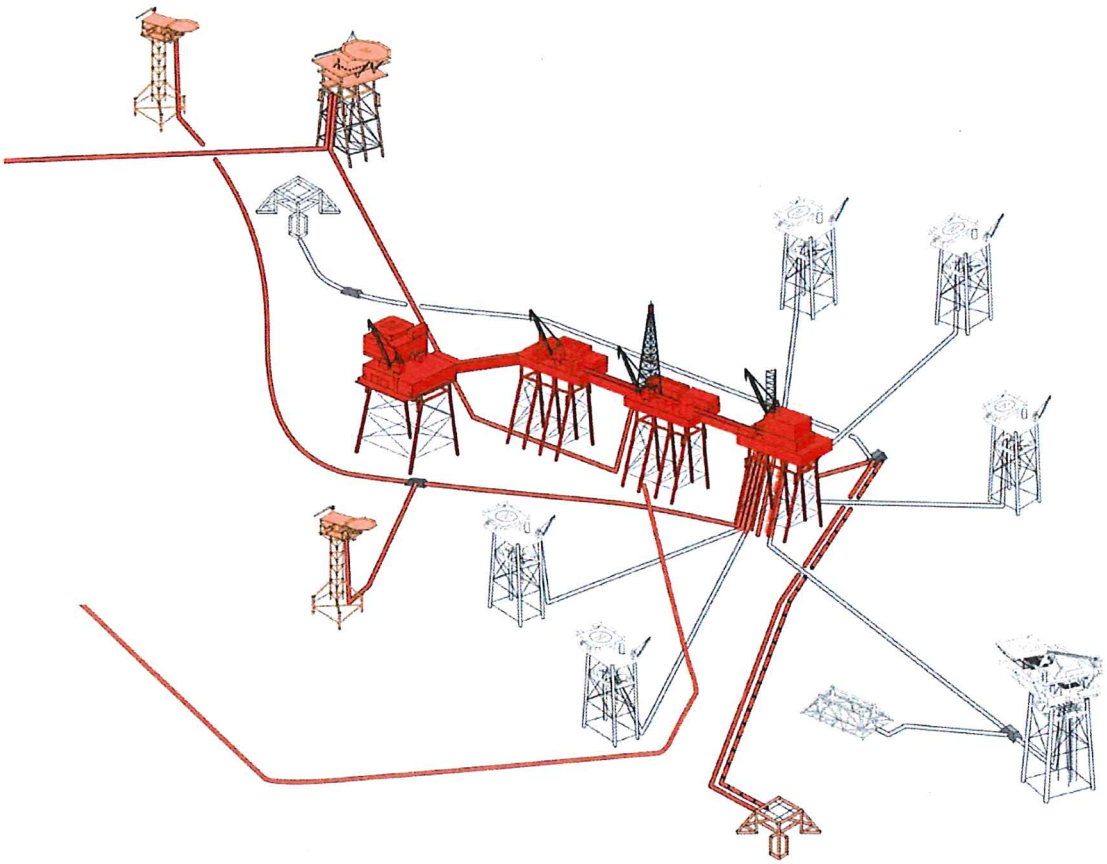
ConocoPhillips

Decommissioning Programmes



Viking Decommissioning Programmes: VDP2

Viking Satellites KD, LD, AR, Subsea tie-back Vixen VM, Viking Bravo Hub BA, BC, BP, BD and Associated Infield Pipelines

9th January 2019

ConocoPhillips

Document Control

Approvals

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Revision Control

Rev	Reference	Changes / Comments	Issue Date
1	COP-SNS-V-XX-X-PM-12-00004	Pre Draft for BEIS	29 Dec 2016
2	COP-SNS-V-XX-X-PM-12-00004	Draft for BEIS	07 Aug 2018
3	COP-SNS-V-XX-X-PM-12-00004	Final for BEIS	09 Jan 2019
4			

Distribution List

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Contents

A. Table of Terms and Abbreviations

Abbreviation	Explanation
AR	Viking A Riser Platform
BA	Viking Bravo Accommodation Platform
BC	Viking Bravo Compression Platform
BP	Viking Bravo Processing Platform
BD	Viking Bravo Drilling Platform
CA	Comparative Assessment
CD	Viking C Satellite Platform
cSAC	Candidate Special Area of Conservation
DD	Viking D Satellite Platform
BEIS	Department for Business, Energy and Industrial Strategy
ED	Viking E Satellite Platform
EIA	Environmental Impact Assessment
EMS	Environmental Management System
ES	Environmental Statement
FD	Viking F Satellite Platform
GD	Viking G Satellite Platform
HD	Viking H Satellite Platform
HLV	Heavy Lift Vessel
KD	Viking K Satellite Platform
KP	Kilometre Point
LAT	Lowest Astronomical Tide
LD	Viking L Satellite Platform
LOGGS	Lincolnshire Offshore Gas Gathering System
MeOH	Methanol
NORM	Naturally Occurring Radioactive Material
NUI	Normally Unattended Installation
OGUK	Oil and Gas United Kingdom
P&A	Plug and Abandon
PWA	Pipeline Works Authorisation
SAC	Special Area of Conservation
SLV	Shear Leg Vessel
SNS	Southern North Sea
Te	Tonne
TGT	Theddlethorpe Gas Terminal
Tscf	Trillion standard cubic foot
UKCS	United Kingdom Continental Shelf
VM	Vixen VM Subsea Manifold

B. Table of Figures and Tables

C. Table of Appendices

1. Executive Summary

1.1 Combined Decommissioning Programmes

This document contains four decommissioning programmes - the Viking Installations, associated Viking pipelines including subsea tees, Vixen installation covering the subsea manifold and associated Vixen pipelines.

The Viking and Vixen facilities to be decommissioned consist of:

- 7 Viking Surface Installations KD, LD, AR, BA, BC, BP and BD
- 1 Subsurface Installation Vixen VM
- 2 subsea tees; at the base of Viking LD riser and at the BD skid
- The inter-field pipelines

1.2 Requirement for Decommissioning Programmes

Installations:
In accordance with the Petroleum Act 1998, ConocoPhillips (U.K.) Limited as Operator of the Viking and Vixen Fields and on behalf of the Section 29 notice holders (see Table 1.2 and Section 8) is applying to the Department for Business, Energy and Industrial Strategy (BEIS) to obtain approval for decommissioning of the following installations:

- Viking installations (Viking KD, LD, AR installations; the Viking Bravo Hub which consists of the 4 interconnected platforms BA, BC, BP and BD) and the
- Vixen VM subsea installation

The details of these are in Section 2 of this document.

Pipelines:
In accordance with the Petroleum Act 1998, ConocoPhillips (U.K.) Limited as Operator of the Viking and Vixen Fields and on behalf of the Section 29 notice holders (see Table 1.4 and Section 8) is applying to BEIS to obtain approval for decommissioning of the following associated pipelines:

- Viking (Viking KD, LD, Viking BP to AR, Viking AR to TGT and Viking BP to LOGGS PR interfield pipelines including the BD skid and the subsea tee at the base of the Viking LD riser)
- Vixen VM interfield pipelines

The details of these are in Section 2 of this document.

In conjunction with public, stakeholder and regulatory consultation, the decommissioning programmes are submitted in compliance with national and international regulations and with consideration of BEIS guidelines. The schedule outlined in this document is for a decommissioning project which commenced with the well plugging and abandonment in 2015.

1.3 Introduction

The first well in the Viking area, 49/17-1, was drilled in August 1965 and discovered gas in the Viking B Field. This was followed by further exploration wells through 1973. The Viking and Vixen Fields are spread over a 24 km diameter sector in blocks 49/11d, 49/12a, 49/16a, 49/16c, 49/17a, and 49/18a in the Southern North Sea, approximately 138 km due East of Theddlethorpe on the Lincolnshire coast.

The installations covered by this document are in the following Quad/blocks:

- Viking KD 49/12a,
- Viking LD 49/17a,
- Viking AR 49/12a,

- Viking Bravo Hub (BA, BC, BP and BD) 49/17a,
- Vixen VM 49/17a.

Production from the Viking reservoirs commenced in 1972 from two manned multi jacket bridge linked complexes Viking A (Alpha) and Viking B (Bravo). Gas export from Viking A and B was combined at the Viking Riser platform (AR) prior to being exported to the Theddlethorpe Gas Terminal (TGT) via a 28" export pipeline. Normally Unattended Installations (NUI) were subsequently tied back to the two manned complexes as follows:

- 1974 – 1975, Viking CD, DD, ED, GD, HD tied back to Viking B complex
- 1975 Viking FD tied back to Viking A complex
- 1984 Victor JD tied back to Viking B complex
- 1995 Victor JM (subsea) tied-back to Victor JD
- 1998 Viking KD and LD tied back to Viking B complex
- 2000 Vixen VM (subsea) tied back to Viking B complex
- 2008 Victoria SM (subsea) tied back to Viking B complex

In 1991 the reservoirs produced by the Viking A complex and Viking FD satellite became uneconomic and were decommissioned in 1995. The Viking AR platform was r e designed as a Normally Unattended Installation (NUI) and transported export gas from the Viking B Complex to TGT until 2009. In 2009 Viking B export gas was re-routed to the Lincolnshire Offshore Gas Gathering System (LOGGS) manned Complex via a new 16" export pipeline.

The 3 Viking satellites KD, LD, AR, the subsea tieback Vixen VM and the Viking Bravo Hub covered by these Decommissioning Programmes produced 1.7 Tscf of gas up to the termination of production in January 2016. Cessation of Production applications were submitted and approved as follows:

Installation	Submission Date	Approval Date
Viking KD	3 August 2015	14 August 2015
Viking LD	17 July 2015	19 August 2015
Viking AR	No wells: Not required	N/A
Vixen VM	20 January 2016	18 February 2016
Viking Bravo BD Platform	15 May 2014	18 June 2014
Viking Bravo BA, BC, BP Platforms	No wells: Not required	N/A

All Viking Satellites and Hub Platforms are small installations with total combined Topsides and Jacket weights ranging from 1372 Te to 3827 Te; these stand in 19.5m to 36.0m of water. The small size, shallow water depth and design life of the Viking Satellites, Vixen subsea tieback, Viking Bravo Hub and associated pipelines has determined the philosophy of their decommissioning, which will be to:

- Well Plug and Abandon (P&A)
- Remove the satellite and hub platforms, Vixen subsea tieback, BD Skid and the Tee at Viking LD
- Leave the cleaned pipelines in situ.

The other installations and pipelines in the Viking field will be decommissioned at an appropriate time and covered by their own Decommissioning Programmes.

1.4 Overview of Installations and Pipelines Being Decommissioned

1.4.1 Installations

Table 1.1a Installations Being Decommissioned - Viking			
Field Names		**Quad / Block**	
Fields	Viking A, Viking E, Viking B	**Production Type**	Gas / Condensate
Water Depth	19.5 – 36.0m	**UKCS block**	Quad 49 Blocks 12a/ 17a

Surface Installations			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
7	Fixed steel jacket	12051	4728

Subsea Installations		Number of Wells	
Number	**Type**	**Number**	**Type**
0	-	23	Platform

Drill Cuttings Piles		Distance to Median	Distance from nearest UK coastline
Number of Piles	**Total Est volume m^3**	**km**	**km**
0	0	Viking Hub (BA, BC, BD and BP) 45 km	Viking LD 84km

Table 1.1b Installations Being Decommissioned – Vixen VM			
Field Names		**Quad / Block**	
Fields	Vixen	**Production Type**	Gas / Condensate
Water Depth	34m	**UKCS block**	Quad 49 Block 17a

Surface Installations			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
0	-	-	-

Subsea Installations		Number of Wells	
Number	**Type**	**Number**	**Type**
1	Subsea Manifold	1	Subsea

Drill Cuttings Piles		Distance to Median	Distance from nearest UK coastline
Number of Piles	**Total Est volume m^3**	**km**	**km**
0	0	Vixen VM 52km	Vixen VM 79km

See Figure 1.1 for further details.

Table 1.2a Installation Section 29 Notice Holders Details - Viking		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	50%
ConocoPhillips Petroleum Limited	01247477	0%
Britoil Limited	SC077750	50%

Table 1.2b Installation Section 29 Notice Holders Details - Vixen		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	50%
Britoil Limited	SC077750	50%

1.4.2 Pipelines

Table 1.3a Pipelines Being Decommissioned - Viking		
Number of Pipelines	12	See table 2.3
Subsea manifold and protection structures	2 (BD Skid and Tee at Viking LD)	See Table 2.3

Table 1.3b Pipelines Being Decommissioned - Vixen		
Number of Pipelines	2	See table 2.3
Subsea protection structures	None	-

Table 1.4a Pipelines Section 29 Notice Holders Details - Viking		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	50%
Britoil Limited	SC077750	50%

Table 1.4b Pipelines Section 29 Notice Holders Details - Vixen		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	50%
Britoil Limited	SC077750	50%

1.5 Summary of Proposed Decommissioning Programmes

Table 1.5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
1. Topsides (in respect of Viking only)		
Complete removal, dismantlement and reuse/ recycling and disposal.	Topsides past design life, equipment obsolete and degraded, or recovery no longer economic.	Removed by Heavy Lift Vessel (HLV) transported to appropriate land based facility for dismantlement, recycling and disposal. Equipment that cannot be re-used will be recycled or disposed of as appropriate.
2. Jackets (in respect of Viking only)		
Complete removal (3m below seabed), dismantlement and reuse/recycling and disposal.	Meets BEIS regulatory requirements. Jackets past design life.	Removed by HLV, transported to appropriate land based facility for dismantlement, recycling and disposal.
3.Subsea Installations (in respect of Vixen subsea manifold)		
Complete removal (3m below seabed), dismantlement and reuse/recycling and disposal.	Meets BEIS regulatory requirements	Removed by Construction Support Vessel (CSV), transported to appropriate land based facility for dismantlement, recycling and disposal.
4. Pipelines, Flowlines and Umbilicals (in respect of both Viking and Vixen)		
Pipelines will be flushed and decommissioned in situ. Concrete mattresses and other pipeline stabilisation structures will be decommissioned in situ. (Includes decommissioning of PL27 and PL161 to the low water mark.)	In situ decommissioning with minimum intervention option: All mattresses would be left in situ to maintain pipeline stabilisation. Minimise disturbance of the established environment. Reduce the requirement for the introduction of new material (Rock Dump) to the Special Area of Conservation (SAC).	Pipelines will be flushed of mobile hydrocarbons prior to subsea disconnection from the satellite. Pipelines would be left open and flooded with seawater with a maximum of 25Te rock dumped on the cut ends as required. Post flushing, the remaining pipeline would be left in its current state, marked on sea charts and notifications issued to fishermen/other users of the sea. Concrete mattresses and other pipeline stabilisation structures will be decommissioned in situ.
Subsea tees in respect of Viking: Complete removal (3m below seabed), dismantlement and reuse/recycling and disposal.	Meets BEIS regulatory requirements	Removed by Construction Support Vessel (CSV), transported to appropriate land based facility for dismantlement, recycling and disposal.

Table 1.5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
5.Well Abandonment Operations (in respect of both Viking and Vixen)		
Permanent well Plug and Abandonment (P&A).	Meets BEIS regulatory requirements.	Abandonment in accordance with OGA and HSE regulatory requirements.
6. Drill Cuttings (in respect of both Viking and Vixen)		
None required.	No Drill Cuttings Piles have been identified by seabed survey.	None required.
7. Interdependencies		
Platform and subsea manifold removal can only occur after Well P&A and Topsides / Pipeline cleaning.		

1.6 Field Location including Field Layout and Adjacent Facilities

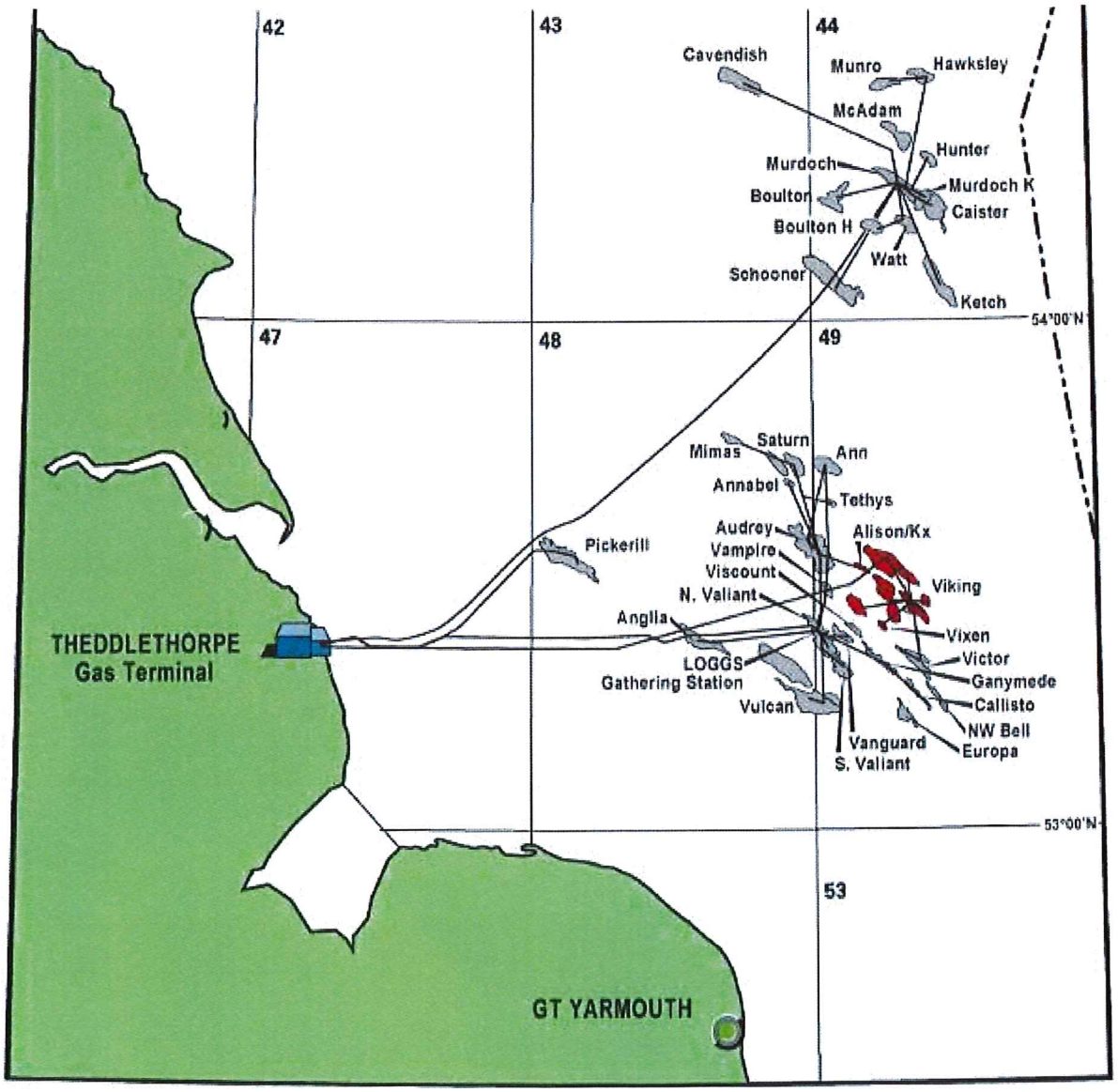


Figure 1.1 – Viking and Vixen Field Location in UKCS

The Viking and Vixen developments are part of the ConocoPhillips Southern North Sea (SNS) Gas Operation with the installations and pipelines covered by these decommissioning programmes highlighted in red in the Field Layout Figure 1.2.

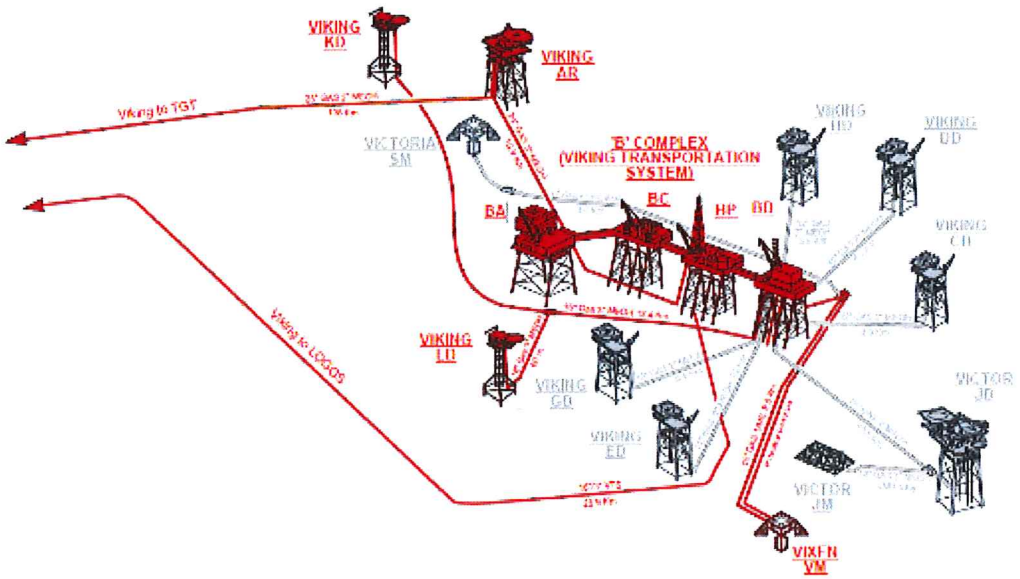


Figure 1.2 – Viking and Vixen Development Layout

Facilities adjacent to the Viking and Vixen facilities that are potentially impacted by these decommissioning programmes are listed below in Table 1.6 and highlighted in red in Figure 1.3.

Table 1.6 List of Adjacent Facilities					
Owner	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
ConocoPhillips / BP	PL89	12" Gas Pipeline	Viking CD to Viking BD 3.9km	Pipeline interconnects Viking CD with Viking BD	Out of use
ConocoPhillips / BP	PL132	2" MeOH Pipeline	Viking BD to Viking CD 3.9km	Piggy backed onto PL89 Pipeline interconnects Viking CD with Viking BD	Out of use
ConocoPhillips / BP	PL90	12" Gas Pipeline	Viking DD to Viking BD 4.1km	Pipeline interconnects Viking DD with Viking BD	Out of use
ConocoPhillips / BP	PL131	2" MeOH Pipeline	Viking BD to Viking DD 4.1km	Piggy backed onto PL90 Pipeline interconnects Viking DD with Viking BD	Out of use
ConocoPhillips / BP	PL93	12" Gas Pipeline	Viking HD to Viking BD 5.6km	Pipeline interconnects Viking HD with Viking BD	Out of use
ConocoPhillips / BP	PL130	2" MeOH Pipeline	Viking BD to Viking HD 5.6km	Piggy backed onto PL93 Pipeline interconnects Viking HD with Viking BD	Out of use
ConocoPhillips / BP	PL92	12" Gas Pipeline	Viking GD to Viking BD 5.1km	Pipeline interconnects Viking GD with Viking BD	Out of use

Table 1.6 List of Adjacent Facilities					
Owner	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
ConocoPhillips / BP	PL66	2" MeOH Pipeline	Viking BD to Viking GD 5.1km	Piggy backed onto PL92 Pipeline interconnects Viking GD with Viking BD	Out of use
ConocoPhillips / BP	PL91	12" Gas Pipeline	Viking ED to Viking BD 12.0km	Pipeline interconnects Viking ED with Viking BD	Out of use
ConocoPhillips / BP	PL133	2" MeOH Pipeline	Viking BD to Viking ED 12.0km	Piggy backed onto PL91 Pipeline interconnects Viking ED with Viking BD	Out of use
ConocoPhillips / ExxonMobil/ Spirit Energy/ Dana Petroleum/ CalEnergy Resources/ DEA	PL211	16" Gas Pipeline	JD to BD 13.5km	Pipeline interconnects Victor JD with Viking BD	Out of use
ConocoPhillips / ExxonMobil/ Spirit Energy/ Dana Petroleum/ CalEnergy Resources/ DEA	PL212	3" MeOH Pipeline	BD to JD 13.5km	Pipeline interconnects Victor JD with Viking BD	Out of use
ConocoPhillips / ExxonMobil/ Spirit Energy/ Dana Petroleum/ CalEnergy Resources/ DEA	PL1095	12" Gas Pipeline	JM to JD pigging skid 8.5 km	Pipeline interconnects Victor JM with Victor JD Gas processing for Victor JM by Viking Bravo Complex	Out of use

Table 1.6 List of Adjacent Facilities					
Owner	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
ConocoPhillips / ExxonMobil/ Spirit Energy/ Dana Petroleum/ CalEnergy Resources/ DEA	PL1096	3" MeOH Pipeline	JD to JM 8.5km	Pipeline interconnects Victor JM with Victor JD	Out of use
ConocoPhillips / ExxonMobil/ Spirit Energy/ Dana Petroleum/ CalEnergy Resources/ DEA	UM1	Umbilical	JD to JM 8.5km	Umbilical from Victor JD to Victor JM	Out of use
Verus Petroleum	Victoria SM	Subsea Manifold	SM to BD 3.8km	Gas processing for Victoria SM by Viking Bravo Complex	Out of use
Verus Petroleum	PL2526	6" Gas Pipeline	Victoria SM to Viking BD 3.8km	Crosses over PL90 & PL93	Out of use
Verus Petroleum	PLU2527	Umbilical	Viking BD to Victoria SM 3.8km	Crosses over PL90 & PL93	Out of use
Spirit Energy	PL0947	12" Gas Pipeline	ANN XM to LOGGS PR	3rd Party Crossing	Out of use
Spirit Energy	PL0496	20" Gas Pipeline	Audrey to LOGGS PP Pipeline	3rd Party Crossing	Active
Spirit Energy	PL0497	3" MeOH Pipeline	LOGGS PP to Audrey Pipeline	3rd Party Crossing	Active
Shell / Mobil Exxon	PL1170	3.5" Glycol Pipeline	Bacton to Clipper PT	3rd Party Crossing	Active
Shell / Mobil Exxon	PL632	24" Gas Pipeline	Clipper PT to Bacton	3rd Party Crossing	Active
Perenco / ENGIE	PL253	24" Gas Pipeline	Esmond to Bacton	3rd Party Crossing	Active
ConocoPhillips / BP	PL0454	24" Gas Pipeline	LOGGS PP to TGT	3rd Party Crossing	Active
ConocoPhillips / BP	PL0455	4" MeOH Pipeline	TGT to LOGGS PP	3rd Party Crossing	Active

Table 1.6 List of Adjacent Facilities					
Owner	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
Shell / Exxon /ARCO	PL1570	34" Gas Pipeline	Shearwater to Bacton SEAL Pipeline	3rd Party Crossing	Active
ConocoPhillips / BP	LOGGS PR Hub	Offshore Gas Platform	-	PL 0496, PL0497 and PL0947 are routed to LOGGS PR	Out of use
ConocoPhillips / BP	TGT Gas Terminal	Onshore Gas Terminal	-	PL0454 and PL1570 are routed to TGT	Active

Impacts of Decommissioning Proposals
No anticipated impact on adjacent facilities if pipelines are decommissioned in situ. Pipeline crossings under rock placement and mattresses are to be decommissioned in-situ.

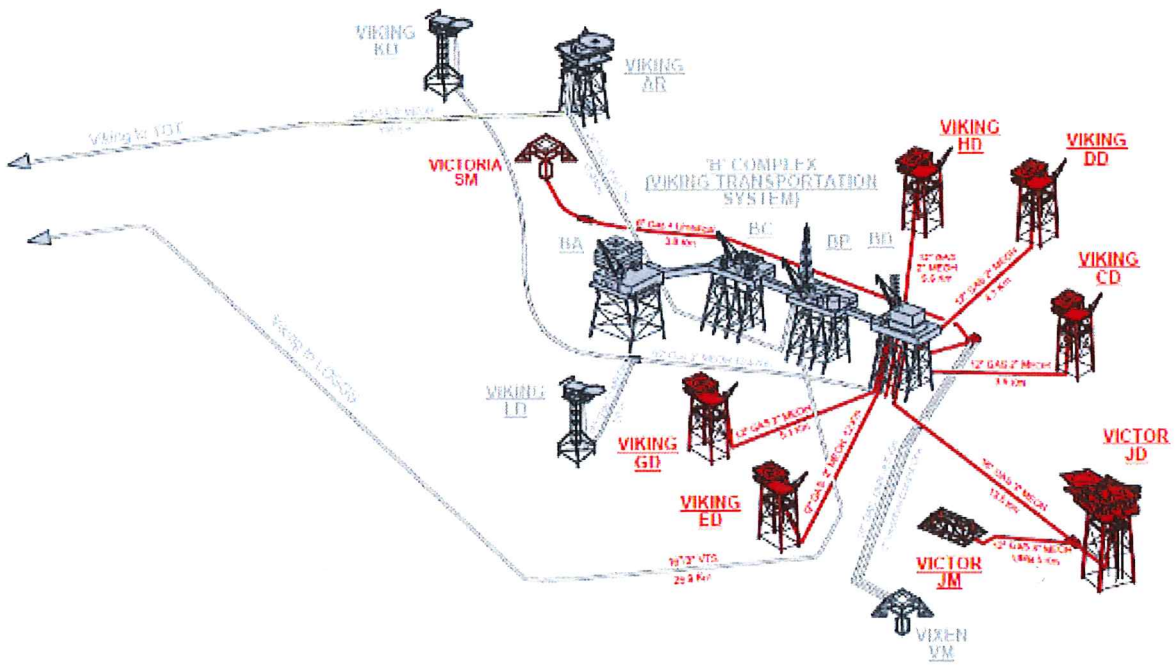


Figure 1.3 – Adjacent ConocoPhillips' Facilities (highlighted in Red)

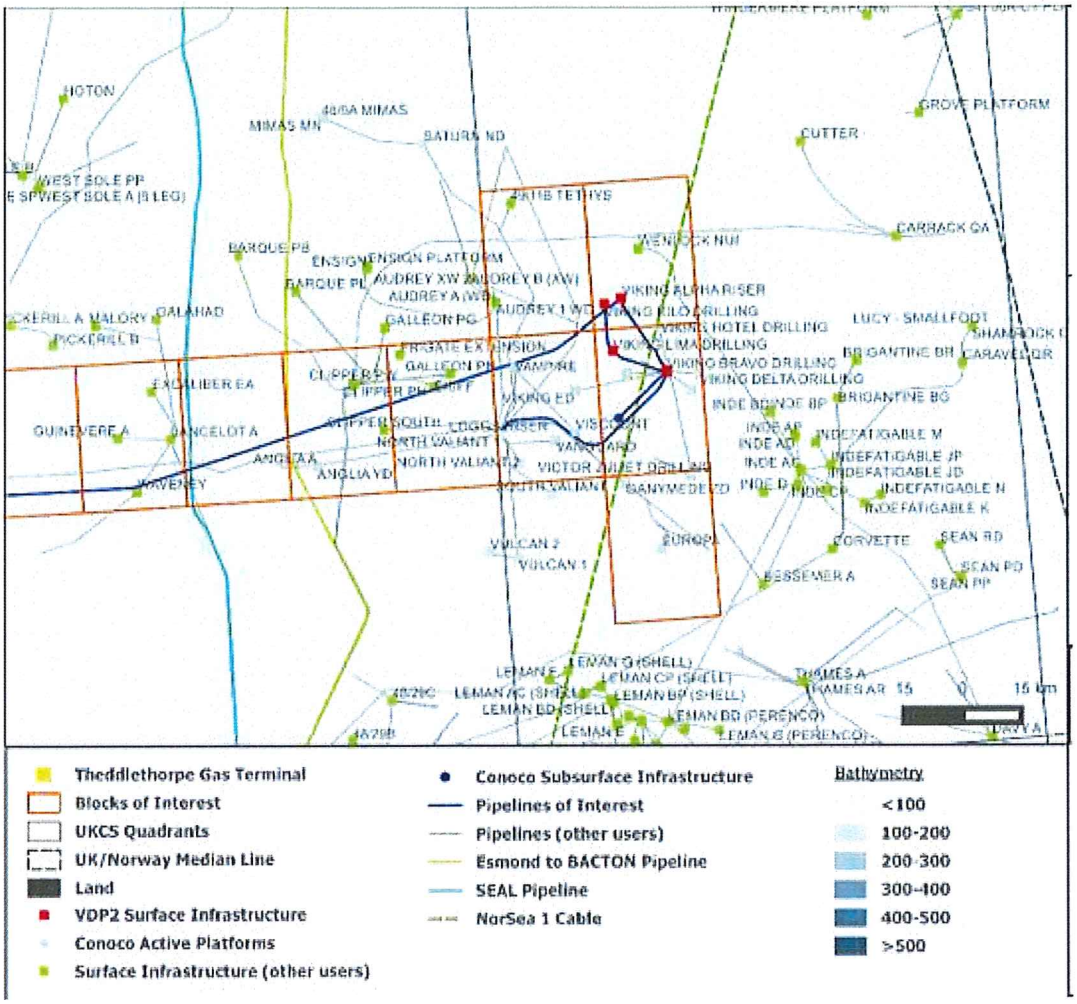


Figure 1.4 – Adjacent Third Party Facilities

1.7 Industrial Implications

Principles of the contracting and procurement strategies to be utilised by ConocoPhillips as operator and on behalf of the other Section 29 notice holders, for the decommissioning of the Viking and Vixen facilities are listed below:

1. ConocoPhillips participates in the PILOT Share Fair events providing one to one sessions with the UK supply chain on the SNS decommissioning programmes and timeline.

2. The First Point Assessment (FPAL) database is the primary source for establishing tender lists for contracts / purchases valued at US$ 100,000 and above, although it is also used under this limit.

3. ConocoPhillips is committed to competitively bidding all of its major contracts where possible and practicable. We are supporters of the UK Supply Chain Code of Practice and our performance in this regard has been acknowledged through Excellence Awards from Oil & Gas UK.

4. ConocoPhillips are active participants in various industry initiatives including:
    a. Oil & Gas UK Supply Chain Forum;
    b. Inventory sharing initiative (Ampelius);
    c. OGA Decommissioning Board - Supply Chain sub-group.

2. Description of Items to be Decommissioned

2.1 Surface Facilities (Topsides and Jackets)

Table 2.1 Surface Facilities Information								
Name	Facility Type	Location	Topsides / Facilities		Jacket (if applicable)			
		WGS84 Decimal/ WGS84 Decimal Minute	Weight (Te)*	No of modules	Weight (Te)**	No of Legs	No of piles	Weight of piles (Te) ***
Viking BA	Fixed Steel Jacket	53.4451° N / 53° 26.908' N 02.3289° E / 02° 19.774' E	2305	2	901	4	4	486
Viking BC	Fixed Steel Jacket	53.4445° N / 53° 26.873' N 02.3303° E / 02° 19.857' E	3375	2	708	8	8	276
Viking BD	Fixed Steel Jacket	53.4434° N / 53° 26.802' N 02.4451° E / 02° 19.908' E	2302	2	949	8	8	216
Viking BP	Fixed Steel Jacket	53.4440° N / 53° 26.837' N 02.3307° E / 02° 19.883' E	1781	2	766	8	8	213
Viking AR	Fixed Steel Jacket	53.5301° N / 53° 32.004' N 02.2548° E / 02° 15.288' E	1395	2	541	6	6	141
Viking KD	Fixed Steel Jacket	53.5274° N / 53° 31.686' N 02.2211° E / 02° 13.305' E	446	1	440	3	3	147
Viking LD	Fixed Steel Jacket	53.4682° N / 53° 28.495' N 02.2307° E / 02° 13.885' E	451	1	423	3	3	147

*Note** *Weights are based on structural designs and review of the Return to Scene (R2S) footage*

*Note*** *Weights are based on design drawings, include piles to mudline, (excludes marine growth)*

*Note**** *Weight of piles below mudline*

Figure 2.1.1 Photograph of Viking KD

Figure 2.1.2 Photograph of Viking LD

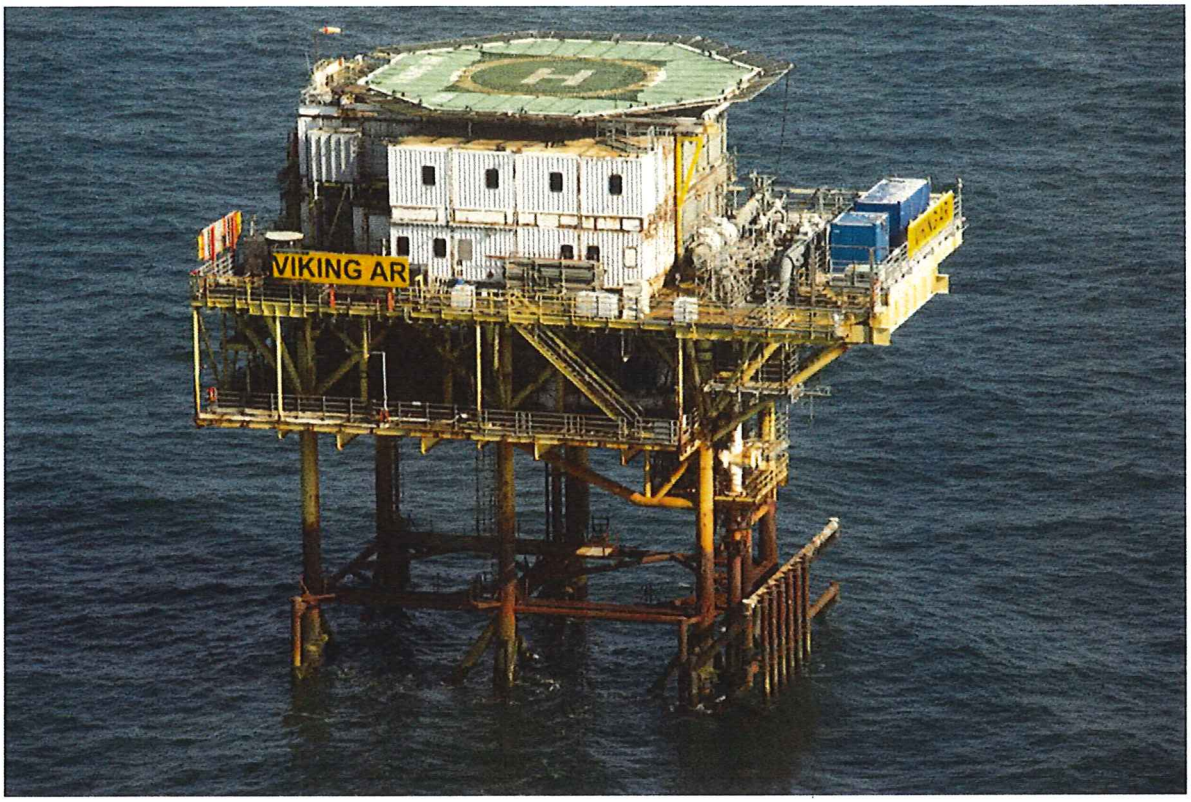


Figure 2.1.3 Photograph of Viking AR

Figure 2.1.4 Photograph of Viking Bravo BA Platform

Figure 2.1.5 Photograph of Viking Bravo BC Platform

Figure 2.1.6 Photograph of Viking Bravo BP Platform

Figure 2.1.7 Photograph of Viking Bravo BD Platform

Figure 2.1.8 Photograph of Viking Bravo Hub Complex

2.2 Subsea Installations and Stabilisation Features

Table 2.2 Subsea Installation and Stabilisation Features				
Subsea installations and stabilisation features	**Number**	**Size / Weight (Te)**	**Location**	**Comments / Status**
			WGS84 Decimal/ WGS84 Decimal Minute	
Wellheads (in respect of Vixen Decommissioning Programme)	1	0	53.3975° N / 53° 23.867' N 02.2322° E / 02° 13.972' E	Disused
Manifolds (in respect of Vixen Decommissioning Programme)*	1	46.6	53.3975° N / 53° 23.867' N 02.2322° E / 02° 13.972' E	Disused
Templates	0	0	None	None present
Protection frames (in respect of Vixen Decommissioning Programme)*	1	0	53.3975° N / 53° 23.867' N 02.2322° E / 02° 13.972' E	Disused
SSIV	0	0	None	None present
Concrete mattresses	0	0	None	None present
Grout bags	0	0	None	None present
Formwork	0	0	None	None present
Frond mats	0	0	None	None present
Rock dump	0	0	None	None present
Other	0	0	None	None present

Note * *Manifold is integral to the Protection frame*

Figure 2.2.1 Photograph of subsea manifold, Vixen VM

2.3 Pipelines Including Stabilisation Features

Table 2.3a Pipeline / Flowline / Umbilical Information – Viking associated pipelines								
Description	**Pipeline No (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points**	**Burial Status**	**Pipeline Status**	**Current Content**
Gas Pipeline	PL27	28	139.2	Steel pipe with coal tar and concrete weight coatings	Gas condensate, produced water	Viking AR to TGT	Trenched and buried, 11,470m (9.5%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater with <30mg/l hydrocarbons
MeOH Pipeline piggy-backed onto PL27	PL161	3	139.2	Steel pipe with polyolefin wrap Piggyback blocks	MeOH, corrosion inhibitor	TGT to Viking AR	Trenched and buried, 11,470m (9.5%) exposed *, no reportable FishSafe spans**	Out of use	Pipeline partially flushed with seawater; MeOH and corrosion inhibitor remaining
Gas Pipeline	PL88	24	10.9	Steel pipe with somastic and concrete weight coatings	Gas condensate, produced water	Viking BP to Viking AR	Trenched and buried, 2,359m (24.6%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater with <30mg/l hydrocarbons
MeOH Pipeline piggy-backed onto PL88	PL134	3	10.9	Steel pipe with polyolefin wrap Piggyback blocks	MeOH, corrosion inhibitor	Viking AR to Viking BP	Trenched and buried, 2,359m (24.6%) exposed *, no reportable FishSafe spans**	Out of use	Untreated seawater
Gas Pipeline	PL1571	16	13.6	Steel pipe with asphalt enamel and concrete weight coatings	Gas condensate, produced water	Viking KD to Viking BD	Trenched and buried, 18.3m (0.2%) exposed*, no reportable FishSafe spans****	Out of use	Untreated seawater with <30mg/l hydrocarbons

Table 2.3a Pipeline / Flowline / Umbilical Information – Viking associated pipelines									
Description	**Pipeline No (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points**	**Burial Status**	**Pipeline Status**	**Current Content**
MeOH Pipeline piggy-backed onto PL1571	PL1573	3	13.6	Steel pipe with fusion bonded epoxy coating Piggyback blocks	MeOH, corrosion inhibitor	Viking BD to Viking KD	Trenched and buried, 18.3m (0.2%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater
Gas Pipeline	PL1572	16	0.1	Steel pipe with asphalt enamel and concrete weight coatings	Gas condensate, produced water	Viking LD to Viking KD/LD midline tee	Installed on seabed with concrete mattresses below and above pipeline, 25m (29.4%) exposed*, no reportable FishSafe spans**	Out of use	Flush fluid ingress prevention gel plug to be discharged to sea upon subsea disconnect
MeOH Pipeline piggy-backed onto PL1572	PL1574	3	0.1	Steel pipe with fusion bonded epoxy coating Piggyback blocks	MeOH, corrosion inhibitor	Viking KD/LD midline tee to Viking LD	Installed on seabed with concrete mattresses below and above pipeline, 25m (29.4%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater
Gas Pipeline	PL2643	16	27.5	Steel pipe with 3 layer PP Coating System	Gas condensate, produced water	Viking BP to LOGGS PR	Trenched and buried, 50m (0.2%) exposed*, 1 FishSafe span of 17m **	Out of use	Untreated seawater with <30mg/l hydrocarbons
MeOH Pipeline piggy-backed onto PL2644	PL2644	3	27.5	Steel pipe with 3 layer PP Coating System Piggyback blocks	MeOH, corrosion inhibitor	LOGGS PR to Viking B	Trenched and buried, 50m (0.2%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater

Table 2.3a Pipeline / Flowline / Umbilical Information – Viking associated pipelines									
Description	**Pipeline No (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points**	**Burial Status**	**Pipeline Status**	**Current Content**
Gas Pipeline connected to PL1571****	PL1464	16	0.03	Steel pipe with polychloroprene coating in the splash zone and thermal sprayed aluminium elsewhere.	Gas condensate, produced water	Platform riser on Viking BD connecting to PL1571	N/A	Out of use	Untreated seawater with <30mg/l hydrocarbons
MeOH Pipeline connected to PL1573****	PL1465	3	0.03	Steel pipe with polychloroprene coating in the splash zone and thermal sprayed aluminium elsewhere. Piggyback clamps.	MeOH, corrosion inhibitor	Platform riser on Viking BD connecting to PL1573	N/A	Out of use	Untreated seawater
Subsea tee between Viking LD and the Viking KD to Viking BD pipeline in respect of Viking associated pipelines Decommissioning Programme	N/A	N/A	N/A	2Te Subsea manifold and protection frame with grout bags that will be removed to gain access to the subsea tee	Gas, Condensate, produced water	Start KP: KP6.065 End KP: KP6.068	Exposed above the seabed	N/A	Flush fluid ingress prevention gel plug to be discharged to sea upon subsea disconnect
BD subsea valve skid between Vixen VM and Victoria SM (in close proximity to Viking BD) - in respect of Viking	N/A	N/A	N/A	38.5Te subsea manifold and protection frame with grout bags that will be removed to gain	Gas, Condensate, produced water	Start KP: KP8.596 End KP: KP8.604	Exposed above the seabed	N/A	Untreated seawater with <30mg/l hydrocarbons

Table 2.3a Pipeline / Flowline / Umbilical Information – Viking associated pipelines									
Description	**Pipeline No (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points**	**Burial Status**	**Pipeline Status**	**Current Content**
associated pipelines Decommissioning Programme				access to the valve skid					

*Note ** *As per pipeline survey length*

*Note *** *As per FishSAFE span reporting criteria: 'significant' pipeline spans (i.e. over 10m long and 0.8m above the seabed)*

*Note *** Average weight of grout bag estimated at 40 kg*

*Note **** PL1571 Viking KD gas and PL1573 Viking KD methanol pipelines are connected to PL1464 16" and PL1465 3" risers respectively. The risers were approved under Pipeline Work Authorisation 21/W/97*

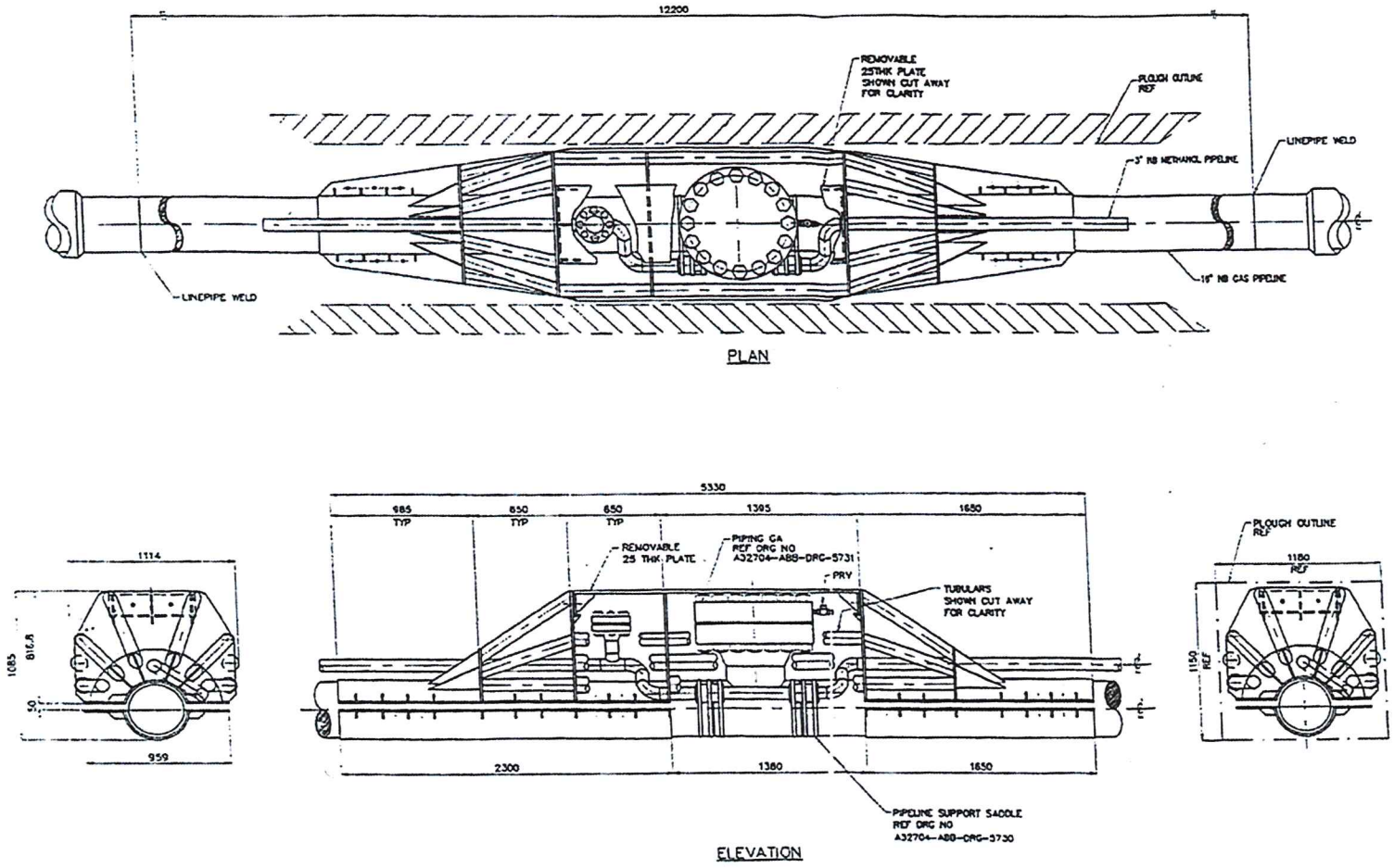


Figure 2.3.1 Schematic of subsea tee between Viking LD and the Viking KD to Viking BD pipeline

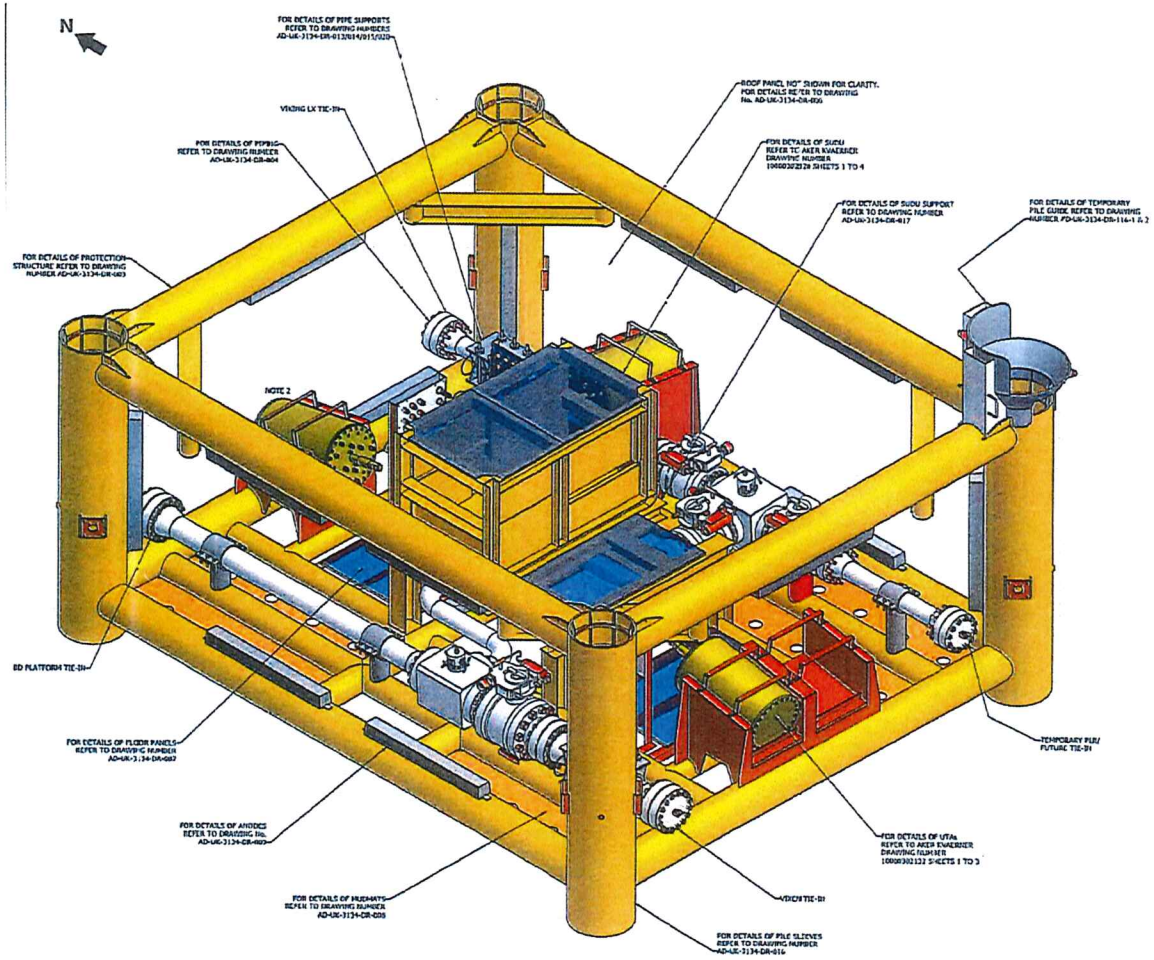


Figure 2.3.2 Schematic of BD subsea valve skid between Vixen VM and Victoria SM (in close proximity to Viking BD)

Table 2.3b Pipeline / Flowline / Umbilical Information – Vixen associated pipelines									
Description	**Pipeline No (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points**	**Burial Status**	**Pipeline Status**	**Current Content**
Gas Pipeline	PL1767	10	8.7	Steel pipe with 3 layer polypropylene coating system	Gas condensate, produced water	Vixen VM to Viking BD	Trenched and buried, 7m (0.1%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater with <30mg/l hydrocarbons
Control Umbilical	PL1768	Nominal 4.5" (113.8mm)	8.7	Composite flexible with external sheath of polypropylene rovings	MeOH, corrosion inhibitor, Hydraulic control fluids	Viking BD to Vixen VM	Trenched and buried, 36m (0.5%) exposed*, no reportable FishSafe spans**	Out of use	Untreated seawater

*Note ** *As per pipeline survey length*
*Note *** *As per FishSAFE span reporting criteria: 'significant' pipeline spans (i.e. over 10m long and 0.8m above the seabed)*

Table 2.4a Subsea Pipeline Stabilisation Features – Viking associated pipelines				
Stabilisation Feature	**Total Number/ Length***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Concrete mattresses	10 2 52 6 19	60 12 312 36 114	PL27 & PL161 at KP49.071 – KP49.124, KP65.903 – KP65.917 PL88 & PL134 at KP10.722 – KP10.731 PL1571 & PL1573 at KP-0.062 – KP0.027, KP6.063 – KP6.072, KP13.408 – KP13.415, KP13.433 – KP13.515 PL1572 & PL1574 at KP0.035 – KP0.036, KP0.058 – KP0.080 PL2643 & PL2644 at KP-0.304 – KP-0.302, KP-0.033 – KP0.020	Exposed during 2007 and 2008 Exposed during 2014 Exposed during 2014 Exposed during 2014 Exposed during 2014
Grout bags	24m		PL27 & PL161 at KP49.083 – KP49.107	Most of the intermittent grout bags are degraded and partially buried. Exposed during 2007 and 2008 surveys.
	2m		PL2643 & PL2644 at KP-0.304 – KP-0.302	Two open grout bags, one on each side of the pipeline. Exposed during 2014 survey.
Formwork	None			
Frond mats	3	18	PL2643 & PL2644 at KP 0.011	Exposed during 2014

Table 2.4a Subsea Pipeline Stabilisation Features – Viking associated pipelines				
Stabilisation Feature	**Total Number/ Length***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Rock Dump	35m		PL27 & PL161 at KP-0.004 – KP0.031	Buried (2014 survey)
	6m		PL27 & PL161 at KP1.696 – KP1.702	Buried (2008 survey)
	11m		PL27 & PL161 at KP2.536 – KP2.547	Partially buried (2008 survey)
	25m		PL27 & PL161 at KP3.603 – KP3.628	Exposed (2008 survey)
	6m		PL27 & PL161 at KP4.256 – KP4.257	Exposed (2008 survey)
	8m		PL27 & PL161 at KP7.213 – KP7.221	Partially buried (2008 survey)
	10m		PL27 & PL161 at KP16.671 – KP16.681	Partially buried (2008 survey)
	12m		PL27 & PL161 at KP17.874 – KP17.886	Partially buried (2008 survey)
	18m		PL27 & PL161 at KP30.152 – KP30.170	Partially buried (2008 survey)
	69m		PL27 & PL161 at KP30.178 – KP30.247	Partially buried (2008 survey)
	17m		PL27 & PL161 at KP38.653 – KP38.670	Partially buried (2008 survey)
	722m		PL27 & PL161 at KP38.027 – KP38.749	Partially buried (2008 survey)
	8m		PL27 & PL161 at KP46.207 – KP46.215	Partially buried (2008 survey)
	14m		PL27 & PL161 at KP46.224 – KP46.238	Partially buried (2008 survey)
	64m		PL27 & PL161 at KP48.985 – KP49.049	Partially buried (2008 survey)
	86m		PL27 & PL161 at KP49.107 – KP49.193	Partially buried (2008 survey)
	51m		PL27 & PL161 at KP57.903 – KP57.954	Partially buried (2008 survey)
	24m		PL27 & PL161 at KP59.347 – KP59.371	Partially buried (2008 survey)
	12m		PL27 & PL161 at KP60.265 – KP60.277	Partially buried (2008 survey)
	22m		PL27 & PL161 at KP104.726 – KP104.748	Partially buried (2008 survey)
	33m		PL27 & PL161 at KP105.014 – KP105.047	Partially buried (2008 survey)
	117m		PL27 & PL161 at KP105.058 – KP105.175	Partially buried (2008 survey)
	31m		PL27 & PL161 at KP108.978 – KP109.009	Partially buried (2008 survey)

Table 2.4a Subsea Pipeline Stabilisation Features – Viking associated pipelines				
Stabilisation Feature	**Total Number/ Length***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Rock Dump	17m 9m		PL88 & PL134 at KP2.835 – KP2.852 PL88 & PL134 at KP3.886 – KP3.895	Partially buried (2008 survey) Partially buried (2008 survey)
	26m 40m 105m 18m		PL1571 & PL1573 at KP0.027 – KP0.053 PL1571 & PL1573 at KP0.636 – KP0.676 PL1571 & PL1573 at KP13.303 – KP13.408 PL1571 & PL1573 at KP13.415 – KP13.433	Partially buried (2014 survey) Partially buried (2014 survey) Partially buried (2014 survey) Partially buried (2014 survey)
	37m		PL1572 & PL1574 at KP0.000 – KP0.037	Partially buried (2014 survey)
	269m 157m 14m 15m 37m		PL2643 & PL2644 at KP-0.302 – KP-0.033 PL2643 & PL2644 at KP0.020 – KP0.177 PL2643 & PL2644 at KP0.205 – KP0.219 PL2643 & PL2644 at KP0.617 – KP0.632 PL2643 & PL2644 at KP2.389 – KP2.426	Partially buried (2014 survey) Partially buried (2014 survey) Partially buried (2014 survey) Partially buried (2014 survey) Partially buried (2012 survey)

Table 2.4a Subsea Pipeline Stabilisation Features – Viking associated pipelines				
Stabilisation Feature	**Total Number/ Length***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
	71m		PL2643 & PL2644 at KP2.489 – KP2.560	Partially buried (2012 survey)
	24m		PL2643 & PL2644 at KP3.373 – KP3.397	Partially buried (2012 survey)
	4m		PL2643 & PL2644 at KP4.319 – KP4.323	Partially buried (2012 survey)
	373m		PL2643 & PL2644 at KP5.027 – KP5.400	Partially buried (2012 survey)
	13m		PL2643 & PL2644 at KP5.200 – KP5.213	Partially buried (2012 survey)
	23m		PL2643 & PL2644 at KP5.318 – KP5.341	Partially buried (2012 survey)
	15m		PL2643 & PL2644 at KP6.533 – KP6.548	Partially buried (2012 survey)
	16m		PL2643 & PL2644 at KP6.638 – KP6.638	Partially buried (2012 survey)
	136m		PL2643 & PL2644 at KP6.942 – KP7.078	Partially buried (2012 survey)
	84m		PL2643 & PL2644 at KP7.095 – KP7.179	Partially buried (2012 survey)
	19m		PL2643 & PL2644 at KP7.218 – KP7.237	Partially buried (2012 survey)
	18m		PL2643 & PL2644 at KP7.287 – KP7.305	Partially buried (2012 survey)
	55m		PL2643 & PL2644 at KP7.378 – KP7.378	Partially buried (2012 survey)
	18m		PL2643 & PL2644 at KP7.760 – KP7.778	Partially buried (2012 survey)
	12m		PL2643 & PL2644 at KP8.508 – KP8.520	Partially buried (2012 survey)
	18m		PL2643 & PL2644 at KP9.205 – KP9.223	Partially buried (2012 survey)
	6m		PL2643 & PL2644 at KP10.188 – KP10.194	Partially buried (2012 survey)
	25m		PL2643 & PL2644 at KP11.662 – KP11.687	Partially buried (2012 survey)
	26m		PL2643 & PL2644 at KP11.743 – KP11.769	Partially buried (2012 survey)
	23m		PL2643 & PL2644 at KP16.512 – KP16.535	Partially buried (2012 survey)
	9m		PL2643 & PL2644 at KP16.737 – KP16.746	Partially buried (2012 survey)
	38m		PL2643 & PL2644 at KP16.750 – KP16.788	Partially buried (2012 survey)
	14m		PL2643 & PL2644 at KP17.039 – KP17.053	Partially buried (2012 survey)
	67m		PL2643 & PL2644 at KP17.173 – KP17.240	Partially buried (2012 survey)
	7m		PL2643 & PL2644 at KP17.390 – KP17.397	Partially buried (2012 survey)
	8m		PL2643 & PL2644 at KP17.404 – KP17.412	Partially buried (2012 survey)
	18m		PL2643 & PL2644 at KP17.874 – KP17.892	Partially buried (2012 survey)
	30m		PL2643 & PL2644 at KP18.235 – KP18.265	Partially buried (2012 survey)
	18m		PL2643 & PL2644 at KP18.674 – KP18.692	Partially buried (2012 survey)
	26m		PL2643 & PL2644 at KP19.053 – KP19.079	Partially buried (2012 survey)
	26m		PL2643 & PL2644 at KP19.083 – KP19.109	Partially buried (2012 survey)
	4m		PL2643 & PL2644 at KP20.064 – KP20.068	Partially buried (2012 survey)

Table 2.4a Subsea Pipeline Stabilisation Features – Viking associated pipelines				
Stabilisation Feature	**Total Number/ Length***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
	18m		PL2643 & PL2644 at KP23.071 – KP23.089	Partially buried (2012 survey)
	19m		PL2643 & PL2644 at KP23.100 – KP23.119	Partially buried (2012 survey)
	6m		PL2643 & PL2644 at KP24.115 – KP24.121	Partially buried (2012 survey)
	9m		PL2643 & PL2644 at KP24.692 – KP24.701	Partially buried (2012 survey)
	19m		PL2643 & PL2644 at KP24.966 – KP24.985	Partially buried (2012 survey)
	28m		PL2643 & PL2644 at KP25.015 – KP25.043	Partially buried (2012 survey)
	25m		PL2643 & PL2644 at KP25.092 – KP25.117	Partially buried (2012 survey)
	18m		PL2643 & PL2644 at KP25.155 – KP25.173	Partially buried (2012 survey)
	360m		PL2643 & PL2644 at KP26.428 – KP26.788	Partially buried (2012 survey)
	4m		PL2643 & PL2644 at KP26.485 – KP26.481	Partially buried (2014 survey)
	20m		PL2643 & PL2644 at KP26.489 – KP26.509	Partially buried (2014 survey)
	270m		PL2643 & PL2644 at KP26.518 – KP26.788	Partially buried (2014 survey)
	107m		PL2643 & PL2644 at KP26.794 – KP26.901	Partially buried (2014 survey)
	10m		PL2643 & PL2644 at KP26.907 – KP26.917	Partially buried (2014 survey)
	7m		PL2643 & PL2644 at KP26.931 – KP26.938	Partially buried (2014 survey)
	109m		PL2643 & PL2644 at KP26.951 – KP 27.060	Partially buried (2014 survey)

Table 2.4a Subsea Pipeline Stabilisation Features – Viking associated pipelines				
Stabilisation Feature	**Total Number/ Length***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Bitumen / grout mattresses	None	-	-	-

Note * *The total number and weight for mattresses have been estimated from the visual survey data and based on a typical mattress size of 6m by 3m and weight of 6 Te. Grout bag and Rock Dump have also been estimated from visual survey data.*

Note ** *KP 0.00 is at the exporting end of the pipeline (Viking BD)*

Table 2.4b Subsea Pipeline Stabilisation Features – Vixen associated pipelines				
Stabilisation Feature	**Total Number***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Concrete mattresses	35	210	PL1767 & PL1768 at KP8.538 – KP8.571, KP8.592 – KP8.594 KP8.605 – KP8.633	Exposed (2014 survey)
Grout bags	None	-	-	-
Formwork	None	-	-	-
Frond mats	15	90	PL1767 & PL1768 at KP-0.041 – KP0.014, KP8.537 – KP8.538	Exposed (2014 survey)

Table 2.4b Subsea Pipeline Stabilisation Features – Vixen associated pipelines				
Stabilisation Feature	**Total Number***	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Rock Dump	101m		PL1767 & PL1768 at KP0.014 – KP0.115	Partially buried (2014 survey)
	66m		PL1767 & PL1768 at KP0.469 – KP0.535	Partially buried (2014 survey)
	12m		PL1767 & PL1768 at KP1.688 – KP1.700	Partially buried (2007 survey)
	8m		PL1767 & PL1768 at KP1.719 – KP1.727	Partially buried (2007 survey)
	5m		PL1767 & PL1768 at KP1.733 – KP1.738	Partially buried (2007 survey)
	20m		PL1767 & PL1768 at KP2.005 – KP2.025	Partially buried (2007 survey)
	38m		PL1767 & PL1768 at KP2.050 – KP2.088	Partially buried (2007 survey)
	17m		PL1767 & PL1768 at KP2.476 – KP2.493	Partially buried (2007 survey)
	32m		PL1767 & PL1768 at KP2.710 – KP2.742	Partially buried (2007 survey)
	16m		PL1767 & PL1768 at KP3.139 – KP3.155	Partially buried (2007 survey)
	12m		PL1767 & PL1768 at KP3.185 – KP3.197	Partially buried (2007 survey)
	4m		PL1767 & PL1768 at KP3.207 – KP3.211	Partially buried (2007 survey)
	188m		PL1767 & PL1768 at KP3.219 – KP3.407	Partially buried (2007 survey)
	15m		PL1767 & PL1768 at KP5.707 – KP5.722	Partially buried (2007 survey)
	41m		PL1767 & PL1768 at KP5.738 – KP5.779	Partially buried (2007 survey)
	37m		PL1767 & PL1768 at KP5.814 – KP5.851	Partially buried (2007 survey)
	51m		PL1767 & PL1768 at KP5.934 – KP5.985	Partially buried (2007 survey)
	178m		PL1767 & PL1768 at KP6.073 – KP6.251	Partially buried (2007 survey)
	55m		PL1767 & PL1768 at KP6.372 – KP6.427	Partially buried (2007 survey)
	61m		PL1767 & PL1768 at KP6.500 – KP6.561	Partially buried (2007 survey)
	65m		PL1767 & PL1768 at KP6.954 – KP7.019	Partially buried (2007 survey)
	5m		PL1767 & PL1768 at KP7.258 – KP7.263	Partially buried (2007 survey)
	40m		PL1767 & PL1768 at KP7.271 – KP7.311	Partially buried (2007 survey)
	48m		PL1767 & PL1768 at KP7.314 – KP7.362	Partially buried (2007 survey)
	18m		PL1767 & PL1768 at KP8.311 – KP8.329	Partially buried (2014 survey)
	197m		PL1767 & PL1768 at KP8.340 – KP8.537	Partially buried (2014 survey)
Bitumen / grout mattresses	None			

Note * *The total number and weight for mattresses have been estimated from the visual survey data and based on a typical mattress size of 6m by 3m and weight of 6 Te. Grout bag and Rock Dump have also been estimated from visual survey data.*

Note ** *KP 0.00 is at the exporting end of the pipeline (Viking BD)*

2.4 Wells

Table 2.5a Well Information - Viking			
Platform Wells	**Designation**	**Status**	**Category of Well**
49/17-12 (LD1)	Gas Production	P&A'd	PL 3-3-3
49/17-L02Z (LD2)	Gas Production	P&A'd	PL 3-3-3
49/12a-9 (BEIS) 49/12a-K1 (COP)	Gas Production	P&A'd	PL 3-3-3
49/12a-K2	Gas Production	P&A'd	PL 3-3-3
49/12a-K3	Gas Production	P&A'd	PL 3-3-3
49/12a-K4Z	Gas Production	P&A'd	PL 3-3-3
49/12a-K5	Gas Production	P&A'd	PL 3-3-3
KD Conductor Slot 4	N/A	N/A	N/A
49/12-A1	Gas Production	P&A'd	PL 3-3-3
49/12-A2	Gas Production	P&A'd	PL 3-3-3
49/12-A3	Gas Production	P&A'd	PL 3-3-3
49/12-A4	Gas Production	P&A'd	PL 3-3-3
49/12-A5	Gas Production	P&A'd	PL 3-3-3
49/12-A6	Gas Production	P&A'd	PL 3-3-3
49/12-A7	Gas Production	P&A'd	PL 3-3-3
49/12-A8	Gas Production	P&A'd	PL 3-3-3
49/12-A9	Gas Production	P&A'd	PL 3-3-3
49/12-A10	Gas Production	P&A'd	PL 3-3-3
49/17-B02	Gas Production	P&A'd	PL 3-3-3
49/17-B03	Gas Production	P&A'd	PL 3-3-3
49/17-B04A	Gas Production	P&A'd	PL 3-3-3
49/17-B05	Gas Production	P&A'd	PL 3-3-3
49/17-B07	Gas Production	P&A'd	PL 3-3-3
49/17-B08	Gas Production	Suspended. Conductor remains 13.5ft above mud line.*	PL 3-3-3
BD Conductor 1**	N/A	N/A	N/A
BD Conductor 2**	N/A	N/A	N/A
BD Conductor 3**	N/A	N/A	N/A
Subsea Wells	**Designation**	**Status**	**Category of Well**
0	N/A	N/A	N/A

Note * *Conductor will be removed during decommissioning and 500m zone will be subject to an overtrawl trial post platform removal*

Note ** *Conductor removed in 2016/17 P&A campaign*

Table 2.5b Well Information - Vixen			
Platform Wells	**Designation**	**Status**	**Category of Well**
0	N/A	N/A	N/A
Subsea Wells	**Designation**	**Status**	**Category of Well**
49/17 – 13Z	Gas Production	P&A'd	PL 3-3-3

For further details of well categorisation see OGUK guidelines for the Suspension or Abandonment of Wells –Issue 4 –July 2012.

2.5 Drill Cuttings

Table 2.6 Drill Cuttings Pile Information		
Location of Pile Centre (Latitude / Longitude)	**Seabed area (m^2)**	**Estimated volume of cuttings (m^3)**
None of the facilities have cuttings pile present	0	0

A 2013 Fugro survey (Fugro 2013c) found no evidence of cuttings piles from locations representative of the Viking area covered by these decommissioning programmes. The dynamic marine environment has resulted in the redistribution of drill cuttings.

2.6 Inventory Estimates

Table 2.7a Current Installation Material Functional Category Summary - Viking							
Installation	**Haz Mat / NORM Te**	**Concrete Te**	**Ferrous Metal Te**	**Non-Ferrous Metal Te**	**Plastics Te**	**Other Non-Haz Te***	**Total Te**
Viking BA	62	1	3103	12	0	28	3206
Viking BC	296	1	3719	8	0.2	59	4083
Viking BD	75	1	3070	12	0	93	3251
Viking BP	294	1	2101	10	0.01	141	2547
Viking AR	59	0	1767	0	0	106	1932
Viking KD	46	18	743	26	0	53	886
Viking LD	45	18	739	27	0	45	874
Total	**877**	**40**	**15242**	**95**	**0.21**	**525**	**16779**

Note* Weights exclude the estimated 227Te marine growth associated with all platform jackets

Table 2.7b Current Installation Material Functional Category Summary - Vixen							
Installation	**Haz Mat / NORM Te**	**Concrete Te**	**Ferrous Metal Te**	**Non-Ferrous Metal Te**	**Plastics Te**	**Other Non-Haz Te***	**Total Te**
Vixen VM Subsea Manifold	0	0	47	0	0	0	47
Total	**0**	**0**	**47**	**0**	**0**	**0**	**47**

Table 2.8a Pipeline and Mattress Material Functional Category Summary - Viking							
Pipeline No	**Description**	**Haz Mat / NORM** Te	**Concrete** Te	**Ferrous Metal** Te	**Non-Ferrous Metal** Te	**Plastics** Te	**Other Non-Haz** Te*
PL27	Viking AR to TGT Gas	2165	93021	40290	0	0	0
PL161	TGT to Viking AR MeOH	0	0	2059	0	30	0
PL88	Viking BP to Viking AR Gas	2668	6784	2533	0	0	0
PL134	Viking AR to Viking BP MeOH	0	0	166	0	2	0
PL1464	Viking KD Gas Riser on Viking BD	0	0	6	0	0	0
PL1465	Viking KD Methanol Riser on Viking BD	0	0	1	0	0	0
PL1571	Viking KD to Viking BD Gas	0	2354	1746	0	0	0
PL1573	Viking BD to Viking KD MeOH	0	0	322	0	0	0
PL1572	Viking LD to KD/LD pipeline tie-in tee Gas	0	11	8	0	0	0
PL1574	KD/LD pipeline tie-in tee to Viking LD MeOH	0	0	1	0	0	0
PL2643	Viking BP to LOGGS PR Gas	1	0	3355	0	78	0
PL2644	LOGGS PR to Viking BP MeOH	0	0	573	0	0	0
	Subsea tee between Viking LD and the Viking KD to Viking BD pipeline	0	0	2	0	0	0
	BD subsea valve skid between Vixen VM and Victoria SM (in close proximity to Viking BD)	0	0	38.5	0	0	0
	Mattresses	0	534	0	0	0	0
Total		**4834**	**102704**	**51101**	**0**	**110**	**0**

Note * *Weights exclude the calculated 257Te marine growth associated with all assets*

Table 2.8b Pipeline and Mattress Material Functional Category Summary - Vixen							
Pipeline No	**Description**	**Haz Mat / NORM** Te	**Concrete** Te	**Ferrous Metal** Te	**Non-Ferrous Metal** Te	**Plastics** Te	**Other Non-Haz** Te*
PL1767	Vixen VM to Viking BD Gas	1	0	857	0	15	0
PL1768	Viking BD to Vixen VM Umbilical	0	0	115	0	44	0
	Mattresses	0	300	0	0	0	0
Total		**1**	**300**	**972**	**0**	**59**	**0**

3. Removal and Disposal Methods

In line with the waste hierarchy, the re-use of an installation (or parts thereof) is first in the order of preferred decommissioning options considered.

Options considered for re-use of the Viking Hub and Satellites and Vixen Manifold were:

- Further Hydrocarbon production from development local to the satellites
- Relocation elsewhere to produce hydrocarbons
- Sale for reuse to others

No economic hydrocarbon developments local to any of the Viking Hub and Satellites were identified. The Viking Hub and Satellites are past their design life, require refurbishment and contain obsolete control systems and components. Their re-use would be uneconomic.

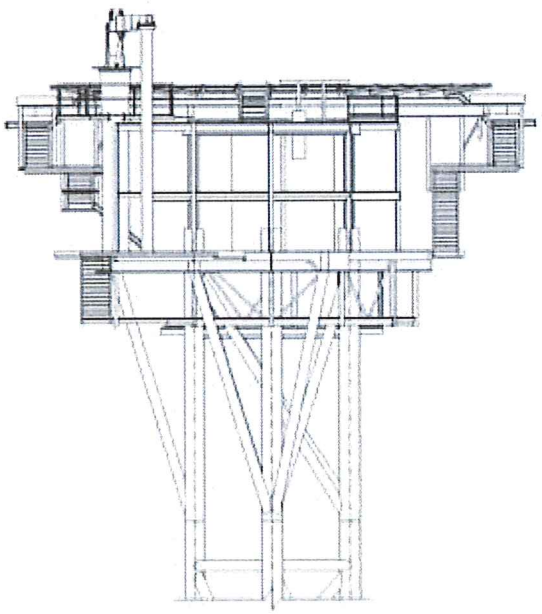
The selected option for the Viking Hub and Satellites is to remove, dismantle and dispose of them, ensuring a high level of material recycling.

3.1 Topsides

3.1.1 Topsides Descriptions

Viking KD

The Viking KD topsides are a minimal facility designed for use as a NUI. The facilities extend 29m above Lowest Astronomical Tide (LAT) to the Helideck. The Topsides weigh 446 Te, have a deck size of 25m by 15m and comprise of a wellbay, local equipment room, diesel power generation, pedestal crane and Helideck.



KD and LD Topsides Elevation

Figure 3.1.1 KD Topsides Elevation

Viking LD

The Viking LD topsides are a minimal facility designed for use as a NUI. The facilities extend 29m above LAT to the helideck. The Topsides weigh 451 Te have a deck size of 35m by 15m and comprise of a wellbay, local equipment room, diesel power generation, pedestal crane and Helideck.

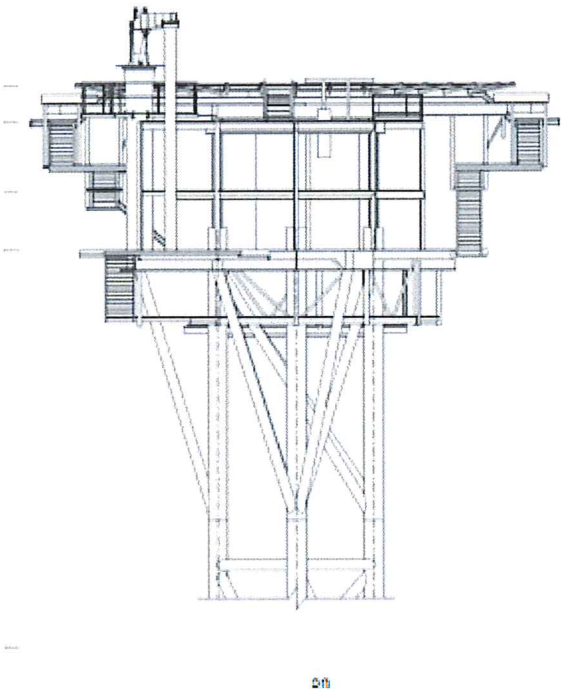


Figure 3.1.2 LD Topsides Elevation

Viking AR

The Viking AR topsides are a minimal facility designed for use as a NUI. The facilities extended 21m above LAT to the main deck. The Topsides weigh 1395Te have a deck size of 35m by 21m and comprise of a wellbay, test separator, gas driven compressor, local equipment room, gas power generation, pedestal crane and Helideck.

Figure 3.1.3 AR Topsides

Viking BA

The Viking BA topsides are a platform facility designed for accommodation to support the Viking Bravo Complex. The facilities extend 24m above LAT to the main deck. The Topsides weigh 2305 Te have a deck size of 39m by 32m and comprise of a wellbay, local equipment room, diesel power generation, pedestal crane and Helideck.

Figure 3.1.4 BA Topsides

Viking BC

The Viking BC topsides are a platform facility designed for power generation to support the Viking Bravo Complex and compression facilities to support gas export operations. The platform extends 24m above LAT to the main deck. The Topsides weigh 3376 Te have a deck size of 45m by 21m and comprise of a wellbay, local equipment room, diesel power generation and pedestal crane.

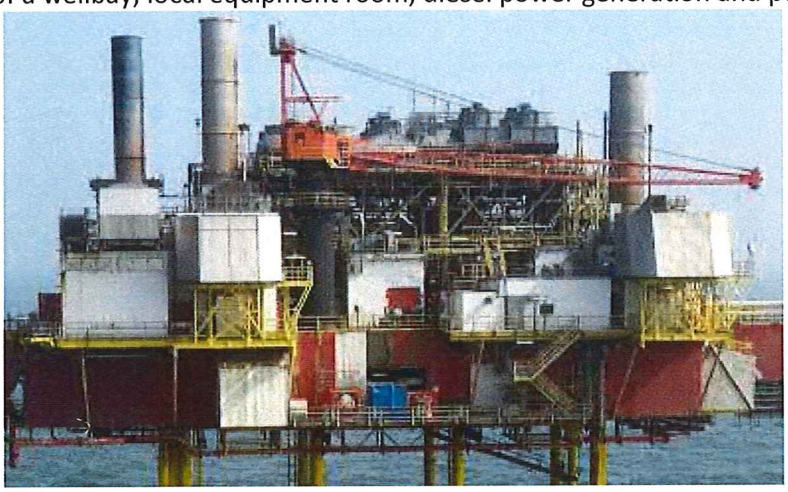


Figure 3.1.5 BC Topsides

Viking BP

The Viking BP topsides are a platform facility designed to process the Viking Area hydrocarbons which are then transported to TGT. The platform extends 24m above LAT to the main deck. The Topsides weigh 1782 Te have a deck size of 40m by 27m and comprise of a local equipment room, diesel power generation and pedestal crane.

Figure 3.1.6 BP Topsides

Viking BD

The Viking BD topsides are a platform facility designed for hydrocarbon production from the wells and is utilised to separate the hydrocarbons before entering the processing facilities on Viking BP. The platform extends 24m above LAT to the main deck. The Topsides weigh 2302 Te have a deck size of 42m by 20m.

Figure 3.1.7 BD Topsides

Preparation / Cleaning: Table 3.1 describes the methods that will be used to flush, purge and clean the topsides offshore, prior to removal to shore.

Table 3.1 Cleaning of Topsides for Removal		
Waste Type	**Composition of Waste**	**Disposal Route**
Hydrocarbons	Process fluids	Will be flushed, Nitrogen purged vented and made liquid free.
Produced solids	Sand, NORM	Any pipeline debris captured in filter packages, will be returned onshore for disposal. Any solids remaining in vessels will be removed and disposed of during the dismantlement of the Topsides onshore.
Diesel	Bunkered Diesel fuel	Bunkered Diesel will be drained and returned onshore for re-use or disposal.
Lubricating oils	Lubricants for equipment e.g. gearboxes, pumps, pedestal crane compressor skid	Lubricating oils will be drained and returned onshore for re-use or disposal.

3.1.2 Topsides Removal Methods

Given the size and combined weight of the Viking Hub and Satellites the Topsides and Jackets will be removed using multiple lifts.

Table 3.2 Topsides Removal Methods	
☑ 1) HLV (semi-submersible crane vessel) ☑ 2) Monohull crane vessel ☑ 3) SLV ☑ 4) Piece small ☑ 5) Other Simultaneous removal of Topsides with Jacket	
Methods Considered	**Description**
Single lift removal complete with Jacket by HLV / Monohull crane vessel / SLV	Removal of Topsides complete with Jacket in a single lift and transportation to shore for dismantlement, disposal and recycling.
Modular lift removal of Topsides by HLV / Monohull crane vessel / SLV	Removal of Topsides for transportation to shore for dismantlement, disposal and recycling.
Offshore removal "piece small" for onshore disposal	Removal of Topsides and dismantlement offshore for transportation onshore for disposal and recycling.
Proposed removal method and disposal route.	**KD and LD Topsides will be removed in one or more lifts.** **BA Topsides will be removed in one or more lifts (PLQ and topsides are expected to be lifted separately).** **BC Topsides will be removed in one or more lifts (the mezzanine deck and topsides deck are expected to be separate lifts).** **BP Topsides will be removed in one or more lifts.** **BD Topsides will be removed in one or more lifts.** **Transportation to shore for dismantlement, disposal and recycling.** **Trans-frontier shipments will not be required**

Note: ☑ Option Considered in Comparative Assessment

3.2 Jackets

There are 4 different jacket designs in these decommissioning programmes:

- The Viking BA Hub platform is of a 4 leg steel conventional design
- The Viking BC, BP and BD Hub platforms are of a similar 8 leg steel conventional design
- The jackets of the Viking KD and Viking LD Satellites are both of a three legged steel tripod design.
- The jacket for Viking AR is of a 6 leg steel conventional design

3.2.1. Jacket Decommissioning Overview

All jackets will be removed to 3m below the seabed. Given the small size of the jackets, they may be lifted with the topsides in a single lift.

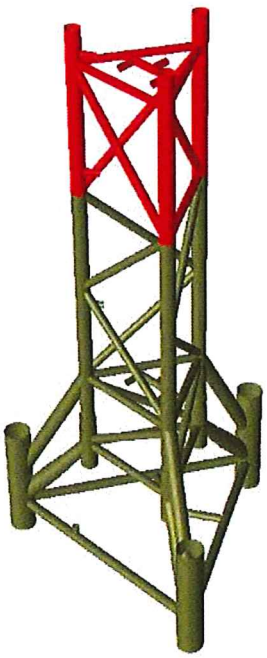


Figure 3.2.1 KD Jacket Elevation

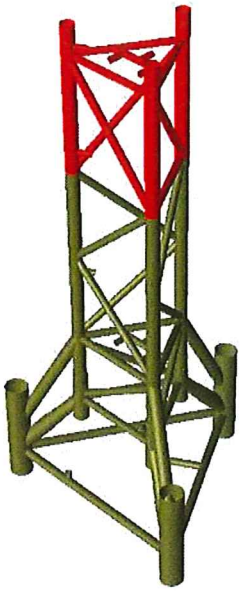


Figure 3.2.2 LD Jacket Elevation

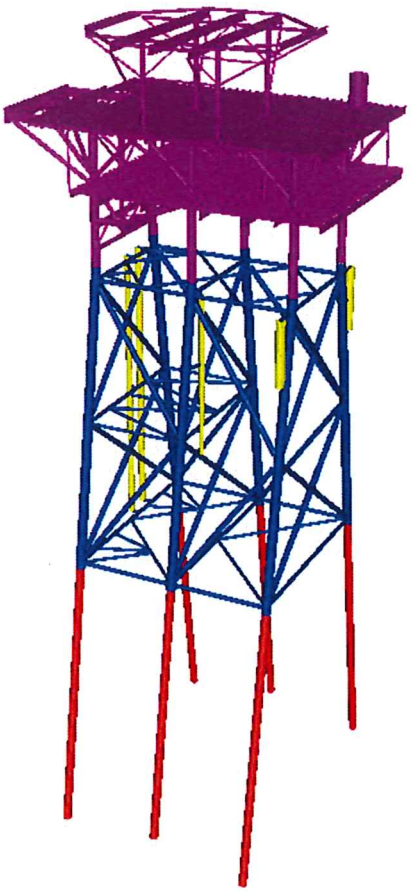


Figure 3.2.3 AR Jacket Elevation

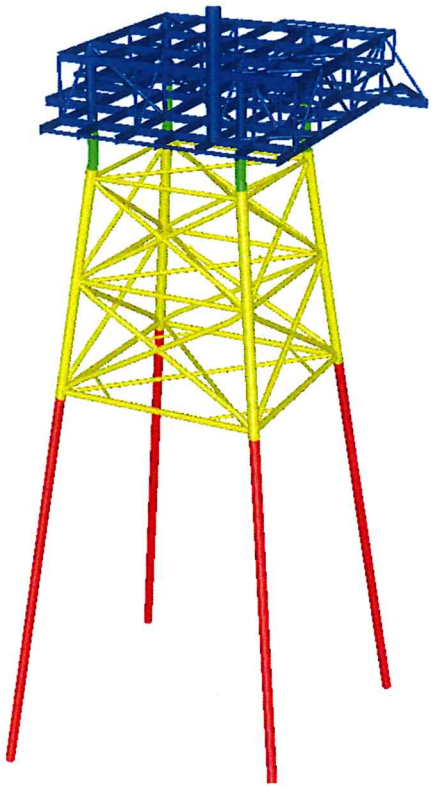


Figure 3.2.4 BA Jacket Elevation

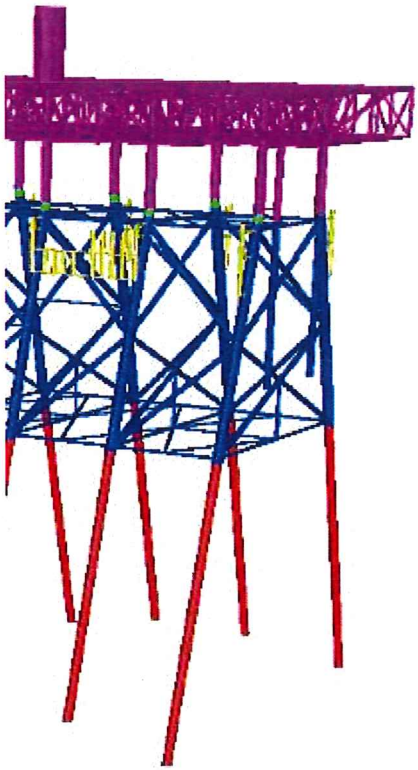


Figure 3.2.5 BC Jacket Elevation

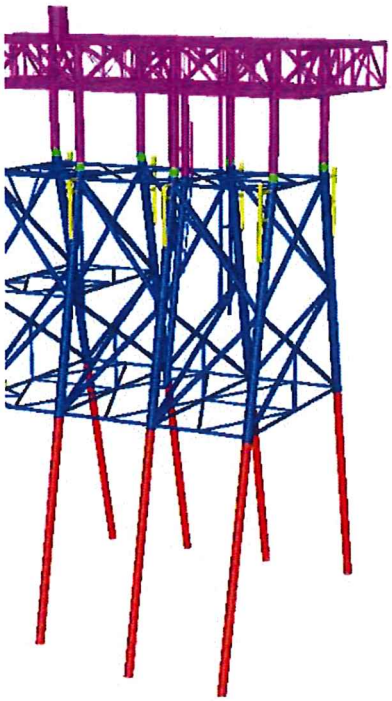


Figure 3.2.6 BP Jacket Elevation

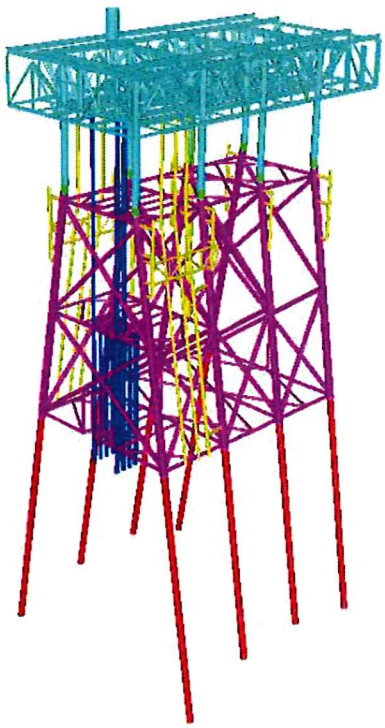


Figure 3.2.7 BD Jacket Elevation

3.2.2 Jacket Removal Methods

Table 3.3 Jacket Removal Methods	
☑ 1) HLV (semi-submersible crane vessel) ☑ 2) Monohull crane vessel ☑ 3) SLV ☑ 4) Piece small ☑ 5) Other Simultaneous removal of Topsides with Jacket	
Method	**Description**
Jacket Piles cut 3m below seabed and removed via single lift complete with Topsides by HLV / Monohull crane vessel / SLV	Jacket Piles cut 3m below seabed. Removal of Jacket complete with Topsides in a single lift and transportation to shore for dismantlement, disposal and recycling.
Jacket Piles cut 3m below seabed and removed via single lift by HLV / Monohull crane vessel / SLV	Jacket Piles cut 3m below seabed. Removal of Jacket in a single lift and transportation to shore for dismantlement, disposal and recycling.
Offshore removal "piece small" for onshore disposal	Jacket Piles cut 3m below seabed. Removal of Jacket and dismantlement offshore for transportation onshore for disposal and recycling.
Proposed removal method and disposal route.	**Jacket Piles cut 3m below seabed.** **Removal of Jackets complete using a single lift.** **Removal to be undertaken with a shear leg heavy lift vessel.** **Transportation to shore for dismantlement, disposal and recycling.** **Trans-frontier shipments will not be required**

Note: ☑ Option Considered in Comparative Assessment

3.3 Subsea Installations and Stabilisation Features

Table 3.4a Subsea Installations and Stabilisation features - Viking			
Subsea installations and stabilisation features	**Number**	**Option**	**Disposal Route**
Wellheads	0	None	None
Manifolds	0	None	None
Templates	0	None	None
Protection frames	0	None	None
SSIV	0	None	None
Concrete mattresses	0	None	None
Grout bags	0	None	None
Formwork	0	None	None
Frond mats	0	None	None
Rock dump	0	None	None
Other	0	None	None

Table 3.4b Subsea Installations and Stabilisation features - Vixen			
Subsea installations and stabilisation features	**Number**	**Option**	**Disposal Route**
Wellheads	1	Full Removal	Recycled
Manifolds*	1	Full Removal	Recycled
Templates	0	None	None
Protection frames*	1	Full Removal	Recycled
SSIV	0	None	None
Concrete mattresses	0	None	None
Grout bags	0	None	None
Formwork	0	None	None
Frond mats	0	None	None
Rock dump	0	None	None
Other	0	None	None

Note * *Manifold is integral to the Protection frame*

3.4 Pipelines

3.4.1 Pipeline Decommissioning Options

In recognition of the environmental sensitivities in the area where pipeline decommissioning will take place, supplementary information in support of the Comparative Assessment and associated information within these Decommissioning Programmes has been provided to BEIS. This information comprises pipeline as-laid status, trends in pipeline exposure, trends in pipeline burial depth and pipeline location in relation to sandbank features.

Table 3.5a: Pipeline or Pipeline Groups / Decommissioning Options - Viking

Pipeline or Group (as per PWA)	Condition of line / group	Whole or part of pipeline / group	Decommissioning Options considered*
PL27, PL161, PL88, PL134, PL1571, PL1573, PL1572, PL1574, PL2643, PL2644	Trenched, buried, spanning	Pipelines will be disconnected on seabed at Satellite end to facilitate Satellite Removal. Pipelines at Viking B Complex end will be disconnected as part of this decommissioning programme.	1, 2, 4, 5, 6, 7, 8, 9
PL1464, PL1465	Risers above seabed on Viking BD	Risers at Viking B Complex will be removed to shore with platform as part of this decommissioning programme.	Full Removal
Protection Frames	2 exposed protection frames: • Subsea tee between Viking LD and the Viking KD to Viking BD pipeline • BD subsea valve skid between Vixen VM and Victoria SM (in close proximity to Viking BD)	Complete removal. Removed and transported to appropriate land based facility for dismantlement, recycling and disposal.	None other

* Key to Options:

1) Remove – reverse reeling
2) Remove – Reverse S lay
3) Trench and bury
4) Remedial removal
5) Remedial trenching
6) Partial Removal
7) Leave in place
8) Other **
9) Remedial rock-dump

** Float and Tow i.e. expose pipelines and add buoyancy so that they can be floated and towed ashore for disposal and recycling

Table 3.5b: Pipeline or Pipeline Groups / Decommissioning Options - Vixen			
Pipeline or Group (as per PWA)	Condition of line / group	Whole or part of pipeline / group	Decommissioning Options considered*
PL1767, PL1768	Trenched, buried, spanning	Pipelines will be disconnected on seabed at subsea manifold end to facilitate subsea manifold removal. Pipelines at Viking B Complex end will be disconnected as part of this decommissioning programme.	1, 2, 4, 5, 6, 7, 8, 9

* Key to Options:

1) Remove – reverse reeling
2) Remove – Reverse S lay
3) Trench and bury
4) Remedial removal
5) Remedial trenching
6) Partial Removal
7) Leave in place
8) Other **
9) Remedial rock-dump

** Float and Tow i.e. expose pipelines and add buoyancy so that they can be floated and towed ashore for disposal and recycling

3.4.2 Comparative Assessment Method

A two phase process was used comprising of multidisciplinary workshops followed by the assessment compilation and option selection. The purpose of the comparative assessment was to identify the best overall option for decommissioning of each of the twelve pipelines included within the scope of the decommissioning programmes in view of the pipeline status, condition and environmental setting. Two risers (PL1464 and PL1465) were not subject to Comparative Assessment as they are to be removed with the Viking BD platform.

The independently chaired workshops comprised of an assessment of the technical feasibility and risk of major operations failure for all identified decommissioning options for the associated pipelines.

Initially 9 decommissioning options were identified and considered by ConocoPhillips for assessment of technical feasibility of the decommissioning of the infield pipelines; these included:

- Leave in situ minimum intervention
- Partial removal reverse lay
- Partial removal cut and lift
- Full removal reverse reel
- Full removal float and tow
- Leave in situ minor intervention
- Partial removal reverse reel
- Full removal reverse lay
- Full removal cut and lift

Note:

Leave in Situ Minimum Intervention entails: Post flushing, the remaining pipeline would be left in its current state, marked on sea charts and notifications issued to fishermen / other users of the sea. All mattresses would be left in situ in their current state to maintain pipeline stabilisation, minimise disturbance of the established environment and reduce the requirement for the introduction of new material to the SCI. Pipelines would be left open and flooded with seawater.

Leave in Situ Minor Intervention entails: Post flushing, the pipelines decommissioned in situ would be left in such a manner that they do not pose a risk to other users of the sea. Reasonable attempts to remove all mattresses would be undertaken where safe to do so. Pipelines would be left open and flooded with seawater.

The decommissioning options deemed to be technically feasible were carried forwards through the comparative assessment process and compared in terms of pre-defined selection criteria namely safety, environmental impacts, energy and atmospheric emissions, socio-economic impacts and cost.

Based on technical feasibility and the risk of major operations failure, the decommissioning options progressed to the second phase of the comparative assessment were reduced to six options comprising;

- Leave in situ minimum intervention
- Partial removal cut and lift
- Full removal reverse reel
- Leave in situ minor intervention
- Full removal reverse lay
- Full removal cut and lift

Table 3.6a: Outcomes of Comparative Assessment - Viking		
Pipeline or Group	**Recommended Option***	**Justification**
PL27, PL161, PL88, PL134, PL1571, PL1573, PL1572, PL1574, PL2643, PL2644	Option 7 Leave in place	Pipelines and mattress were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option. Rock-placement (max. 25Te per cut pipeline end) on the cut pipeline ends only.

*Key to Options:

1) Remove – reverse reeling
2) Remove – Reverse S lay
3) Trench and bury
4) Remedial removal
5) Remedial trenching
6) Partial Removal
7) Leave in place
8) Other**
9) Remedial rock-dump

** Float and Tow i.e. expose pipelines and add buoyancy so that they can be floated and towed ashore for disposal and recycling

During the pipeline flushing campaign, PL161 was found to be damaged and fluids could not flush through the pipeline to remove the methanol. ConocoPhillips is in consultation with BEIS on the cleaning of PL161. The remaining inventory in PL161 is to be managed in accordance with the offshore chemical regulations and any discharge to the marine environment will be risk assessed and made in accordance with permit conditions.

A subsea inspection survey conducted on the PL134 methanol pipeline from Viking AR to Viking BP in 2016 identified structural damage on the pipeline between KP3.841 and KP4.102 where the pipeline was found to have been severed and displaced away from its original route/ corridor. A risk assessment concluded that the damaged area of the pipeline does not pose a risk to the environment or to the safety of other users of the sea which required remediation. The location of the damage was reported to the Kingfisher Information System for upload to the FishSAFE database. A subsequent inspection in 2017 has determined that part of the span has broken off resulting in an exposed span of approximately 90m in length and a detached section of approximately 230m in length. The additional damage was reported to the Kingfisher Information System for upload to the FishSAFE database and the decision was taken to remove the detached and exposed pipeline sections in the 2018 subsea campaign. 24 Te of rock will be placed on the exposed cut end.

Table 3.6b: Outcomes of Comparative Assessment - Vixen		
Pipeline or Group	**Recommended Option***	**Justification**
PL1767, PL1768	Option 7 Leave in place	Pipelines and mattress were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option. Rock-placement (max. 25Te per cut pipeline end) on the cut pipeline ends only.

*Key to Options:

1) Remove – reverse reeling
2) Remove – Reverse S lay
3) Trench and bury
4) Remedial removal
5) Remedial trenching
6) Partial Removal
7) Leave in place
8) Other**
9) Remedial rock-dump

** Float and Tow i.e. expose pipelines and add buoyancy so that they can be floated and towed ashore for disposal and recycling

ConocoPhillips have risk assessed and understand the risk and consequences of decommissioning pipelines in situ.

3.5 Pipeline Stabilisation Features

Table 3.7a Pipeline Stabilisation features - Viking			
Stabilisation features	**Number**	**Option**	**Disposal Route**
Concrete mattresses	86	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Grout bags	9m length	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Formwork	None	N/A	N/A
Frond mats	3	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Rock placement	4440m length	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Other			

*Leave in situ

Table 3.7b Pipeline Stabilisation features - Vixen			
Stabilisation features	**Number**	**Option**	**Disposal Route**
Concrete mattresses	35	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Grout bags	None	N/A	None required*
Formwork	None	N/A	N/A
Frond mats	15	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Rock placement	1330m length	Pipelines and mattresses were subject to a formal comparative assessment which concluded that in situ decommissioning with minimum intervention was the preferred option	None required*
Other			

Note * *Leave in situ*

3.6 Wells

Table 3.8: Well Plug and Abandonment
The Viking and Vixen wells have been plugged and abandoned using a Mobile Offshore Drilling Rig. A Master Application Template (MAT) and the supporting Subsidiary Application Templates (SATs) have been submitted in support of all well plug and abandonment activities.

3.7 Drill Cuttings

3.7.1 Drill Cuttings Decommissioning Options

Not applicable. A 2013 Fugro survey (Fugro 2013c) found no evidence of cuttings piles around the Viking Hub or Satellites.

3.8 Waste Streams

Table 3.9 Waste Stream Management Methods	
Waste Stream	**Removal and Disposal method**
Bulk liquids	Pipeline flushing fluids will be injected into redundant gas production wells. Bulk liquids removed from vessels and transported to shore. Vessels and pipework will be drained prior to removal to shore and shipped in accordance with maritime transportation guidelines. Bulk fluids taken onshore for handling at the appropriately permitted facilities prior to onshore treatment and disposal.
Marine growth	To be taken onshore with the infrastructure identified for removal for handling at the appropriately permitted disposal yard prior to onshore disposal.
NORM	To be taken onshore with the infrastructure identified for removal and decontamination at the appropriately permitted disposal yard prior to onshore disposal. NORM not removed as part of pipeline cleaning will be left in situ and is considered to have a negligible impact on the receiving marine environment (ES Section 11).
Asbestos	To be taken onshore with the infrastructure identified for removal for handling at the appropriately permitted disposal yard prior to onshore disposal.
Other hazardous wastes	To be taken onshore with the infrastructure identified for removal for handling at the appropriately permitted disposal yard prior to onshore disposal.
Onshore Dismantling sites	Appropriately permitted sites will be selected through the ConocoPhillips procurement process. Disposal yard selection has not yet concluded however the selection process will consider the suitability of the facility, systems in place for the safe and efficient segregation and storage of waste in accordance with operational site permits, proven materials re-use and recycling performance including the use of innovative materials management practices to minimise the quantity of materials disposed of. Trans-frontier shipment of waste will not be required.

Table 3.10a Inventory Disposition - Viking			
	Total inventory Tonnage	**Planned Tonnage to shore***	**Planned Tonnage Decommissioned in situ**
Installations	18404	16778	1626 (Below Mudline)
Pipelines	158175	0	158175**
Subsea Tees	40.5	40.5	0
Mattresses	534	0	534

Note * *Excludes 227Te marine growth associated with the installation jackets and weight*

Note ** *Conservative estimate: Includes the tonnage of the spool piece which will be removed between the platform and the touch down point on the seabed to provide clearance for the removal of the installations.*

Table 3.10b Inventory Disposition - Vixen			
	Total inventory Tonnage	**Planned Tonnage to shore**	**Planned Tonnage Decommissioned in situ**
Installations	-	-	-
Pipelines	1032	0	1032***
Subsea Manifold	47	47	0
Mattresses	300	0	300

Note *** *Conservative estimate: Includes the tonnage of the spool piece which will be removed between the platform and the touch down point on the seabed to provide clearance for the removal of the installations.*

It is not currently possible to predict the market for re-usable materials with confidence however there is a target that >95% of the materials will be recycled.

In accordance with the ConocoPhillips Corporate Waste Management Standard, all facilities receiving waste are to be approved by the Company prior to use. Approval requires a favourable assessment of a waste facility's ability to avoid environmental harm through protective designs, operations, monitoring, financial integrity and institutional controls. Post approval, the facility will be audited to confirm operations are undertaken within the conditions of associated site permits and to confirm its ongoing suitability for continued use and to identify opportunities for improvement.

ConocoPhillips will collaborate with the operator of the waste facility to communicate the proposed consignment of the waste to the local regulatory authority in accordance with the site permits.

4. Environmental Impact Assessment

4.1 Environmental Sensitivities (Summary)

Table 4.1: Environmental Sensitivities (Summary)	
Environmental Receptor	**Main Features**
Conservation interests	**Special Areas of Conservation (SAC), Sites of Community Interest (SCI) and Candidate SACs (cSACs)** The VDP2 decommissioning areas are located within the following SACs and cSAC (ES Section 4.3): • The North Norfolk Sandbanks and Saturn Reef SAC designated for the Annex I sandbanks that are slightly covered by water all the time and Sabellaria spinulosa biogenic reef habitats. Annex I habitats sandbanks occurring within this SAC radiate northeast parallel to the Norfolk coast. The sandbanks typically have fields of sand waves associated with them, the amplitude of which decreases with distance from the shore. • Inner Dowsing, Race Bank and North Ridge SAC designated for the Annex I sandbanks which are slightly covered by seawater all the time and Sabellaria spinulosa reef habitats. • Southern North Sea cSAC identified as an area of importance for harbour porpoise (Phocoena phocena) populations. In addition, there are two inshore SACs with marine components and one inshore SAC designated for qualifying marine habitats or species in the vicinity of TGT. These SACs are: • Saltfleetby – Theddlethorpe Dunes & Gibraltar Point inshore. SAC. • Humber Estuary inshore SAC with marine components • The Wash and North Norfolk Coast inshore SAC with marine components. **Special Protection Areas (SPAs)** The VDP2 export pipeline crosses the Greater Wash marine SPA, newly designated in the offshore UK waters classified for breeding and non-breeding Annex I bird populations and the Humber Estuary coastal SPA, classified for breeding and overwintering Annex I bird populations, on the shore approach. **Marine Conservation Zones (MCZs)** There are no designated, proposed or recommended MCZs located within the VDP2 decommissioning area (ES Section 4.3).

Table 4.1: Environmental Sensitivities (Summary)	
Environmental Receptor	**Main Features**
Seabed	The seabed in the vicinity of the Viking and Vixen infrastructure comprises of ripples and sand formations. The sediments are comprising of fine to course sands, often silty with variable amounts of shell fragments and occasional pebbles and cobbles. The highly dynamic marine environment restricts the silt and clay content to less than 15% (Fugro, 2013a and 2013b) (ES Section 4.1.2). There is no evidence of bedrock, pockmarks or unusual or irregular bedforms. Surficial seabed sediments at the shoreline approaches of PL27 and PL161 are comprised of gravelly sand and sandy gravel, with the latter being located towards the 12nm limit from the Lincolnshire coastline. These Holocene derived sediments overlay bedrock primarily composed of chalk. Dominant taxa within the Viking AR area and wider Viking and Vixen area are typical of the mobile sands and coarser sediments present across the decommissioning area, namely characterised by the polychaetes *Ophelia borealis*, *Nephtys cirrosa*, several species of *Spio* and crustacean from the genera *Bathyporeia* and *Urothoe*. There is a high probability of *Sabellaria spinulosa* across the region. There was evidence in the Fugro (2013a and 2013b) reports of patches of Sabellaria spinulosa, however this was sparse and fragmented. The spatial extent of these aggregations was limited with low elevations above the seabed and as such do not fit the criteria to be considered as Sabellaria spinulosa reef (ES Section 4.2.1).
Fish	The Viking and Vixen infrastructure is located within the spawning grounds of mackerel, cod, whiting, plaice, lemon sole, sole, sandeel, sprat and Nephrops. The plaice spawning area within the vicinity of the decommissioning infrastructure is considered to be part of an important spawning area for the species, with a relative high intensity spawning recorded from the International Council for the Exploration of the sea (ICES) fish survey data. The infrastructure also lies within the nursery grounds for anglerfish, spurdog, thornback ray, mackerel, herring, cod, haddock, whiting, plaice, lemon, sole, sandeel, Nephrops, tope shark, Norway pout, sprat and horse mackerel. Data suggests the probable presence of Age 0 group fish defined as fish in the first year of their lives or those that can be classified as juveniles (ES Section 4.2.2).

Table 4.1: Environmental Sensitivities (Summary)	
Environmental Receptor	**Main Features**
Fisheries	Fishing activity in the Viking and Vixen area is described as moderate to low. The Viking and Vixen installations are primarily located in the International Council for the Exploration of the sea (ICES) rectangles 35F2 and 36F2, while the export pipelines PL27 and PL161 are located in the four rectangles (35F0, 35F1, 35F2 and 36F2). There are 11 different methods of commercial fishing recorded from these ICES rectangles. In the offshore Viking and Vixen area commercial fishing is mainly from demersal and beam trawlers. Vessel Monitoring Satellite data indicates a geographical split in terms of fishing types along the export pipelines with fishing grounds targeted by potters (creel vessels) from the shore to approximately 65 km and primarily demersal and beam trawlers beyond the 65 km distance. Within a 50km radius of the offshore Viking and Vixen infrastructure, fishing vessels are mainly from the Netherlands comprising of beam trawlers fishing for demersal species including plaice. However, there is a shift to electric beam trawl gear which requires a clean seabed; as a result, fewer vessels are fishing near the current infrastructure (ES Section 5.1).
Marine Mammals	The main cetacean species occurring in the Viking and Vixen area include white-beaked dolphin, white-sided dolphin and harbour porpoise. Additional species observed in the surrounding area include minke whale, long-finned pilot whale, bottlenose dolphin and common dolphin. Pinnipeds sighted in the area include grey seals and harbour or common seals. Grey seals may travel past the infrastructure towards foraging grounds, but densities generally reduce with distance offshore. Harbour seals are more likely to be sighted further offshore; travelling to this area from haul-out sites in The Wash to forage for food (ES Section 4.2.4).

Table 4.1: Environmental Sensitivities (Summary)	
Environmental Receptor	**Main Features**
Birds	Seabirds found in the offshore North Sea waters include fulmars, gannets, auk, gulls and terns, while coastal regions accommodate their breeding colonies. The Norfolk coast accommodates one of the most important breeding areas for waders, featuring estuarine shingle structures and beaches, sand dunes and salt marshes. Offshore areas of the North Sea contain peak numbers of seabirds following the breeding season and through winter, with birds tending to forage closer to coastal breeding colonies in spring and early summer. The East Inshore and East Offshore Marine Plans (MMO, 2015) indicate a clear seasonality in seabird density within the decommissioning area. Summer density is typically less than 5 seabirds per km2 offshore, increasing to 5 to 10 seabirds per km2 towards the PL27 and PL161 pipeline landfalls. Winter density is typically less than 5 seabirds per km2 offshore, increasing to 10 to 20 seabirds per km2 towards the PL27 and PL161 pipeline landfalls Across the decommissioning area, the overall seabed vulnerability to surface pollution is classified as moderate. In the waters closest to shore periods of high to very high seabird vulnerability to oil pollution occurs during February, April and August to December. For the remainder of the year, seabird vulnerability ranges from moderate to low. In the areas further offshore, periods of high to very high seabird vulnerability to oil pollution generally occurs during February to April and August to December, with moderate to low vulnerability occurring throughout the remainder of the year (ES Section 4.2.3)
Onshore Communities	An onshore decommissioning facility will be used that complies with all relevant permitting and legislative requirements.
Other Users of the Sea	**Shipping** Shipping density in the area of the infrastructure to be decommissioned ranges from very low to high. The main contributing factor of very high vessel density in the area closer to shore is the number of large international ports within the region including Hull, Immingham, Grimsby and Great Yarmouth (ES Section 5.4). **Oil & Gas Industry** The infrastructure is located in the SNS gas basin which is densely populated by various installations. See table 1.6 for a list of adjacent facilities. **Offshore Renewables** Three wind farms are consented in the vicinity of the infrastructure to be decommissioned. The Race Bank wind farm (Blocks 47/24 and 47/25) is located 2.2 km south from the export pipelines (PL27 and PL61). The Dudgeon wind farm (Block 48/22 and 48/23) located 5.6 km from the export pipelines and the Triton Knoll wind farm (Blocks 47/14, 47/15, 47/19 and 47/20) is located 5.6 km north from the export pipeline.

Table 4.1: Environmental Sensitivities (Summary)	
Environmental Receptor	**Main Features**
	Furthermore, the Hornsea Project 1 Transmission Asset (OFTO) Wind Farm export cable, within Blocks 47/17 and 47/18 is currently under construction and is within the vicinity of the export pipeline (ES Section 5.3).
Atmosphere	Local atmospheric emissions arise from the Viking and Vixen operations, vessel use and nearby oil and gas facilities (ES Section 8).

4.2 Potential Environmental Impacts and their Management

4.2.1 Environmental Impact Assessment Summary

The potential environmental impacts associated with the Viking and Vixen decommissioning activities have been assessed and it is concluded that the proposed decommissioning of the Viking and Vixen infrastructure can be completed without causing significant adverse impact to the environment. The results of the Environmental Impact Assessment (EIA) will be reported in an Environmental Statement (ES) accompanying the Decommissioning Programmes.

The ES identifies potential environmental impacts by identifying interactions between the proposed decommissioning activities and the associated environmental receptors. The ES also describes the proposed mitigation measures designed to avoid or reduce the identified potential environmental impacts and how these will be managed in accordance with ConocoPhillips's Environmental Management System (EMS) while considering responses from stakeholders.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
Topsides Removal	Energy use and atmospheric emissions (ES Section 8)	All engines, generators and combustion plant on the vessels will be well maintained and correctly operated to ensure that they are working efficiently to minimise energy use and gaseous emissions. Vessel operations will be minimised where practical.
	Underwater noise (ES Section 9)	A noise assessment has been completed to determine the likely impact of noise generated by the proposed operations on marine mammals in the surrounding area. The results of the assessment will be used during the planning of vessel operations.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	Accidental hydrocarbon release (ES Section 13)	Hydrocarbon inventories are to be removed from the topsides prior to commencing removal operations. The SNS Oil Pollution Emergency Plan has been updated in agreement with BEIS to include all planned decommissioning operations.
Jacket Removal	Energy use and atmospheric emissions (ES Section 8)	All engines, generators and combustion plant on the vessels will be well maintained and correctly operated to ensure that they are working efficiently to minimise energy use and gaseous emissions. Vessel operations will be minimised where practical.
	Underwater noise (ES Section 9)	A noise assessment has been completed to determine the likely impact of noise generated by the proposed operations on marine mammals in the surrounding area. The results of the assessment will be used during the planning of vessel operations. There is no intention to use underwater explosives during these activities.
	Accidental hydrocarbon release (ES Section 13)	The SNS Oil Pollution Emergency Plan has been updated in agreement with BEIS to include all planned decommissioning operations.
	Seabed disturbance and loss of habitat (ES Section 10)	The decommissioning operations will be carefully designed and executed so as to minimise the area of seabed that will be disturbed. Loss of habitat through the introduction of new material to the marine environment is to be avoided or minimised throughout the proposed operations.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
Subsea Installation Removal	Energy use and atmospheric emissions (ES Section 8)	All engines, generators and combustion plant on the vessels will be well maintained and correctly operated to ensure that they are working efficiently to minimise energy use and gaseous emissions. Vessel operations will be minimised where practical.
	Underwater noise (ES Section 9)	A noise assessment has been completed to determine the likely impact of noise generated by the proposed operations on marine mammals in the surrounding area. The results of the assessment will be used during the planning of vessel operations. There is no intention to use underwater explosives during these activities.
	Accidental hydrocarbon release (ES Section 13)	The SNS Oil Pollution Emergency Plan has been updated in agreement with BEIS to include all planned decommissioning operations.
	Seabed disturbance and loss of habitat (ES Section 10)	The decommissioning operations will be carefully designed and executed so as to minimise the area of seabed that will be disturbed. Loss of habitat through the introduction of new material to the marine environment is to be avoided or minimised throughout the proposed operations.
Decommissioning Pipelines	Energy use and atmospheric emissions (ES Section 8)	All engines, generators and combustion plant on the vessels will be well maintained and correctly operated to ensure that they are working efficiently to minimise energy use and gaseous emissions.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	Underwater noise (ES Section 9)	A noise assessment has been completed to determine the likely impact of noise generated by the proposed operations on marine mammals in the surrounding area. The results of the assessment will be used during the planning of vessel operations.
	Seabed disturbance and loss of habitat (ES Section 10)	The operations to remove the pipeline ends will be carefully designed and executed so as to minimise the area of seabed that will be disturbed. Loss of habitat through the introduction of new material to the marine environment is to be avoided or minimised throughout the proposed operations. The resulting rock berm profile will be overtrawlable.
	Discharges to sea (ES Section 11)	The pipelines will be flushed prior to cutting of the pipeline ends. A chemical risk assessment will be undertaken and operations permitted under the Offshore Chemicals Regulations 2002 (as amended). Hydrocarbon discharges during subsea pipeline disconnect operations will be permitted under the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended). Residual hydrocarbons, scale and sediments will be released gradually after through-wall corrosion occurs and the integrity of the pipelines progressively fails. Through-wall degradation is anticipated to begin to occur after many decades (i.e. 60 – 100 years). Pathways from the pipelines to the receptors would be via the interstitial spaces in seabed

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
		sediments, overlying rock placement where applicable and the water column. Release would therefore be gradual and prolonged such that the effects on the receiving marine environment are considered to be negligible (ES Section 11.5.2). The remaining inventory in PL161 is to be managed in accordance with the offshore chemical regulations and any discharge to the marine environment will be risk assessed and made in accordance with permit conditions.
Decommissioning Stabilisation Features	Snagging hazard of stabilisation feature associated with pipeline	Pipelines decommissioned in situ will continue to be shown on Navigational charts. Stabilisation features associated with pipeline remain in situ. Full overtrawlability survey in 500m zone where stabilisation features predominantly exist. Stabilisation features inherently overtrawlable by design.
Decommissioning Drill Cuttings Piles	No drill cuttings piles present	No drill cuttings piles present.

Note: The overtrawlability surveys within the Viking Bravo 500m zone will be conducted at the time of decommissioning the Viking Bravo facilities.

5. Interested Party Consultations

Note Section 5 to be populated post consultation.

Table 5.1 Summary of Stakeholder Comments		
Stakeholder	**Comment**	**Response**
Statutory Consultees (NFFO, SFF, NIFPO)	NFFO: The previous concern raised by the Federation on the amount of rock placement originally proposed was alleviated and The Federation has no further comments to add regarding the proposed decommissioning of these assets.	Comments Noted
Statutory Consultees (GMS)	- GMG have no objections to the decommissioning methodologies or the proposal to leave the pipelines in situ. - Tampnet owned NSC-1 passes nearby and it is recommended that they are contacted. - Additional cables may be installed, or repairs taking place in the vicinity at the time the decommissioning is undertaken, and I would ask that details and timings of works are published in the Kingfisher fortnightly bulletin to ensure that any cable owner undertaking works nearby can take this into consideration. - There may be other subsea cables in the area –both in service or out of service, and any owners should be identified and contacted if there is likely to be a conflict between them and any decommissioning activities.	Comments Noted
Other (VisNed)	No comments received.	N/A
Public	Although VisNed are not a statutory consultee their views were obtained during stakeholder engagement in 2017 and no issues were raised.	N/A

6. Programmes Management

6.1 Project Management and Verification

ConocoPhillips has established a UK Decommissioning organisation as a department to manage and execute decommissioning projects. ConocoPhillips existing processes for Operations, Planning, Project Management, Procurement, Health Safety and Environment, will be used and tailored to meet the specific requirements of decommissioning projects. ConocoPhillips will manage all permitting, licences, authorisations, notices, consents and consultations.

Any changes to this decommissioning document will be discussed and agreed with BEIS.

6.2 Post-Decommissioning Debris Clearance and Verification

A post decommissioning site survey will be carried out around a 500m radius of installation sites of each Viking Satellite, the Viking hub and the Vixen subsea manifold. Oil and Gas seabed debris will be recovered for onshore disposal or recycling in line with existing disposal methods. The BD skid and LD tee piece are within the platform 500m zones and hence will be overtrawled as part of the Viking BD platform (BD skid) and Viking LD (LD tee piece) decommissioning activities.

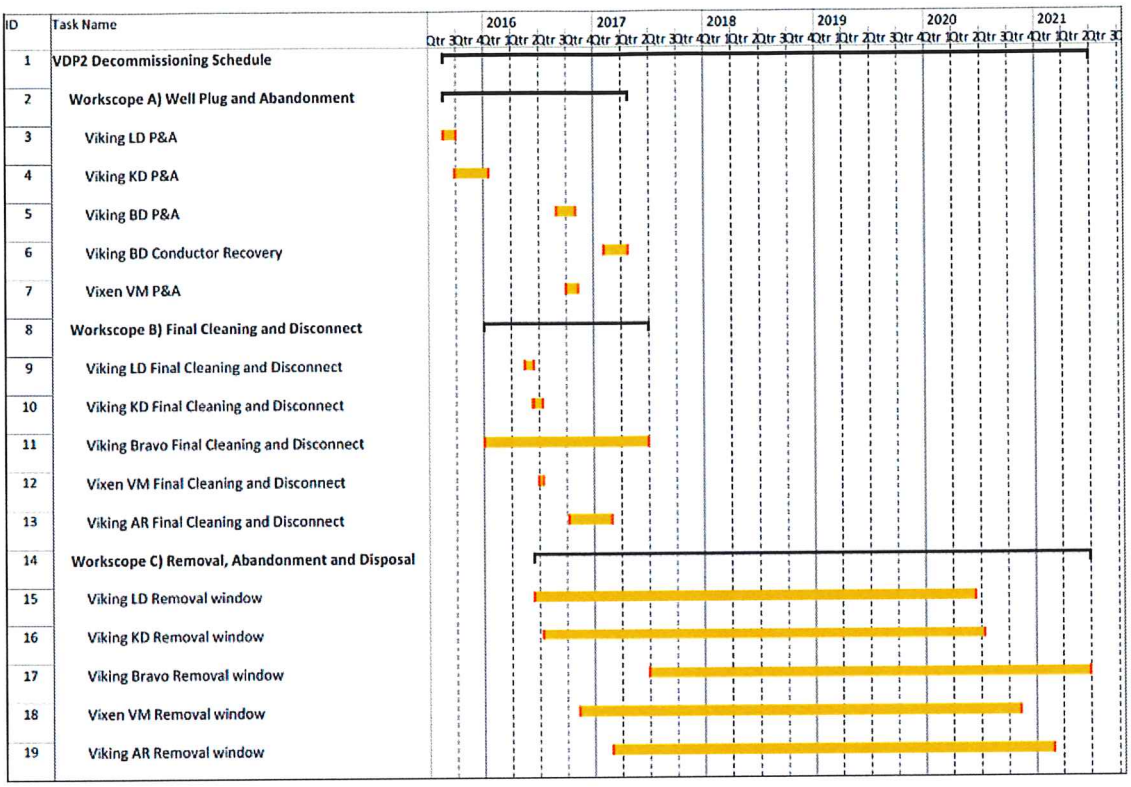
Independent verification of seabed state will be obtained by trawling the platform area of each previously occupied Viking platform and Vixen subsea manifold. This will be followed by a statement of clearance to all relevant governmental departments and statutory consultees.

Based on the findings from the Comparative Assessment the Decommission in situ – minimum intervention is the preferred pipeline decommissioning option for VDP2. The evaluation criteria which contributed to the conclusions were safety, environment and cost. The location of the installations and pipelines in the North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (SAC) and Southern North Sea Candidate Special Area of Conservation (cSAC) contributed to the scoring and results.

The chosen pipeline decommissioning methodology is to place rock on cut pipeline ends at the platforms and the subsea tee. The pipelines and mattresses are to be left in situ to minimise the disturbance to the established environment and reduce the requirements for the introduction of new material to the North Norfolk Sandbanks and Saturn Reef SAC. Oil and gas debris activity and verification along the remaining pipeline corridor of the pipeline sections not subject to actual decommissioning works, will be carried out in accordance with BEIS guidance in operation at the time those activities commence. This activity will reflect the environmental setting of the North Norfolk Sandbanks and Saturn Reef SAC.

The outcomes of the overtrawl and the alternative survey methods will be reported in the Close Out Report.

6.3 Schedule



Note: This is an indicative schedule and is subject to change based on technical, market, and commercial, factors.

Figure 6.1: Gantt Chart of Project Plan

6.4 Costs

Table 6.1 – Provisional Decommissioning Programmes costs, £mm*												
Asset Name	TOTAL	Operator Project Management	Facility Running/ Owner Costs	Wells Abandonment	Facilities/ Pipeline Making Safe	Topsides Preparation	Topsides Removal *	Sub-structure Jacket Removal	Topside and sub-structure Onshore Recycling	Subsea Infrastructure (pipelines, umbilicals, mattresses, SSIV)	Site Remediation	Monitoring
Viking LD												
Viking KD												
Viking AR and trunkline												
Viking Bravo & new VTS pipeline												
Vixen VM												
VDP2 Total												

Note: *Provisional estimate subject to change based on technical, market, and commercial, factors.*

Note * *An estimate of the overall cost has been provided separately to BEIS.*

6.5 Close Out

In accordance with BEIS guidelines a close out report will be submitted to BEIS within 12 months of completion of the offshore decommissioning scope covered by this decommissioning document. The close out report will contain debris removal and independent verification of seabed clearance, the first post-decommissioning environmental survey and explanation of any variations to the approved Decommissioning Programmes.

6.6 Post Decommissioning Monitoring and Evaluation

A post decommissioning environmental seabed survey will be carried out in the Viking and Vixen areas once the offshore decommissioning work scope covered by this decommissioning document has been completed. The survey will include seabed sampling to monitor levels of hydrocarbons, heavy metals and other contaminants to allow for a comparison with the results of the pre-decommissioning survey.

Results of this survey will be available once the decommissioning document work scope is complete.

PIPELINE RISK BASED MONITORING PROGRAMME

All pipeline systems covered within this Decommissioning Document scope will be subject to survey. The post decommissioning pipeline (and associated stabilisation features) monitoring programme, to be agreed with BEIS, will:

- Begin with an initial baseline survey covering the full length of each pipeline;
- Be followed by a risk based assessment for each pipeline (and associated stabilisation materials) which will inform the minimum agreed extent and frequency of future surveying. This will take account of pipeline burial, exposure and spanning data derived from the initial baseline survey, all available historical survey information and fisheries impact assessment;
- Provide a report of each required survey (with analysis of the findings, the impact on the risk based assessment and identification of the proposed timing of the next survey in accordance with the agreed RBA approach), for discussion and agreement of BEIS;
- Include provision for remediation in the framework where such a requirement is identified. Appropriate remediation will be discussed and agreed with BEIS;

- Where remediation has been undertaken, a follow up survey of the remediated section(s) will be required;
- In the event of a reported snagging incident on any section of a pipeline, the requirement for any additional survey and/or remediation, will be discussed and agreed with BEIS;
- Will include a further fisheries impact assessment following completion of the agreed survey programme;
- Monitoring will become reactive following completion of the agreed survey programme and BEIS agreement of the analysis of the outcomes;
- Require pipeline information to be recorded on Navigation charts and FishSAFE.

The monitoring programme will also include discussion with BEIS of the long-term pipeline degradation and potential risk to other users of the sea following conclusion of the planned survey programme.

7. Supporting Documents

Table 7.1 : Supporting Documents

Document Number	Title
BMT-SNS-V-XX-X-HS-02-00003	Environmental Statement For SNS Decommissioning Programmes VDP2 & VDP3
BMT-SNS-V-XX-X-HS-02-00012	Comparative Assessment Report for the Viking VDP2 and VDP3 Pipelines and Associated Mattresses
J/1/20/2342	Fugro EMU Limited, 2013. Decommissioning Environmental Survey Report Viking AR, Viking CD & Viking GD
J/1/20/2342-3	Fugro EMU Limited, 2013. Habitat Assessment Report Viking AR, Viking CD & Viking GD

8. Partner Letters of Support

bp

Jessica Howe

Decommissioning Business Manager
North Sea

Britoil plc
North Sea Headquarters
1 Wellheads Avenue
Dyce
Aberdeen
AB21 7PB

22nd January 2019

Department for Business, Energy and Industrial Strategy (BEIS)
Offshore Petroleum Regulator for Environment & Decommissioning
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

Main 01224 832000
Mobile 07880 054969
jessica.howe@bp.com

Dear Sir or Madam,

Viking Satellites KD, LD, AR, Subsea tie-back Vixen VM, Viking Bravo Hub BA, BC, BP, BD and Associated Infield Pipelines Decommissioning Programmes

PETROLEUM ACT 1998

We acknowledge receipt of your letter dated 8th January 2019.

We, Britoil Limited (company number SC077750), a company incorporated in Scotland having its registered office at 1 Wellheads Avenue, Dyce, Aberdeen, AB21 7PB, as a holder of a section 29 notice relative to the Viking and Vixen fields and in accordance with the Guidance Notes[1] confirm that we hereby authorise ConocoPhillips (U.K.) Limited (company number 00524868), a company incorporated in England and Wales having its registered office at 20th Floor 1 Angel Court, London, England EC2R 7HJ, to submit on our behalf abandonment programmes relating to the Viking Satellites KD, LD, AR, Subsea tie-back Vixen VM, Viking Bravo Hub BA, BC, BP, BD and associated pipelines as directed by the Secretary of State on 8th January 2019.

We confirm that we support the proposals detailed in the Viking Satellites KD, LD, AR, Subsea tie-back Vixen VM, Viking Bravo Hub BA, BC, BP, BD and Associated Infield Pipelines Decommissioning Programmes dated 9th January 2019, which is to be submitted by ConocoPhillips (U.K.) Limited in so far as they relate to those facilities and pipelines in respect of which we are required to submit abandonment programmes under section 29 of the Petroleum Act 1998.

[1] Guidance Notes issued by the Department of Energy and Climate Change on Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998

Yours faithfully,

Jessica Howe
Decommissioning Business Manager

For and on behalf of Britoil Limited (company number SC077750)

9. Appendix

9.1 Onshore Pipelines

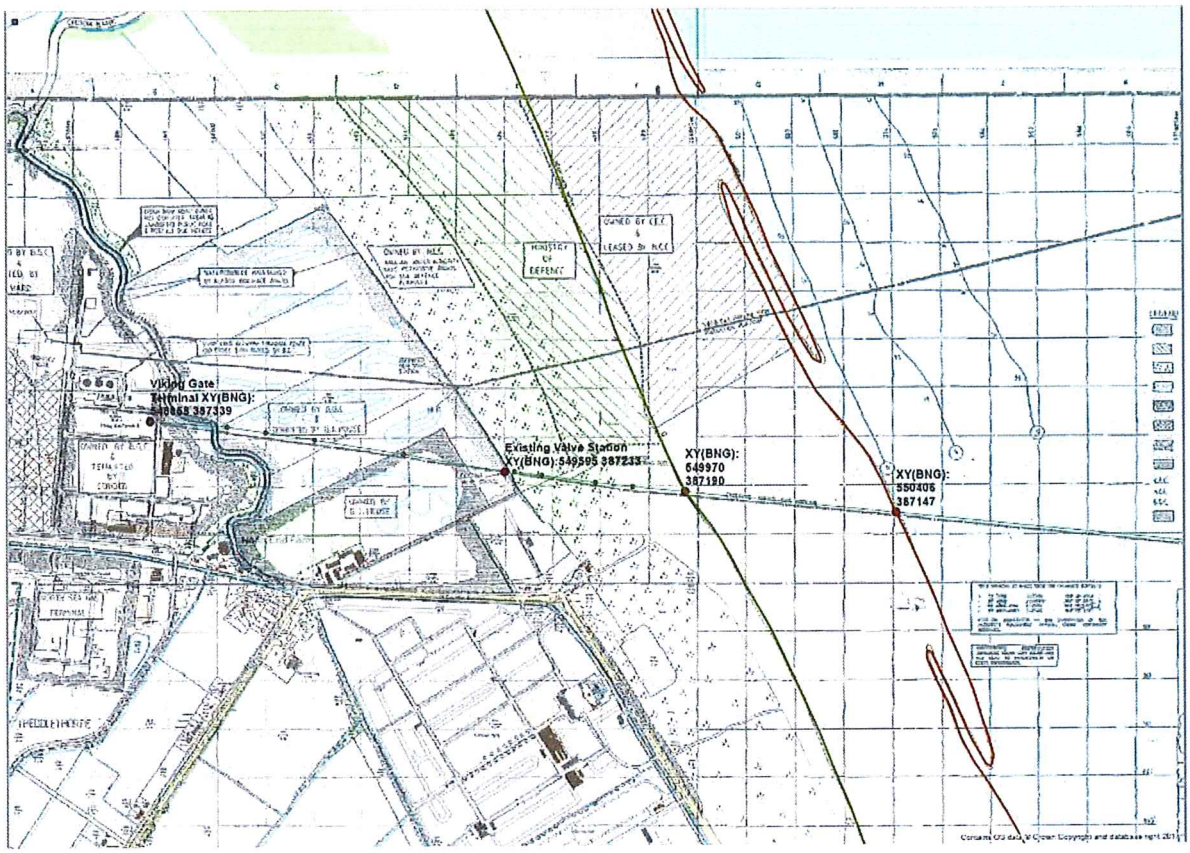


Figure 9.1: Map of Theddlethorpe Gas Terminal

The onshore pipelines will be decommissioned and abandoned in accordance to the Pipe-lines Act 1962, Regulations 25, the Pipelines Safety Regulations 1996 and the BSI Code of Practice for steel pipelines on land [PD 8010-1:2015+A1:2016].
The pipelines will be flushed clean of hydrocarbons and toxic materials, then disconnected, capped and sealed. The abandonment plan for the onshore sections of the pipelines out to the LAT water mark has not been fully defined; however, the in-line dunes valve (including appurtenances) may be removed and pipeline ends capped. Where the pipelines are to be abandoned in situ, they may be filled with a suitable filler and left buried 900mm or more below ground. A record will be kept of all in situ pipelines indicating their contents, location, size and depth of burial.

The option to use a suitable filler material for the onshore abandoned in situ pipeline sections would be based on an option selection assessment, as well as, comprehensive stakeholder engagement.

Structural degradation of the pipelines will be a long-term process caused by corrosion and the eventual collapse of the pipelines under their own weight, the weight of the pipeline coating material and that of the overlying soil / substrate. It is anticipated that failure of the pipelines due to through-wall degradation would only begin to occur after many decades (i.e., 60 to 100 years) and is expected to take up to 500 years to fully degrade (Costain, 2014b).

During this process, degradation products derived from the exterior and interior of the pipe will breakdown and potentially become bioavailable in the immediate vicinity. Pathways from the pipelines to the receptors would be via the interstitial spaces in substrate.

The release of degradation products is expected to occur at a slow rate and therefore expected to have a minimal impact on the surrounding environment. The area that could be biologically impacted would likely be limited to a few metres on either side of the pipeline.

The primary degradation products will originate from the following pipeline components:

- Pipeline scale;
- Steel;
- Sacrificial anodes;
- Coal tar enamel coating;
- Concrete coating; and
- Plastic coating.

Complete failure of water filled buried pipelines has a potential for subsidence of the overlying substrate.