVT). Cormorant Alpha is also a centre for telecommunications in the area.

Connected to the installation is the Pelican subsea template located on the Pelican field and the Central Cormorant Underwater Manifold Centre (UMC) located on the South Cormorant field. The Pelican and UMC subsea developments will both be subject to their own separate Decommissioning programmes. The concrete gravity base substructure (CGBS) of the Cormorant Alpha platform will be subject to a separate Decommissioning Programme, as will the Brent Pipeline between Cormorant Alpha and SVT.

The South Cormorant fields (Blocks I & II) have now produced 189MMbbls from the latest STOIIP view of 372MMbbls. The ability for Cormorant Alpha to continue producing to the limit of economic viability will be largely influenced by the performance of aging critical equipment, which in some instances would face obsolescence issues in the event of failure.

Artificial lift is required to support production from the native Cormorant Alpha platform wells and is reliant on the availability of a single gas compressor and power generator and the availability of an export route through Cormorant Alpha to the Sullom Voe Terminal (SVT).

The Cormorant fields cover a large area and a decision was made in the original field development plans to install two platforms at the North (North Cormorant) and South of the areas (Cormorant Alpha). The Underwater Manifold Centre (UMC) was installed to act as a template structure for nine wells and pipelines back to Cormorant Alpha. The installation was originally designed to utilise its large concrete gravity base structure with storage cells capable of holding 1MMbbls of oil, although that functionality is now disused following the 2017 Direct Export Project. The new export configuration allows native field and Brent System Partner's production to tie into a new collection manifold prior to flowing to SVT.

Third party fields who currently utilise the Brent System transportation service via the Cormorant Alpha facilities include Hudson, Brent Charlie & Alwyn North. This is in addition to the TAQA operated Tern and Cormorant North area fields. Of these only one (Alwyn North) is expected to still be in production at the time of Cormorant Alpha's cessation of production. The Alwyn North Operator has been engaged to advise of the decommissioning timeline. They have identified two potential alternative export routes and have initiated a project to identify the optimum solution. Both initial options are feasible to be implemented in advance of Cormorant Alpha CoP. Therefore, the removal of the Cormorant Alpha topsides will not strand any upstream reserves.

TAQA has carried out a review of the Cormorant Alpha asset to determine the feasibility of asset reuse (Ref 4). The alternatives for reuse included: an offshore renewable energy generation station (wind, wave or tidal), a marine research station, a training centre, fish farming site, carbon capture and storage site and reuse of the facilities at an alternative location. However, after a thorough review TAQA concluded that reuse was not a credible option because of the age of the infrastructure, its distance from shore and lack of demand for and the capital outlay combined with the annual operational and maintenance costs of the converted facility making it

economically unviable. Therefore, the asset must be decommissioned.

Separate Decommissioning Programmes covering the remainder of the Cormorant Alpha substructure, currently planned for submission in 2022+, the associated pipelines and subsea developments are currently planned for 2021+.

The removal of the Cormorant Alpha Topside will not prejudice the future decommissioning solutions covering the remaining Cormorant Alpha area infrastructure not dealt with in this document. For further details please refer to sections 3.1.3 and 3.1.6.

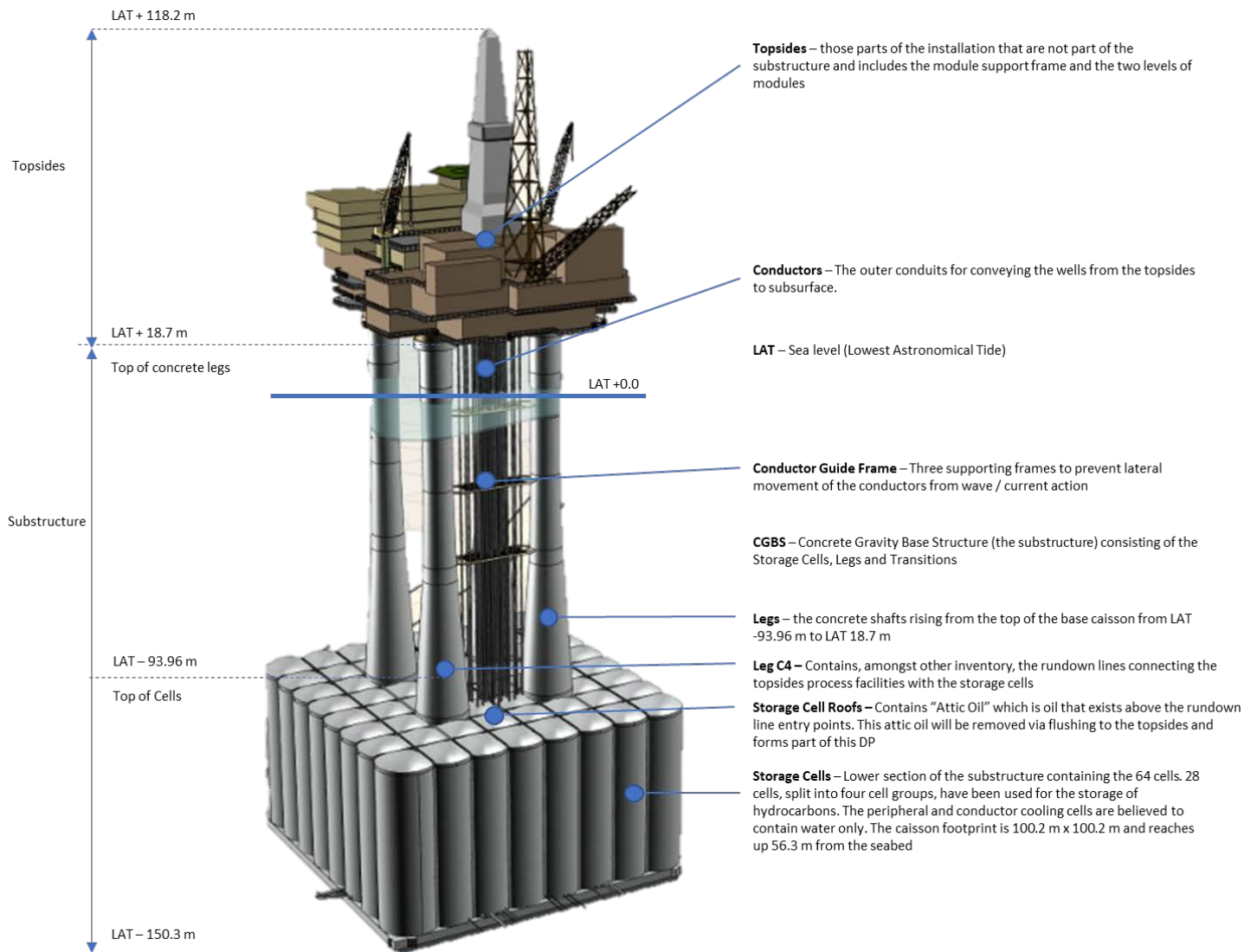


Figure 1.1: Cormorant Alpha Platform

1.4 Overview of Installation Being Decommissioned

1.4.1 Installation

TABLE 1.1 INSTALLATION TO BE DECOMMISSIONED			
Platform:	Cormorant Alpha	Production Type (Oil/Gas/Condensate):	Oil / Gas
Water Depth:	150 m	UKCS Block:	211/26a
Distance to Median (km):	41 km	Distance from Nearest UK Coastline (km):	103km NE from Unst
Surface Installation			
Number:	Type:	Topsides Weight (Te):	Jacket Weight (Te):
1	Cormorant Alpha Topside	25,546.45	N/A
Number of Wells			
Platform:		25	

TABLE 1.2 INSTALLATION SECTION 29 NOTICE HOLDERS DETAILS

Section 29 Notice Holders	Registration Number
TAQA Bratani Limited	05975475
A/S Norske Shell	914 807 077
Amoco (U.K.) Exploration Company, LLC	SF000790
Apache Beryl I Limited	FC005975
Britoil Limited	SC077750
Neo Energy (UKCS) Limited	02669936
CNR International (U.K.) Limited	00813187
Chrysaor Production (U.K.) Limited	00524868
ConocoPhillips Skandinavia AS	918 110 127
Dana Petroleum (E&P) Limited	02294746
EnQuest Heather Limited	02748866
EnQuest Thistle Limited	04487223
Enterprise Oil Norge Limited	01682049
Enterprise Oil U.K. Limited	02290358
Esso Exploration and Production UK Limited	00207426
ExxonMobil Exploration and Production Norway AS	914 048 990
Fairfield Betula Limited	04465204
Fairfield Fagus Limited	05461823
Total E&P North Sea UK Limited	03682299

TABLE 1.2 INSTALLATION SECTION 29 NOTICE HOLDERS DETAILS

Section 29 Notice Holders	Registration Number
MCX Dunlin (UK) Limited	06451712
MCX Osprey (UK) Limited	06451720
MOL UK Facilities Ltd	08824520
Siccar Point Energy E&P Limited	01504603
Shell U.K. Limited	00140141
Equinor UK Limited	01285743
Equinor ASA	923609016
Wintershall DEA Norge AS	985224323

The Cormorant Alpha installation is owned jointly between the Cormorant Alpha Field Owners (TAQA) and the Brent System Owners.

1.5 Summary of Proposed Decommissioning Programme

TABLE 1.3 SUMMARY OF DECOMMISSIONING PROGRAMME

Proposed Decommissioning Solution	Reason for Selection
Topsides	
<p>Cormorant Alpha Platform: complete removal of topsides for re-use, recycling or appropriate disposal by a method to be determined as appropriate.</p> <p>This does not include the drilling derrick structure as this has already been covered by a separate approved decommissioning programme. This was due to the need to have a serviceable rig with which to execute platform well P&A and the uneconomic proposition of returning the original facilities to service. The modular drill rig which will be used for the P&A campaign will be removed prior to topside removal.</p> <p>The cut height for the topside removal is to be determined, but OPRED will be advised once detailed engineering has been completed. Cleaned equipment refurbished for re-use where possible. Equipment which cannot be re-used will be recycled or other disposal routes as appropriate.</p>	Meets regulatory requirements
Wells	
<p>Abandoned in accordance with Oil & Gas UK Guidelines for the suspension and abandonment of wells.</p> <p>A PON5 / Portal Environmental Tracking System (PETS) / Marine Licence application under the relevant regulations will be submitted in support of the works planned to be carried out. Currently planned to take place in the window between 2021 & 2025.</p> <p>For information, conductors will be cut above the top of the concrete storage cells at a height to avoid disturbance of the drill cuttings pile. The removed sections will be transported to shore for recycling. OPRED will be advised of the elevations of the conductor cut heights once determined.</p>	Meets OGA and HSE regulatory requirements
Interdependencies	
<p>Separate decommissioning programmes will be submitted for both the Cormorant Alpha substructure and the remainder of the wider field infrastructure to be submitted from 2022 onwards.</p> <p>Cormorant Alpha serves as the entry point to Brent System and as such is the Hub for this area of the East Shetland Basin. At present incoming pipelines from North Cormorant, Brent Charlie and Alwyn North utilise the 'up and over' service to SVT via Cormorant Alpha and the Brent System Pipeline. However, production through Brent System will have ceased at the point the Cormorant Alpha Topsides are to be removed (refer to Table 1.4 for further detail).</p>	

1.6 Field Location Including Field Layout and Adjacent Facilities

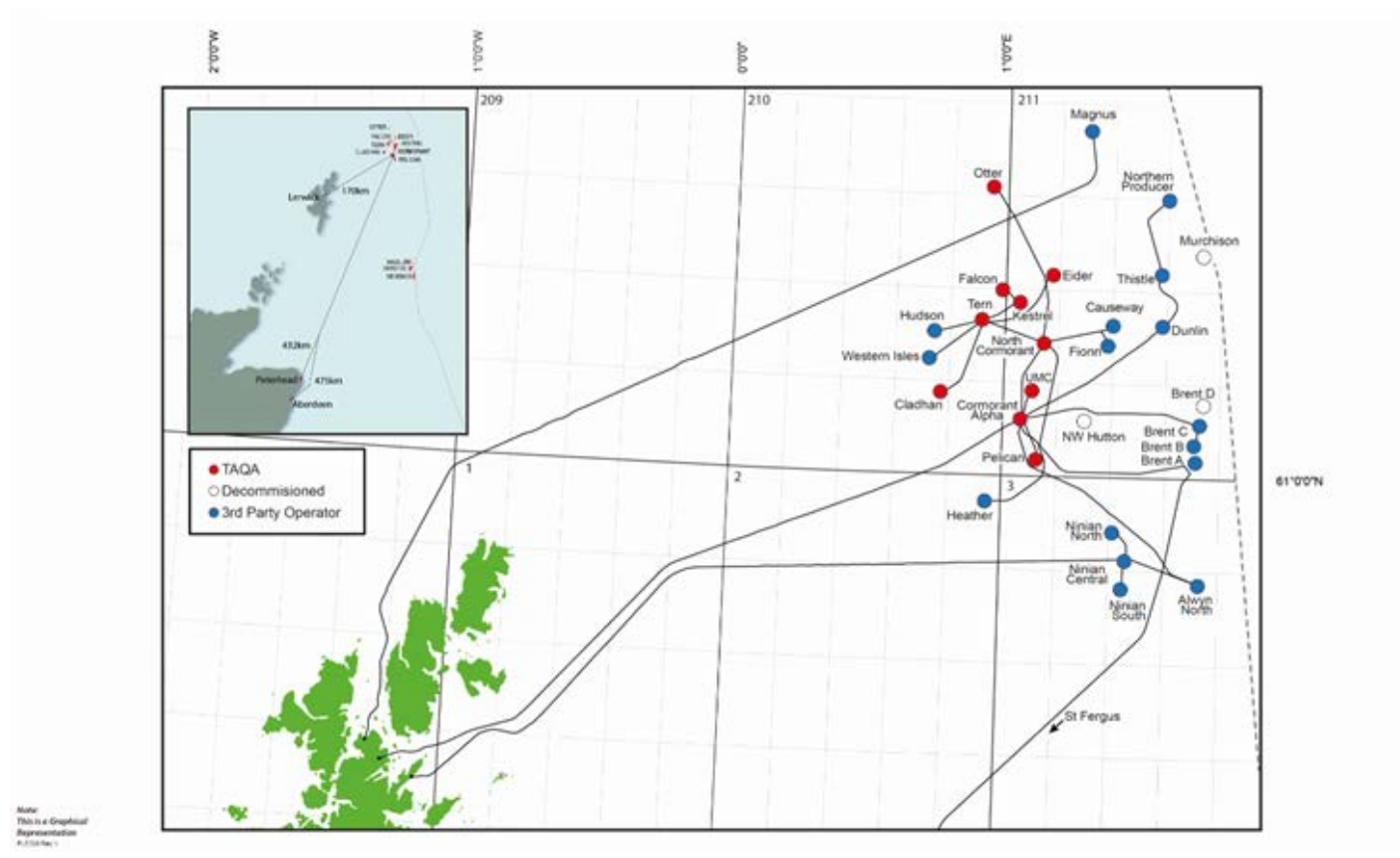


Figure 1.2: Field Location in UKCS

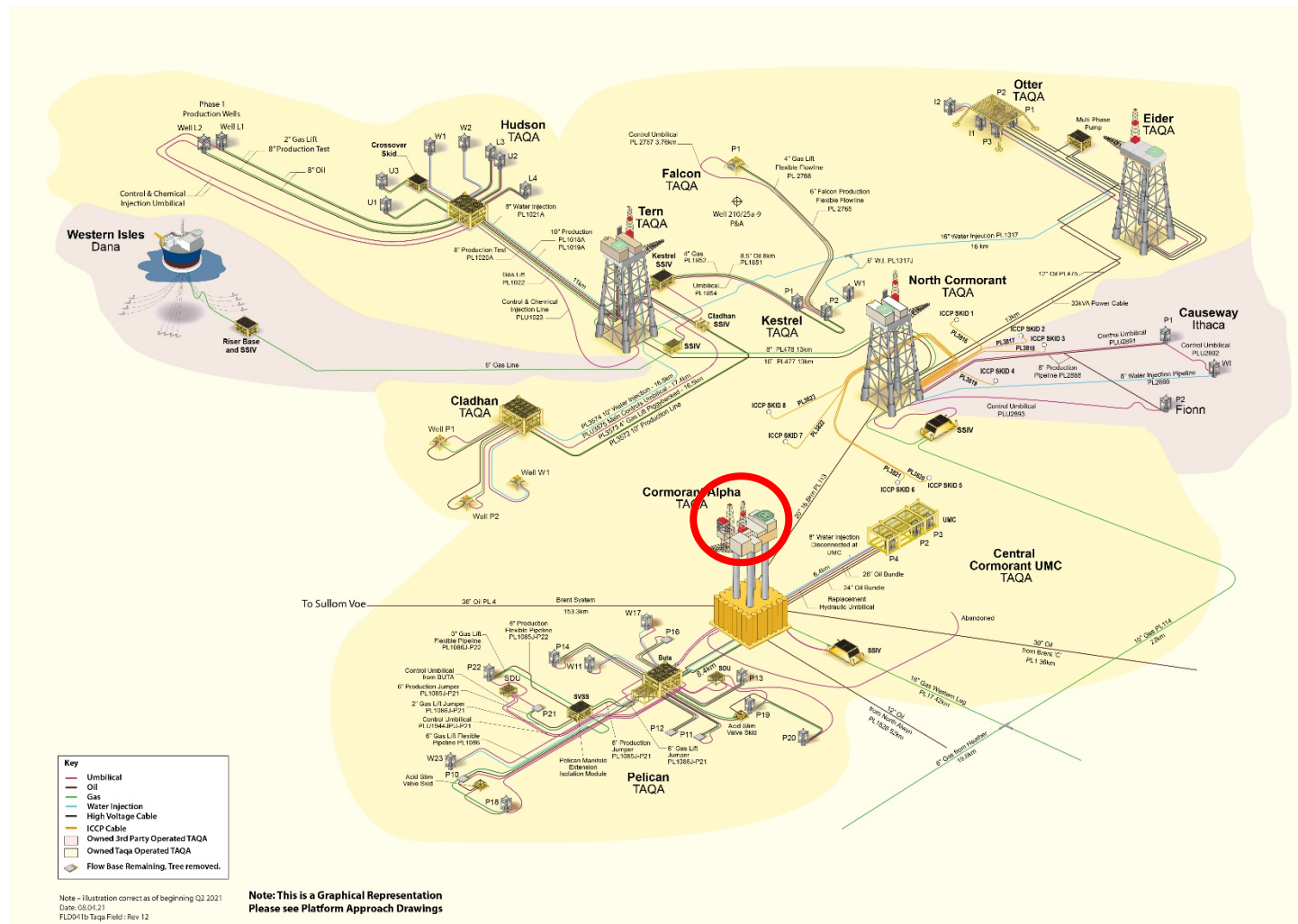


Figure 1.3: TAQA NNS Field Layout

TABLE 1.4 ADJACENT FACILITIES

Owner	Name	Type	Distance / Direction	Information	Status
TAQA Bratani Limited	Eider	Platform	28.8km N of COA		Utility Mode
TAQA Bratani Limited	Otter	Subsea Wells (Template)	46 km NW of COA	Water Injection / Production	Operational
TAQA Bratani Limited	Otter	Subsea Structure	46 km NW of COA	Multiphase Pump	Operational
TAQA Bratani Limited	Tern Alpha	Platform	21 km WNW of COA	Adjacent Platform	Operational
Dana Petroleum (E&P) Ltd	Western Isles FPSO	Production Facility	12 km West of COA	Adjacent production Facility	Operational
Dana Petroleum (E&P) Ltd	Hudson	Subsea Structures	32 km WNW of COA	Water injection / Production	Operational
TAQA Bratani Limited	Falcon	Subsea Structures	23.1 km NW of COA	Production	Operational
TAQA Bratani Limited	Kestrel	Subsea Structures	23.1 km NW of COA	Water Injection / Production	Operational
TAQA Bratani Limited	Kestrel	Umbilical PLU1854	7 km Kestrel to Tern	Control Umbilical	Operational
TAQA Bratani Limited	Cladhan	Subsea Structures	22 km SW of COA	Water Injection / Production	Operational
TAQA Bratani Limited	Cormorant North	Platform	15.8 km N of COA		Operational
TAQA Bratani Limited	Cormorant North	20" Pipeline PL113	17.5 km CON to COA	Oil Export Line	Operational
Ithaca Energy Ltd	Causeway	Subsea Structures	15.6 km East of CON	Water Injection / Production	Shut in pending Decom
Ithaca Energy Ltd	Fionn	Subsea Structure	11.9 km E of COA	Production	Shut in pending Decom

TABLE 1.4 ADJACENT FACILITIES (Cont.)

Owner	Name	Type	Distance / Direction	Information	Status
Fairfield Energy	Dunlin A	Platform	33 km ENE of COA		Shut in pending Decom
Fairfield Energy	Dunlin	24" Pipeline PL5	36.4 km DUN to COA	Oil Export Line	Decommissioned
Shell UK Ltd	Brent	20" Pipeline PL1	36 km Brent C to COA	Oil Export	Operational
BP UK	NW Hutton	20" Pipeline PL148	Decommissioned	Oil Export	Decommissioned
Total UK	North Alwyn	12" Pipeline PL1526	52 km Alwyn North to COA	Oil Export	Operational
TAQA Bratani Limited	Brent System Pipeline	36" Pipeline PL4A	Within COA GBS	Platform Bypass	Isolated and Out of Use
TAQA Bratani Limited	Brent System Pipeline	36" Pipeline PL4	153.293 km COA to Sullom Voe	Oil Export	Operational
TAQA Bratani Limited	Underwater Manifold Centre	Subsea Installation	8 km NNW of COA	Water Injection / Production	Operational
TAQA Bratani Limited	Underwater Manifold Centre	8" Pipeline PL167	7 km UMC to COA	Production	Operational
TAQA Bratani Limited	Underwater Manifold Centre	Dual 3" TFL Pipeline Bundle PL168	7 km UMC to COA	Service Line	Out of Use
TAQA Bratani Limited	Underwater Manifold Centre	8" Pipeline PL210	7 km UMC to COA	Production	Operational
TAQA Bratani Limited	Underwater Manifold Centre	Umbilical PL169	7 km UMC to COA	Control Umbilical (Hydraulics)	Operational
TAQA Bratani Limited	Underwater Manifold Centre	8" Pipeline PL184	7 km UMC to COA	Water Injection	Out of Use
TAQA Bratani Limited	Underwater Manifold Centre	Umbilical PL1165	7 km UMC to COA	Control Umbilical	Operational
TAQA Bratani Limited	Satellite Well P1	Umbilical PL118	6 km P1 to COA	Control Umbilical (Power)	Operational
TAQA Bratani Limited	Pelican	Subsea Installation	8 km S of COA	Water Injection / Production	Operational
TAQA Bratani Limited	Pelican	8" Pipeline PL1084	8 km Pelican to COA	Production	Operational
TAQA Bratani Limited	Pelican	8" Pipeline PL1085	8 km Pelican to COA	Production	Operational

TABLE 1.4 ADJACENT FACILITIES (Cont.)

Owner	Name	Type	Distance / Direction	Information	Status
TAQA Bratani Limited	Pelican	8" Pipeline PL1086	8 km Pelican to COA	Water Injection	Operational
TAQA Bratani Limited	Pelican	6" Pipeline PL1087	8 km Pelican to COA	Gas Lift	Operational
TAQA Bratani Limited	Pelican	Umbilical PLU1944	8 km Pelican to COA	Control Umbilical	Operational
TAQA Bratani Limited	Pelican	3/8" Chemical Line PL1088	8 km Pelican to COA	Control Umbilical	Operational
TAQA Bratani Limited	Pelican	3/8" Chemical Line PL1089	8 km Pelican to COA	Control Umbilical	Operational
TAQA Bratani Limited	Pelican	3/8" Chemical Line PL1090	8 km Pelican to COA	Control Umbilical	Operational
TAQA Bratani Limited	Underwater Manifold Centre	6" Pipeline PL1558	3.5 km W4 well to UMC	Water Injection	Out of Use
TAQA Bratani Limited	Pelican	Power Cable PL3136	25m Pelican SDU to Well P22	Control Umbilical	Operational
Shell UK Ltd	Western Leg Gas Pipeline	16" Pipeline PL17	COA Gas Export / Import to Brent Bypass tie-in	Gas Export	Operational

TABLE 1.4 ADJACENT FACILITIES (Cont.)

Impacts of Decommissioning

The base of the incoming risers on Cormorant Alpha serves as the entry points into Brent System, with the Cormorant Alpha Platform and connection to Brent Pipeline to SVT all jointly owned by TAQA and its JV Partners.

All upstream fields, except for the Alwyn Area, have profiles which show a CoP date before, or in alignment with, the cessation of Brent System throughput. Engagement with Alwyn Area Operator has been undertaken to share the high-level decommissioning timeline to allow an alternative export route to be in place in advance of Brent System CoP.

Flushing of the relevant substructure pipework, upstream pipelines, connecting subsea infrastructure and export pipeline to SVT will have been completed prior to the removal of the Cormorant Alpha Topside.

TAQA has engaged with the Western Leg Gas Pipeline Operator to discuss disconnection arrangements. TAQA has also engaged with Western Isles Operator regards the requirements for future fuel gas access via the Western Leg post CoP of Cormorant Alpha and North Cormorant. These discussions remain ongoing.

Cormorant Alpha also serves as a communications hub for the East Shetland Basin. The removal of the Topside will require a re-route of the northern telecommunications ring. Advance notice of decommissioning activities will be provided to Operators of installations served by this service, as well as the Communications Service Provider, to allow them to determine the most appropriate network arrangements following the removal of the Cormorant Alpha Topside.

Cormorant Alpha shares an ERRV with the nearby Heather platform. Consultation will be undertaken with the Heather Operator over the timing of cessation during future contractual discussions.

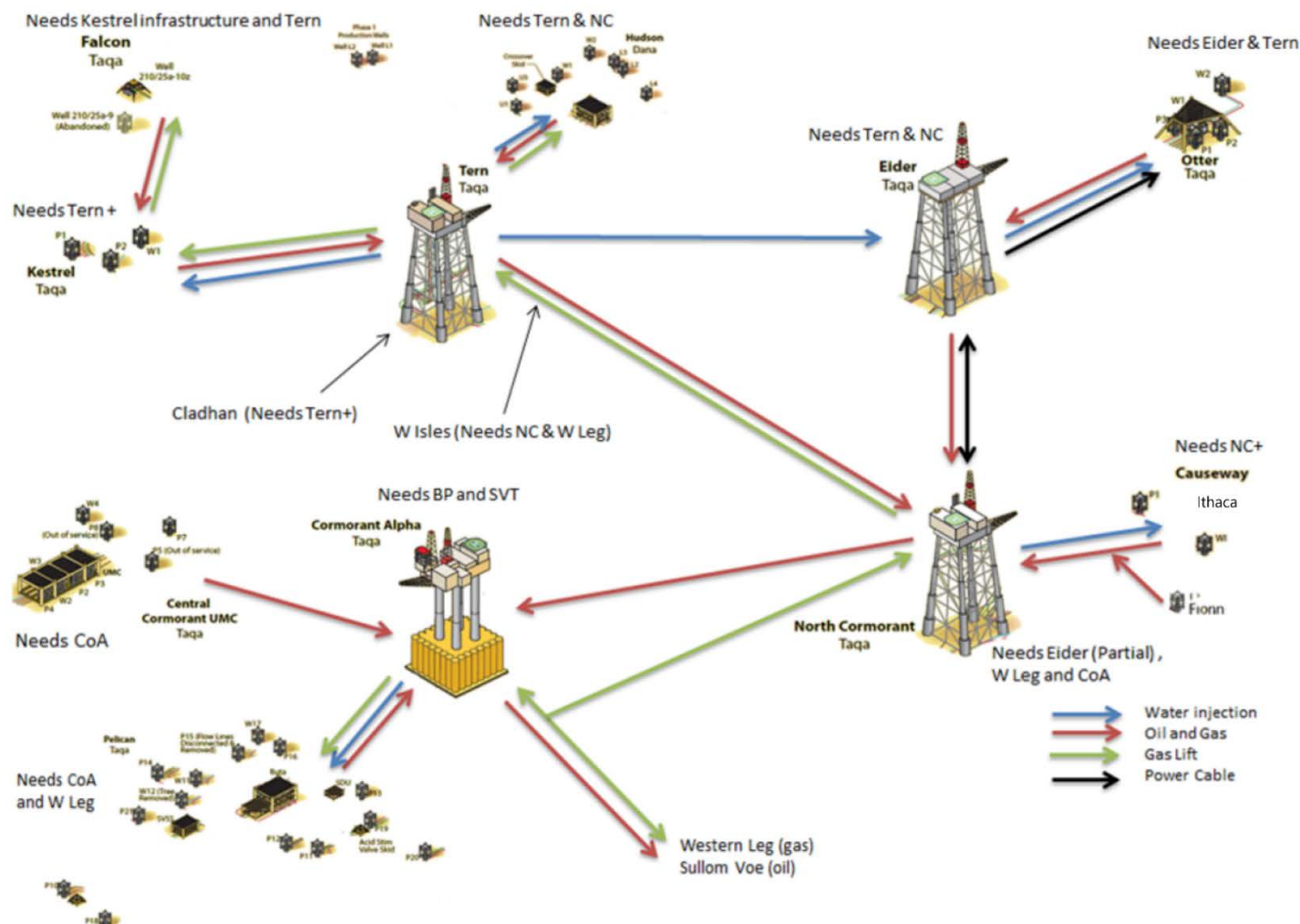


Figure 1.4: Adjacent Facilities Interdependency Overview

Please note that 'BP' refers to the Brent System Pipeline

1.7 Industrial Implications

The Cormorant Alpha Topside Decommissioning Programme will be managed by TAQA's UK business, to ensure safe, efficient and legally compliant delivery of the various elements of TAQA's decommissioning scope. The intention is to make efficient use of the supply chain to generate value through the application of knowledge, innovation and technology, explore collaboration opportunities and to employ best practice in the management of the supply chain to deliver a cost effective and reliable service.

This will be achieved through the following:

- TAQA will treat the supply chain in an ethical, fair and mutually rewarding way
- Drive continuous improvement through collaboration with other Operators and industry stakeholders
- TAQA has and will continue to actively support Regulatory and OGA industry initiatives including Showcase events and as part of the East of Shetland workgroup
- Will stimulate the supply chain and innovation through actively supporting and working with industry representative bodies including the OGTC, ONE, Decom North Sea, SPE and NOF
- Actively explore potential opportunities to drive efficiency through multi-asset, multi-field or multi-Operator campaigns
- Conduct detailed market analysis ensuring that not only established removal methodologies are considered, but genuine new market concepts also
- Use of open and transparent decision criteria on Contractor and contract strategy selection

TAQA have explored the possibility of working collaboratively with other Operators in the East of Shetland basin in order to execute our decommissioning strategies in the most efficient way possible. However, at this time, due to the differences in timing of forecast activities, this has not provided any opportunities to take forwards with regards topsides removal. TAQA will continue to collaborate with industry and the supply chain in the future.

TAQA have engaged with the OGA (January 2020) to discuss and agree the contracting strategy and tender approach as well as the supporting SCAP requirements.

Detailed feasibility studies with a number of short-listed removal contractors have commenced to allow the removal contractors to develop a proposal for a removal methodology and schedule with greatly reduced technical uncertainty, has been very well-received by the removal contractors, as a mutually beneficial collaborative approach.

2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Installation: Surface Facilities (Topside)

TABLE 2.1 SURFACE FACILITIES INFORMATION					
Name	Facility Type	Location		Topsides / Facilities	
				Weight (Te)	No. of Modules
Cormorant Alpha	Topside	WGS84	340° 48' 20"	25,546.45	40
		WGS84 Decimal Minute	61° 06' 09.411" N 01° 04' 22.272" E		



Figure 2.1: Cormorant Alpha Topside

2.2 Wells

TABLE 2.2 WELL INFORMATION				
Platform Wells	Designation	Status	Category of Well	Date Abandoned
211/26-A1	Never Completed	Abandoned Phase 2	PL-4-3-3	17.01.2017
211/26-A13	Water Injector	Completed (Shut in)	PL-4-3-3	-
211/26-A17	Water Injector	Abandoned Phase 1	PL-3-3-3	14.06.2004
211/26-A18	Water Injector	Completed Operational	PL-3-3-3	-
211/26-A24	Water Injector	Completed (Shut in)	PL-3-3-3	-
211/26-A25J	Junked	Abandoned Phase 1	PL-0-0-3	26.01.1983
211/26-A27Z	Appraisal Well	Completed (Shut in)	PL-3-3	-
211/26-A28Z	Oil Producer	Abandoned Phase 1	PL-2-3-3	09.02.2008
211/26-A32	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A33Y	Oil Producer	Completed Operational	PL-2-4-3	-
211/26-A34	Oil Producer	Completed (Shut in)	PL-4-3-3	-
211/26-A35	Oil Producer	Completed Operational	PL-3-3-3	-
211/26-A36	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A37	Oil Producer	Completed Operational	PL-3-4-3	-
211/26-A38	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A39	Water Injector	Completed Operational	PL-3-4-3	-

TABLE 2.2 WELL INFORMATION (CONT.)

Platform Wells	Designation	Status	Category of Well	Date Abandoned
211/26-A40	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A40Z	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A41	Oil Producer	Completed Operational	PL-2-3-3	-
211/26-A42	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A42Z	Oil Producer	Completed Operational	PL-4-3-3	-
211/26-A43	Oil Producer	Completed Operational	PL-2-3-3	-
211/26-A43Z	Oil Producer	Completed Operational	PL-2-3-3	-
211/26-A6	Water Injector	Completed (Shut in)	PL-3-3-3	-
211/26-A8Z	Water Injector	Completed Operational	PL-4-3-3	-

Please note: The slot from which Appraisal Well 211/26-A27Z was drilled was subsequently, hence there are more well listed than platform well slots.

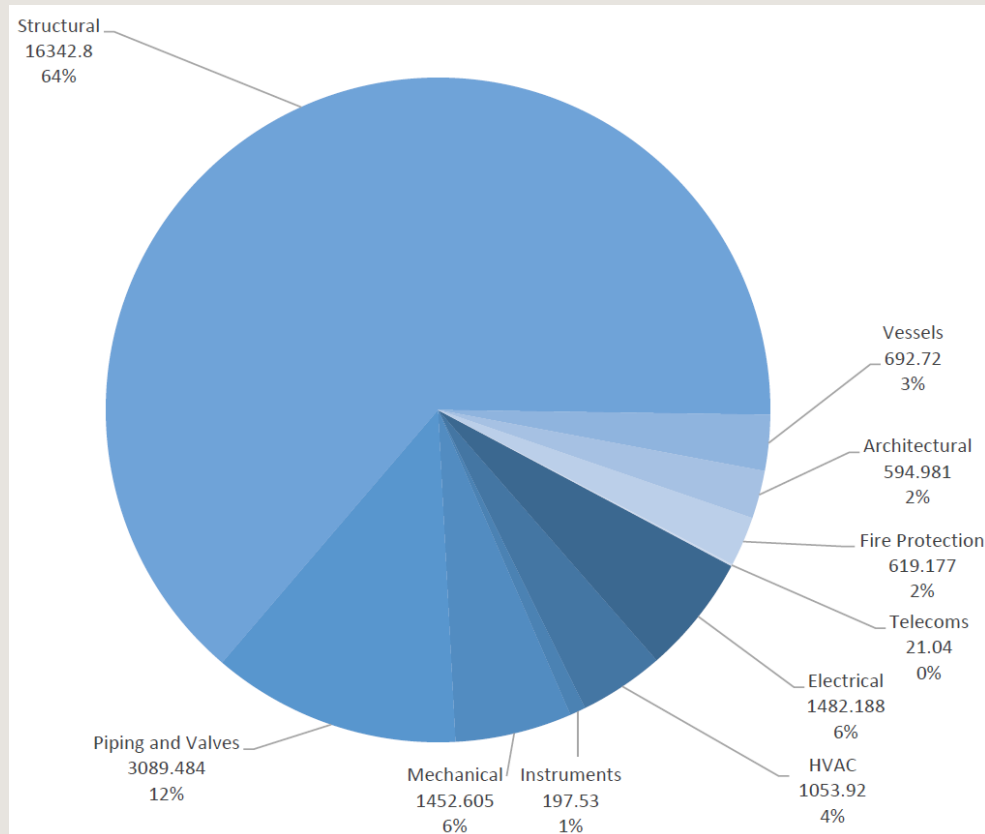
The drilling derrick structure has already been covered by a separate approved decommissioning programme. This was due to the need to have a serviceable rig with which to execute platform well P&A and the uneconomic proposition of returning the

original facilities to service. The modular drill rig which will be used for the P&A campaign will be removed prior to topside removal.

Details of Wells categorisation have been taken from OGUk Guidelines: Well Decommissioning Guidelines Issue 6, June 2018. All platform wells will be plugged and abandoned (P&A'd) under the appropriate standards as per the current WONS and Marine Licences legislation.

2.3 Inventory Estimates

Figure 2.2: Cormorant Alpha Topside by Functional Category



Total 25,546.45 Tonnes

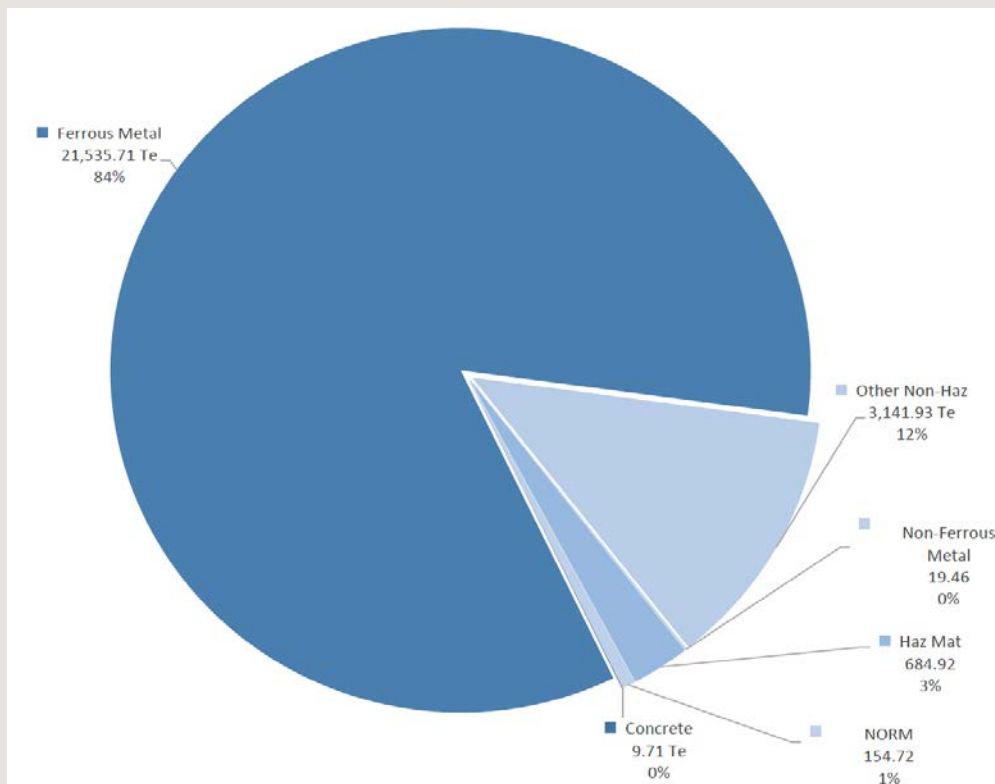
Please refer to Section 2.7 within the Environmental Appraisal for further details on the materials inventory data. The total Topsides weight of 25,546.45 Te is inclusive of an estimated 839.64 Te of hazardous waste such as paint and NORM, as shown in Figure 2.3.

The Cormorant Alpha topside will likely be cut at or around the transition between the top of the concrete legs and the start of the steel footing supporting the cellar deck structure, that is at EL. +18.62m relative to LAT (168.92m above seabed). The final cut height will be determined dependant on the removal method of the appointed contractor.

Once the removal methodology is selected OPRED will be informed and whilst some material e.g. pipework, in each of the legs is likely to be removed to facilitate leg cutting, it is also likely that material will require to be added within each leg to support and secure the remaining pipework and / or systems left in place below the cut height. OPRED will be informed about the material removed and added. The final solution will be determined by the cut height of the appointed contractor.

To date there has been no evidence of marine growth extending up to the level of transition and therefore it is extremely unlikely that any trace of marine growth will be removed with the topsides.

Figure 2.3: Cormorant Alpha Topside by BEIS Category



Total 25,546.45 Tonnes

Please refer to Section 2.7 within the Environmental Appraisal for further details on the materials inventory data.

3. REMOVAL AND DISPOSAL METHODS

3.1 Topsides

3.1.1 Topsides Decommissioning Overview

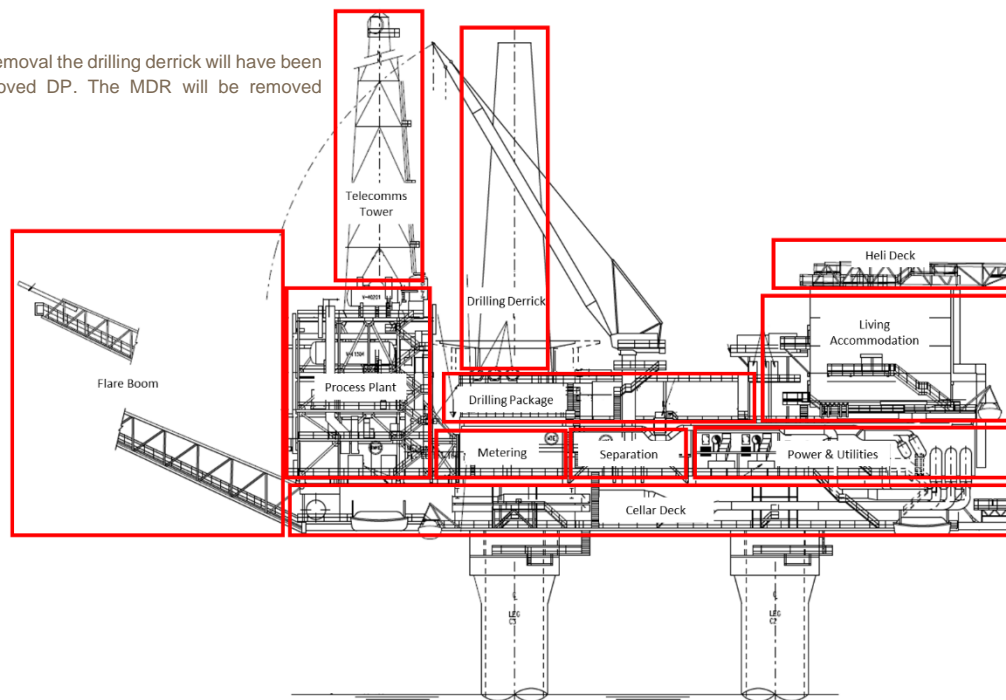
During the decommissioning of the Cormorant Alpha topside there will be a wide range of materials that will need to be processed and, where possible, either reused or recycled.

Preventing waste is ultimately the most preferential option, achieved through reducing consumption and using resources more efficiently. TAQA will comply with the Duty of Care requirements under the UK Waste Regulations and The Environmental Protection (Duty of Care) (Scotland) Regulations 2014. The hierarchy of waste management will also be followed at all stages of disposal and industry best practice will be applied.

The Cormorant Alpha topside will be removed and returned to shore for reuse, recycling or disposal. TAQA will select a recycling and disposal facility considering the factors of safety, environmental, socio-economic and cost. UK, European and other international facilities may be considered. Once a facility is selected TAQA will advise OPRED. The successful facility along with the chosen removal contractor will be required to have a proven track record and clearly documented and legislatively compliant procedures including the handling of transfrontier shipment of waste in the event that is required. Regulations governing the transfrontier shipment of waste (TFS) as implemented in the UK by the “Transfrontier Shipment of Waste Regulations 2007” details the UK required procedures in order for compliance with the legislation. All waste material will be handled in accordance with UK and relevant International legislation. TAQA and the selected contractor(s) will address any transfrontier shipment of waste to ensure that

Figure 3.1: Cormorant Alpha Topside East Elevation

Note: At the point of topsides removal the drilling derrick will have been removed as part of an approved DP. The MDR will be removed prior to topside removal



For illustrative purposes: red boxes show main function of the topside models

the associated issues are appropriately managed.

The Cormorant Alpha Topside Structure comprises 40 modules (see figure 3.2) with a total weight of 25,546.45 tonnes.

The Installation consists of a four-leg concrete gravity base structure with a steel box girder module support frame (Cellar Deck) supporting two levels of modules (Module Deck and Drilling Deck).

The cellar deck comprises a compartmentalised box girder assembly comprising 2 principal girders running North-South connecting leg C1 to C4 and C2 to C3. Transverse box girders running East-West connect leg C1 to Leg C2 and C3 to C4 complete the main support assembly. The areas between the box girders are infilled with a series of compartments. The conductor slots are located in the Box Girder assembly between legs C3 and C4. The Module Deck comprises 11 modules supported from the superstructure roof. The modules are of similar trussed frame assembly comprising a plated deck, plated roof and clad walls. The exception

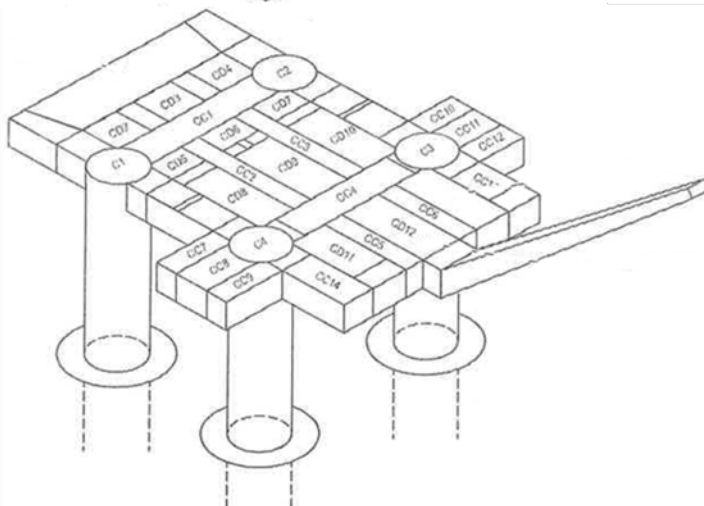
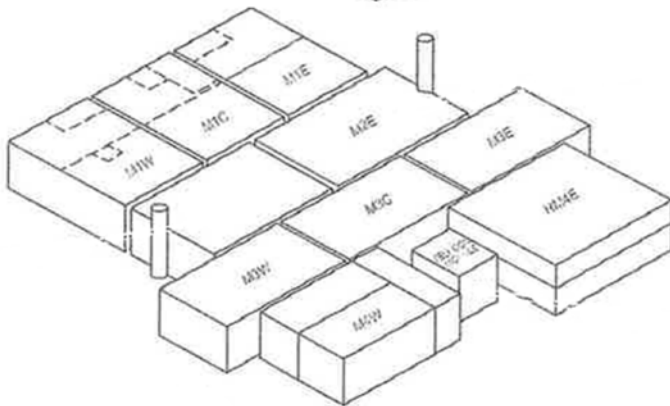
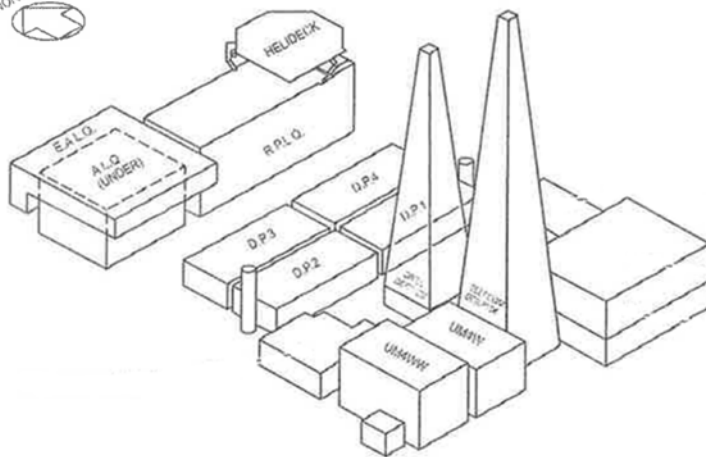
is module RM4E which is open truss construction and comprises 5 deck levels.

The Drilling Deck comprises 4 drilling package modules supported from the roof of modules M2E and M2W below. The modules are of similar trussed frame assembly comprising a plated deck, plated roof and stiffened plate clad walls. UM3E, UM3W, UM4W and UM4WW are open clad pallets located above the roofs of corresponding modules below.

The removal methodology for the Cormorant Alpha topside has not been finalised yet, as this will be subject to a commercial tendering process.

However, TAQA have instructed a vendor to conduct a study (Ref 2) which looked at removal options that are deemed technically feasible. Options studied were single lift (SL) and reverse of installation (RoI). These methodologies were reviewed against a common and consistent set of assumptions. This is discussed in detail in section 2 of the Environmental Appraisal (EA).

For an overview of the Cormorant Alpha topsides see figures 3.2 and 3.3



Module

ALQ	ADDITIONAL LIVING QUARTERS
BULK	BULK STORAGE MODULE
CD	CELLAR DECK BOX STRUCTURE
CD01	CELLAR DECK PALLET CD01
CD02	CELLAR DECK PALLET CD02
CD03	CELLAR DECK PALLET CD03
CD04	CELLAR DECK PALLET CD04
CD05	CELLAR DECK PALLET CD05
CD06	CELLAR DECK PALLET CD06
CD07	CELLAR DECK PALLET CD07
CD08	CELLAR DECK PALLET CD08
CD09	CELLAR DECK PALLET CD09
CD10	CELLAR DECK PALLET CD10
CD11	CELLAR DECK PALLET CD11
CD12	CELLAR DECK PALLET CD12
CD13	CELLAR DECK PALLET CD13
CD14	FLARE BOOM SUPPORT
CRN E	EAST CRANE
CRN W	WEST CRANE
ENGIN	ENGINE MODULE
FLARE	FLARE BOOM
M1C	UTILITIES
M1E	SWITCHGEAR & POWER GENERATION
M1W	SWITCHGEAR & POWER GENERATION
M2E	SEPARATION
M2W	WATER INJECTION
M3C	WELLHEADS
M3E	METERING
M3W	PUMPING & METERING
M4W	PUMPING
PUMP	MUD PUMP MODULE DP1
RM4E	PELICAN PROCESS MODULE
RPLQ	REPLACEMENT LIVING QUARTERS
SACK	SACK STORAGE MODULE DP2
SHALE	SHALE SHAKER
SKID	SKIDBASE
SUBST	SUBSTRUCTURE & DERRICK
TELE	TELECOMMUNICATIONS
UM4W	POWER GENERATION
UM4WW	PELICAN GAS/TREATMENT

Figure 3.2: Cormorant Alpha Topside Modular Construction



Figure 3.3: Cormorant Alpha Topside Overview

3.1.2 Preparation and Cleaning

Table 3.1 describes the methods that will be used to drain, flush, purge or clean the topsides, prior to removal to shore.

TABLE 3.1 CLEANING OF TOPSIDES FOR REMOVAL		
Waste Type	Composition of Waste	Disposal Route
Onboard Hydrocarbons	Process fluids, fuels, and lubricants	Flushing of bulk process hydrocarbons will be conducted offshore, and residual fluids disposed of under appropriate permits. Fuels and lubricants will be drained and transported onshore for re-use / disposal within in UK* As per the waste hierarchy, export quality crude trapped in the oil storage cell attic spaces will be removed to ALARP utilising BAT. This will ensure that the produced oil will not be considered as waste as this will be exported to SVT via the Brent Pipeline.
Other Hazardous Materials	Chemicals for cleaning topsides. Hazardous waste such as NORM radioactive material, instruments containing heavy metals & batteries	Discharge of cleaning chemicals offshore will be managed under relevant permits. Waste chemicals, bulk NORM solids and other hazardous materials will be transported ashore for re-use / disposal within the UK*
Original Paint Coating	Lead-based paint. Further survey work will be undertaken to identify other components that may be present	During preparation works to enable topside removal either by SL or RoI activities may generate toxic fumes / dust if flame-cutting or grinding / blasting is used, so appropriate safety measures will be taken. All remaining material will be dealt with onshore
Asbestos and Ceramic Fibre	Asbestos has been identified in surveys. Additional surveys will be undertaken.	During preparation works to enable topside removal either by SL or RoI activities may generate a requirement for appropriate control and management methods to be enforced. All remaining material will be dealt with onshore

** Some waste types may be removed with the topsides and depending on the location of the onshore disposal facility, this may be out with the UK.*

The sampling of lead-based paint was included within the scope of a specialist material inventory and waste characterisation consultant who visited Cormorant Alpha in 2019. During

this visit lead-based paint was sampled and analysed to determine its composition. However, asbestos was not sampled as it is recorded in the TAQA asbestos register and is

actively managed in line with TAQA procedures. A demolition survey will be required to be carried out by a specialist prior to the planned removal of the topsides. The method for the disposal of asbestos and ceramic fibre will be determined by the onshore facility who will be selected to dismantle the Cormorant Alpha topsides and will be in line with their policies and procedures and will be compliant with all relevant legislation.

Pipelines to and from the installation will have been flushed, as appropriate and feasible and under the appropriate permits before the topside is removed.

3.1.3 Rundown Line & Vent Line Isolation

As referenced in Section 1.3 the completion of the Direct Export Project in 2017 saw the end of the active use of the CGBS storage cells for their original purpose. (See figure 3.4) A last export run, utilising the existing export pumps was carried out from the storage cells. However, due to the large capacity of the export pumps it was not feasible to export all remaining hydrocarbons from the storage cells as when the majority of oil had been exported the pumps would “cone” water up through the remaining thin layer of hydrocarbons, at which point pumping had to cease. These hydrocarbons are known as “hydrodynamically trapped oil”.

A subsequent project was tasked undertaking a trial to remove this hydrodynamically trapped oil from three of the four cells groups using a low flow rate pump arrangement to prevent the “coning” issue observed using the large capacity export pumps. This project concluded in April 2020 having exported around 655m³ of oil.

It is estimated that a maximum of 10,856 m³ of oil remain in the cells following this most recent recovery. This figure estimates the remaining export quality crude and does not include any emulsions.

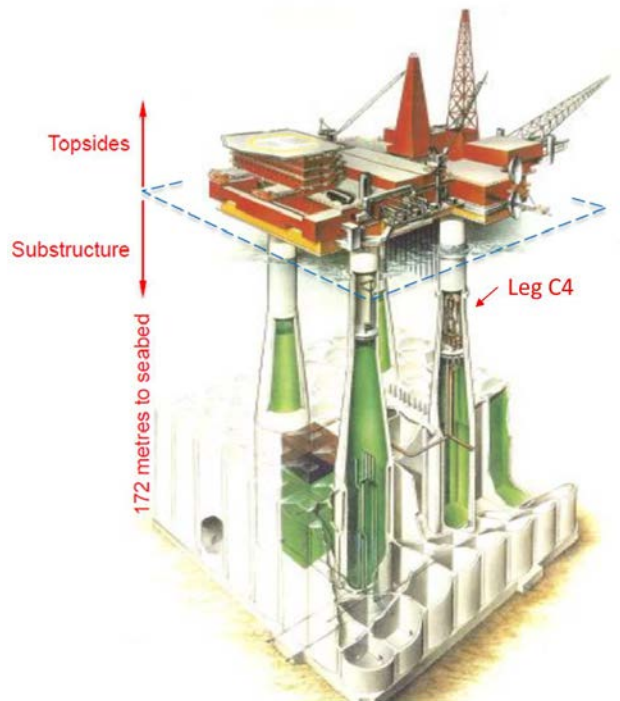


Figure 3.4 Cormorant Alpha Platform: Topside & CGBS

It is planned to remove the residual hydrocarbon inventory contained in the platform substructure cells after topside removal. This scope will be executed utilising cell top drilling, similar to the technology deployed within the Brent Field. A feasibility study into utilising this technology was completed in late 2020. This study concluded that, subject to some modifications to existing tooling, it would be feasible to deploy the technology at Cormorant Alpha to access the cells.

Management of residual hydrocarbons within the storage cells will be covered under the Cormorant Alpha Substructure Decommissioning Programme which will be submitted in 2022+.

To ensure safety of those onboard through until disembarkation, and to facilitate the safe leg separation and finally topside removal, it is planned to isolate the Rundown Lines and Vent Lines within the platform substructure. This “Facilities Make Safe” activity is included within

the scope of the Cormorant Alpha Topside Removal DP.

Execution of the Vent Line and Rundown Line scopes is currently anticipated within a Q4 2021 to Q4 2022 window, subject to satisfactory completion of project engineering activity.

3.1.4 Removal Methods

Possible methods are outlined in Table 3.2 and studied (Ref 2) The final decision on the decommissioning method of the topsides will be made following a commercial tendering process. Once a decision has been made TAQA will advise OPRED.

Two possible methods of topsides removal are under consideration; single lift and modular removal. At this stage, the specific method by which the removal activity will take place has not been determined. Both are potentially suitable. These decisions will depend to some degree on the proposals made by the eventual contractor. The approaches are summarised in Table 1, and all will involve the following steps for the preparation for removal:

- Removal of under deck objects and cutting of risers, J-tubes and caissons
- Cutting for topsides separation using diamond wire cutting tools
- Cellar deck strengthening
- Equipment and loose items sea fastening/removal
- Installation of clamps and/or beams to provide lifting points; and
- Installation of an above-water guiding system mounted on the CGBS

TABLE 3.2 TOPSIDE REMOVAL METHODS

1) HLV (Semi-submersible crane vessel) ☒ 2) SLV ☒

Method	Description
Single lift removal by HLV / SLV	Removal of topsides as a complete unit and transportation to shore for re-use of selected equipment, recycling, break up, and / or disposal. All methodologies are being carried forward into competitive tendering. A final decision on decommissioning method will be made following a commercial tendering process
Modular removal and re-use / recycle by HLV	Removal of parts / modules of topsides for transportation and re-use in alternate location(s) and / or recycling / disposal. All methodologies are being carried forward into competitive tendering. A final decision on decommissioning method will be made following a commercial tendering process

3.1.5 Post Removal Considerations

Once the topside is removed, it is planned that the legs of CGBS will be capped and an AtoN installed on one leg of the CGBS. If for whatever reason this cannot be done before the vessel leaves the Field, we will discuss appropriate action with OPRED. In such circumstances a likely temporary solution would be to station a guard vessel close to the platform to warn shipping. Notices to mariners will be issued and the UK Hydrographic Office (UKHO) and Maritime and Coastguard Agency (MCA) informed of the changed status of the platform. The new status of the structure will be entered into the FishSAFE programme of electronic warning.

3.1.6 Substructure Management

Please note that decommissioning of the Cormorant Alpha substructure is not within the scope of this document. However, it is discussed here to demonstrate that the removal of the Cormorant Alpha topside will not prejudice these activities.

There several elements required to be addressed to decommission the Cormorant Alpha substructure, these include attic oil removal, cell sampling and ongoing cell monitoring, as well as drill cutting pile sampling.

As detailed in Section 3.1.3 attic oil removal is scheduled to take place after topside removal. This scope will be executed using existing, proven remote access technology after the

topside has been removed, so does not rely on the ongoing presence of the platform topside.

Additionally, cell water sampling activities are due to take place after attic oil removal, using existing proven technology which will be deployed to execute this scope. Should ongoing cell access be required this can be achieved using the same technology and does not require the topside to remain in place.

Consideration has been given to the presence of drill cuttings on and around the CGBS and TAQA has already carried out a subsea sampling and analysis campaign to characterise these cuttings. The topside facilities were not utilised as part of this vessel-based campaign. Therefore, the removal of the topside does not preclude future drill cutting piles survey and sampling, if required.

3.2 Wells

TABLE 3.3 WELL PLUG AND ABANDONMENT

At the time of writing 4 of the platform Wells for Cormorant Alpha have been abandoned, with the remaining 21 Wells still to be abandoned. All Wells will be fully decommissioned in accordance with the Oil and Gas UK (OGUK) "Well Decommissioning Guidelines" (issue 6, June 2018.)

3.3 Waste Streams

TABLE 3.4 WASTE STREAM MANAGEMENT METHODS

Method	Removal and Disposal Method
Bulk Liquids	During the EDC phase, flushing of bulk liquids will be undertaken offshore under appropriate oily discharge and chemical permits. Vessels, pipework and sumps will be drained prior to removal to shore and shipped in accordance with maritime transportation guidelines. Further cleaning and decontamination will take place onshore prior to recycling / re-use at a fully permitted onshore disposal facility.
Marine Growth	It is not anticipated that any marine growth will be recovered as part of this topside decommissioning scope. However, if it is encountered it will be taken ashore for disposal under appropriate permits. Some marine growth maybe encountered during well plugging and abandonment works including removal of conductors. The marine growth is likely to be present in localised areas on the conductors around the wave zone and upon removal to the topside, most marine growth is likely to fall to sea. Where applicable, the discharge of marine growth during removal will be covered under relevant permits (Marine Licence) and onshore disposal sites will prepare for additional cleaning.
NORM / LSA Scale	To facilitate topside separation and subsequent removal NORM will be partially removed offshore under appropriate radiation and oily discharge permits. Any residual NORM contamination will be treated and disposed onshore via approved NORM decontamination specialists.
Asbestos	An intrusive demolition survey will be conducted prior to decommissioning activities and asbestos contaminated waste will be disposed onshore via licensed waste contractors.
Other Hazardous Wastes	Will be recovered to shore and disposed of under appropriate permits.
Onshore Dismantling Sites	Appropriate licenced sites will be selected. TAQA will ensure that the removal contractor has a proven track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver innovative recycling options. TAQA will carry out audits on disposal yards to provide assurance that they are compliant with legislation.

TABLE 3.5 INVENTORY DISPOSITION

	Total Inventory Tonnage	Planned Tonnage to Shore	Planned Left <i>in situ</i>
Installations	Topsides: 25,546.45 Te	Topsides: 25,546.45 Te	Topsides: Zero

The topside will be landed ashore in the window of 2026 to 2028. It is not possible to forecast the reuse market with any accuracy or confidence this far forward, so the following is a statement of re-use / recycling aspirations. Percentages shown relate to the weight of material which is expected to be recovered to shore. Refer to Sections 2.8 and 2.9 of the EA for further detail.

TABLE 3.6 REUSE, RECYCLE & DISPOSAL ASPIRATIONS FOR RECOVERED MATERIAL

Reuse	Recycle	Disposal
< 10%	90-97%	< 3%

4 ENVIRONMENTAL APPRAISAL OVERVIEW

4.1 Environmental Sensitivities (Summary)

The Key environmental and social sensitivities in the Cormorant Alpha area have been summarised below in Table 4.1.

TABLE 4.1 ENVIRONMENTAL SENSITIVITIES

Environmental Receptor	Main Feature
Conservation interests	<p>There are no Nature Conservation Marine Protected Areas, Special Protection Areas, Special Areas of Conservation, or Demonstration and Research Marine Protected Areas within 40 km of the Cormorant Alpha platform.</p> <p>The ocean quahog (<i>Arctica islandica</i>) is listed by OSPAR as a threatened and/or declining species and is also listed as a Scottish Priority Marine Feature; records of this species occur over large areas of the central and northern North Sea. A benthic survey in 2019 recorded a single (and juvenile) <i>Arctica islandica</i> individual.</p> <p><i>Lophelia pertusa</i> may be present in the Cormorant Alpha platform area, but the majority of <i>L. pertusa</i> communities are located in water depths below 200 metres and as such it unlikely to be present in significant numbers. No other features of conservation interest have been recorded in the vicinity of the Cormorant Alpha platform.</p>
Seabed	<p>The Cormorant Alpha platform is located at a water depth of 150 m. Wave energy at the seabed is moderate, the annual mean wave height within the South Cormorant field ranges from 2.71 m – 3.00 m and the annual mean wave power is 39.35 kW/m.</p> <p>Sediments in the area show little variation and were dominated by sands. A small cuttings pile was detected around the south-east jacket which had a high proportion of sedimentary fines with some evidence of coarser sediments related to the presence of relic <i>Mytilus edulis</i> shells. The seabed around the Cormorant Alpha Platform was classified as the EUNIS broadscale habitat A5.26 'Circalittoral Muddy Sand'</p>

Fish	<p>The Cormorant Alpha platform sits within known spawning grounds for cod, haddock, Norway pout, saithe and whiting. Norway pout have high concentration spawning grounds in the vicinity of the Cormorant Alpha platform.</p> <p>The area is also a potential nursery ground for haddock, Norway pout, whiting, blue whiting, hake, herring, ling, mackerel and spurdog. The area is known to be a high intensity nursery ground for blue whiting. Published sensitivity maps indicate that the probability of aggregations of juvenile blue whiting and hake are medium. All other species are low.</p>
Fisheries	<p>The Cormorant Alpha platform is located in an area targeted primarily for demersal species in terms of both landed weights and value.</p> <p>Fishing intensity is considered moderate for demersal fisheries and low for pelagic and shellfish fisheries in comparison with other areas of the North Sea. According to fisheries statistics for the UK provided by Marine Scotland, fishing effort has increased in 2018 in comparison to the two preceding years. Both fishing effort and landings have been low over the last five years of statistics since 2014. Summer months are generally busiest.</p>
Marine Mammals	<p>Harbour porpoise (<i>Phocoena phocoena</i>), white-beaked dolphin (<i>Lagenorhynchus albirostris</i>), white-sided dolphin (<i>Lagenorhynchus acutus</i>) and minke whale (<i>Balaenoptera acutorostrata</i>) are the most abundant species recorded in the survey block covering the Cormorant Alpha platform area. Harbour porpoise and minke whale are the most frequently recorded cetacean in the vicinity of the Cormorant Alpha platform. Harbour porpoise is the most abundant and widely distributed cetaceans in the North Sea.</p> <p>Both grey and harbour seal densities are known to be low 103 km offshore, and around the Cormorant Alpha platform densities are predicted to be between 0 and 1 seals per 25 km² for both species, which is considered low.</p>
Birds	<p>Offshore in the NNS, the most numerous species present are likely to be northern fulmar, black-legged kittiwake and common guillemot. The Cormorant Alpha decommissioning area is located within or close to hotspots for northern fulmar, European storm-petrel, northern gannet, Arctic skua, long-tailed skua, great skua, black-legged kittiwake, great black-backed gull, common guillemot, and Atlantic puffin during their breeding season.</p> <p>Adults of these species can be seen foraging far from their coastal breeding colonies. In addition, after the breeding season ends in June, large numbers of moulting auks (common guillemot, razorbill and Atlantic puffin) disperse from their coastal colonies and into the offshore waters from July onwards. At this time these high numbers of birds are particularly vulnerable to oil pollution.</p>

	Seabird sensitivity to oil pollution in the region of the Cormorant Alpha platform is considered low from January to August and medium from September to December.
Onshore Communities	<p>The Cormorant Alpha platform is located approximately 103 km from the north-east coast of the Shetland Isles. Due to this distance, no impacts to onshore communities are expected from offshore operations at the Cormorant Alpha Decommissioning Area.</p> <p>Waste generated from the Decommissioning activities will be transported onshore and managed in line with legislation and TAQA's associated Active Waste Management Plan and in collaboration with SEPA and other regulatory bodies.</p>
Other Users of the Sea	<p>The Cormorant Alpha platform is located in a well-developed area for oil and gas extraction. However, there is little activity from other sea users recorded in the area. Apart from pipelines and cables associated with the Cormorant Alpha platform, there are no other cables or pipelines in the vicinity, no designated military practice and exercise areas, no offshore renewable or wind farm activity. There are two designated wrecks located 9 km south-southwest and 12 km east-southeast of the platform. However, these wreck sites are not protected or dangerous.</p> <p>Shipping density in the NNS in the vicinity of the proposed decommissioning activities is considered moderate. Between 200 – 300 vessels transit through Block 211/26 annually.</p>
Atmosphere	Emissions from short-term decommissioning activities e.g. vessel and platform fuel combustion emissions are considered small compared to those previously arising from the asset over its operational life.

4.2 Potential Environmental Impacts and their Management

Environmental Impact Assessment Summary:

A review of potentially significant environmental and social interactions has been completed and, considering the mitigation measures that will be built into the project activities, there is expected to be no significant impact on receptors from Cormorant Alpha topside decommissioning. Further information and justification statements can be found in the Cormorant Alpha Topside Environmental Appraisal (Ref 3).

Given the remote offshore location of the South Cormorant field, there is no potential for Cormorant Alpha topsides decommissioning to impact any European or nationally designated protected sites. The Environmental Appraisal has considered the Scottish National Marine

Plan adopted by the Scottish Government to help ensure sustainable development of the marine area. TAQA considers that the proposed decommissioning activities are in alignment with its objectives and policies.

Therefore, based on the findings of the Environmental Appraisal including the identification and subsequent application of appropriate mitigation measures, and project management according to TAQA's Health, Safety, Security and Environment Policy and Environmental Management System (EMS), it is considered that the proposed Cormorant Alpha topside decommissioning activities do not pose any significant threat of impact to environmental or societal receptors within the UKCS.

TABLE 4.2 ENVIRONMENTAL IMPACT MANAGMENT

Activity	Main Impacts	Management
Topsides Removal	The following aspects may be impacted by the decommissioning activities, however, none of these are assessed as significant:	

TABLE 4.2 ENVIRONMENTAL IMPACT MANAGMENT (Cont.)

Activity	Main Impacts	Management
	Emissions to air	<p>Emissions during decommissioning activities, (largely comprising fuel combustion gases) will occur in the context of the cessation of production. As such, emissions from operations and vessels associated with operation of the Cormorant Alpha topsides will cease. Reviewing historical European Union (EU) Emissions Trading Scheme data and comparison with the likely emissions from the proposed operations suggests that emissions relating to decommissioning will be small relative to those during production. The majority of emissions for the Cormorant Alpha topsides decommissioning can be attributed to vessel time or are associated with the recycling of material returned to shore. As the decommissioning activities proposed are of such short duration this aspect is not anticipated to result in significant impact.</p> <p>The latest available total annual CO₂ emissions estimate from oil and gas exploration and production is 13,200,000 tonnes (for 2018, Oil and Gas UK, 2019) and the latest (confirmed) total annual CO₂ emissions estimate for UK shipping is approximately 7,800,000 tonnes (for 2017, BEIS, 2019), giving a total of 21,000,000 tonnes of CO₂. The annual CO₂ emissions from the worst-case decommissioning option (Single Lift) is estimated to be 25,179 te (Appendix A), which will contribute less than 0.12% of the atmospheric emissions associated with UK offshore shipping and oil and gas activities. Considering the above, atmospheric emissions do not warrant further assessment.</p>
	Disturbance to seabed	<p>Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no anchoring associated with the decommissioning of the topsides. Should this change following the commercial tendering process and an anchor vessel is required, any potential seabed impact would be assessed and captured in the Consent to Locate application, Marine Licence application and supporting Environmental Impact Assessment (EIA) justification within the Portal Environmental Tracking System (PETS).</p> <p>On this basis, no further assessment needs to be undertaken.</p>

TABLE 4.2 ENVIRONMENTAL IMPACT MANAGMENT (Cont.)

Activity	Main Impacts	Management
Topside Removal	Physical presence of vessels	<p>The presence of a small number of vessels for topsides decommissioning activities will be short-term in the context of the life of the Cormorant Alpha installation. Activity will occur using similar vessels to those currently deployed for oil and gas installation, operation and decommissioning activities.</p> <p>The decommissioning of the Cormorant Alpha topsides is estimated to require up to six vessels, with a maximum of four on site at the platform location at any one time, depending on the selected method of removal.</p> <p>If applicable, Notices to Mariners will be made in advance of activities occurring. This may not be a requirement as decommissioning activities will only take place within the existing 500m safety exclusion zone. Stakeholders will have time to make any necessary alternative arrangements for the very limited period of operations.</p> <p>Considering the above, temporary presence of vessels does not need further assessment.</p>
	Physical presence of infrastructure decommissioned <i>in situ</i>	<p>As topsides will be fully removed and a temporary navigational aid will be installed on the substructure up until its subsequent removal, there will be no mechanism for associated long-term impact through physical presence.</p> <p>Considering the above, no further assessment related to long term presence of infrastructure is justified.</p>
	Discharges to sea (short-term & long-term)	<p>Discharges from vessels associated with the decommissioning work are typically well-controlled activities that are regulated through vessel and machinery design, management and operation procedures. In addition, the topsides will be Drained, Flushed, Purged and Vented (DFPV) using the TAQA DFPV philosophy prior to any decommissioning activities commencing. There would be no planned discharges from the topsides. Any residual remaining material will be in trace levels/volumes following the DFPV regime and therefore would not pose any significant risk.</p>

TABLE 4.2 ENVIRONMENTAL IMPACT MANAGMENT (Cont.)

Activity	Main Impacts	Management
Topside Removal		<p>The rundown lines connect the topsides facilities with the (disused) storage cells. Planned hydrocarbon/ chemical discharges during the flushing, cleaning and dewatering of the rundown line pipework within Leg C4 (Figure 2-1) will be covered by oil discharge permits and chemical permits under the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 and the Offshore Chemicals Regulations 2002 (as amended), respectively.</p> <p>The process to break containment of the rundown lines and will be internal to the legs. A small amount of metal waste (<100 kg) may be produced during the breaking of containment. This will be collected and returned to shore along with the topsides waste inventory. Breaking of containment will enable the installation of launcher cans and the environmental isolation of the rundown lines.</p> <p>As the topsides will be fully removed and the rundown lines will be isolated, there will be no potential for any discharges in the longer term from the facilities. The potential for any accidental release is assessed in the 'Accidental Events' section of this Table. Considering the above, discharges to sea from the topsides will not be assessed further.</p>
	Under water noise emissions	<p>Cutting required to remove the topsides will take place above the waterline, and there will be no other noise-generating activities. Vessel presence will be limited in duration. The project is not located within an area protected for marine mammals.</p> <p>With industry-standard mitigation measures and JNCC guidance, EAs for offshore oil and gas decommissioning projects typically show no injury, or significant disturbance associated with these projects.</p> <p>On this basis, underwater noise assessment does not need assessed further.</p>

TABLE 4.2 ENVIRONMENTAL IMPACT MANAGAMENT (Cont.)

Activity	Main Impacts	Management
Topside Removal	Resource use	<p>Generally, resource use from the proposed activities will require limited raw materials and be largely restricted to fuel use. Such use of resources is not typically an issue of concern in offshore oil and gas. The estimated worst-case (Single Lift option) total energy usage for the project is 284,310 GJ (Appendix A).</p> <p>Material will be returned to shore as a result of project activities, and expectation is to recycle at least 97% of this returned material. There may be instances where infrastructure returned to shore is contaminated and cannot be recycled, but the weight/volume of such material is not expected to result in substantial landfill use. Considering the above, resource use does not warrant further assessment.</p>
	Onshore activities	<p>The onshore waste management process is likely to have negligible consequences for the human population in terms of an increase in dust, noise, odour and reduced aesthetics.</p> <p>It should be noted that, through TAQA's Waste Management Strategy, only licenced contractors will be considered who can demonstrate they are capable of handling and processing the material to be brought ashore (e.g. permitted capacity to accept the relevant waste streams). This will form part of the commercial tendering process, including duty of care audits and due diligence on the successful contractor. Approval is determined through due-diligence assessment comprising site visits, review of permits and consideration of the facilities design and construction has been developed to minimise environmental impact. TAQA understands that dismantling sites will also require consents and approvals from onshore regulators such as the Scottish Environment Protection Agency (SEPA) or the Environment Agency, who apply conditions relating to mitigation, management and who are responsible for the provision of permits for such work.</p>

TABLE 4.2 ENVIRONMENTAL IMPACT MANAGMENT (Cont.)

Activity	Main Impacts	Management
Topside Removal	Waste	It is waste management, not generation, that is the issue across DPs, with capacity to handle waste within the UK often cited as a stakeholder concern. The limited waste to be brought to shore, which will be routine in nature, will be managed in line with TAQA's Waste Management Strategy as part of the project Active Waste Management Plan, using approved waste contractors. On this basis, no further assessment of waste is necessary.
	Employment	TAQA will communicate regularly with all crew members throughout. Following the above measures and continued communications further assessment is not warranted for this aspect.
	Dropped objects, although unlikely, the dropping of a large object (i.e. during heavy lifts) onto the CGBS storage cells could lead to a release of the cell contents (hydrocarbons, water, scale, sediments) to sea.	The impacts, management and mitigation of dropped objects and potential release of the cell contents during decommissioning activities have been documented in Section 5.2 of the Cormorant Alpha Topside Environmental Appraisal (Ref 3).

5 INTERESTED PARTY CONSULTATIONS

TABLE 5.1 SUMMARY OF STAKEHOLDER COMMENTS

Who	Comment	Response
Statutory Consultations		
National Federation of Fisherman's Organisations	23 rd April email to provide a high-level summary of the project scope and intent with an invitation for further engagement	No Comment received
Scottish Fisherman's Federation (SFF)	23 rd April email to provide a high-level summary of the project scope and intent with an invitation for further engagement	SFF thanked TAQA for their early engagement and confirmed any further comments would be through the statutory consultation
Northern Irish Fish Producers Organisation	23 rd April email to provide a high-level summary of the project scope and intent with an invitation for further engagement	No Comment received
Global Marine Systems Limited	15 th June email to provide a high-level summary of the project scope and intent with an invitation for further engagement	No Comment received
Informal Stakeholder Consultations		
Public		

6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

A Project Management team will be appointed to manage suitable sub-contractors for the removal of the installation. Standard procedures for operational control and hazard identification and management will be used. Where possible the work will be coordinated with other decommissioning operations in the NNS. The Management team will monitor and track the progress of consents and the consultations required as part of this process. Any changes in detail to the offshore removal programme will be discussed and agreed with OPRED.

6.2 Post Decommissioning Debris Clearance and Verification

During topside decommissioning OPRED will be provided with progress reports and once the Cormorant Alpha topside is removed TAQA will inform OPRED and subsequently provide a close out report.

The existing 500m radius safety zone around the platform will remain in place. The final condition of the CGBS will depend on the decommissioning proposals presented in the substructure DP. Following the completion of decommissioning activities in the wider Cormorant Alpha area verification of the seabed state for other users of the sea will be obtained by over-trawl trials, or alternative methods, to be discussed and agreed with OPRED. Following verification TAQA will notify all relevant governmental departments and non-governmental organisations. The survey results will also be shared with UK Fisheries Offshore Oil and Gas Legacy Trust Fund Ltd for inclusion in their FishSAFE system and to the United Kingdom Hydrographic Office for marking on Admiralty Charts and notices to mariners as required.

6.3 Schedule

Project Plan: Please refer to the latest plan below

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Well Plug & Abandonment											
Topsides & Pipelines Clean & Make Safe											
Removal Strategy Contract Tender & Award											
Topsides Removal											
Close Out Report Submission											

KEY:

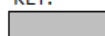
 Potential Activity Window

Figure 6.1: Cormorant Alpha Decommissioning Project Schedule

6.4 Long Term Facilities Management

This Decommissioning Programme covers a multi-year timescale, during which time the asset will be maintained in line with legislation and TAQA's corporate standards and procedures in order to facilitate the safe execution of the topside removal.

Following the removal of the topsides the existing 500m safety zone will remain in place and the Cormorant Alpha Consent to Locate will be revised to reflect the change in structure.

As the Comparative Assessment process for the Cormorant Alpha Substructure has yet to take place the final decommissioning solution has yet to be determined. TAQA's working assumption is that the interim status is that caps will be installed on the top of each concrete leg and that suitable navigational aids will be fitted by the removal contractor. The final condition of the substructure (CGBS & Legs) will depend on the decommissioning proposals presented in the

substructure DP which will be submitted at a future date.

TAQA will consult with the NLB to ensure that the design of the navigational aid unit meets all regulatory requirements. It is anticipated that the unit will be of a self-contained offshore lighthouse (SCOL) design and will be helicopter portable to facilitate maintenance and replacement as required.

Following the topside removal TAQA will confirm this with the United Kingdom Hydrographic Office (UKHO) along with the details of the SCOL e.g. light colour, sequence, and range.

The Cormorant Alpha Safety Case will be revised at the appropriate phases during the decommissioning process to ensure it is reflective of the changing installation status.

TAQA will continue to maintain an Oil Pollution Emergency Plan (OPEP) for the installation.

[6.5 Costs](#)

TABLE 6.1 PROVISIONAL DECOMMISSIONING PROGRAMME COSTS

Item	Estimated Cost (£m)
Operator Project Management	Provided to OPRED
Facility Running / Owner Costs	
Well Plug & Abandonment	
Facilities Make Safe	
Topside Preparation	
Topsides Removal	
Topside Only Onshore Recycling	Provided to OPRED
TOTAL	

[6.6 Close Out](#)

In accordance with the OPRED guidelines, a close out report will be submitted to OPRED within 1 year of the completion of the offshore decommissioning scope. The report will detail the removal of the Cormorant Alpha topside and any major variances from the programme.

[6.7 Post Decommissioning Monitoring and Evaluation](#)

TAQA will discuss and agree with OPRED a programme of post decommissioning surveys following full field decommissioning.

7 SUPPORTING DOCUMENTS

TABLE 7.1 SUPPORTING DOCUMENTS

Document Number	Title
1	TB-COADEC01-X-AD-0001-000 Cormorant Alpha Derrick Structure Removal and MDR Installation Decommissioning Programme
2	405686-T04P-HE-MSR-001 Method statement - Cormorant Alpha topsides removal Rev. B
3	Cormorant Alpha Topsides Environmental Assessment (Non-Derogation) 77IFS-167262-H99-0001-000
4	Detailed Feasibility Study – Decommissioning of TAQA NNS Assets 77-DEC00001-X-SW-0003-000
5	Cormorant Alpha Asset Re-Use Study TB-COA-10345-X-SU-0001-000

APPENDICES

[Public Notice](#)

[Letters of Support](#)

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