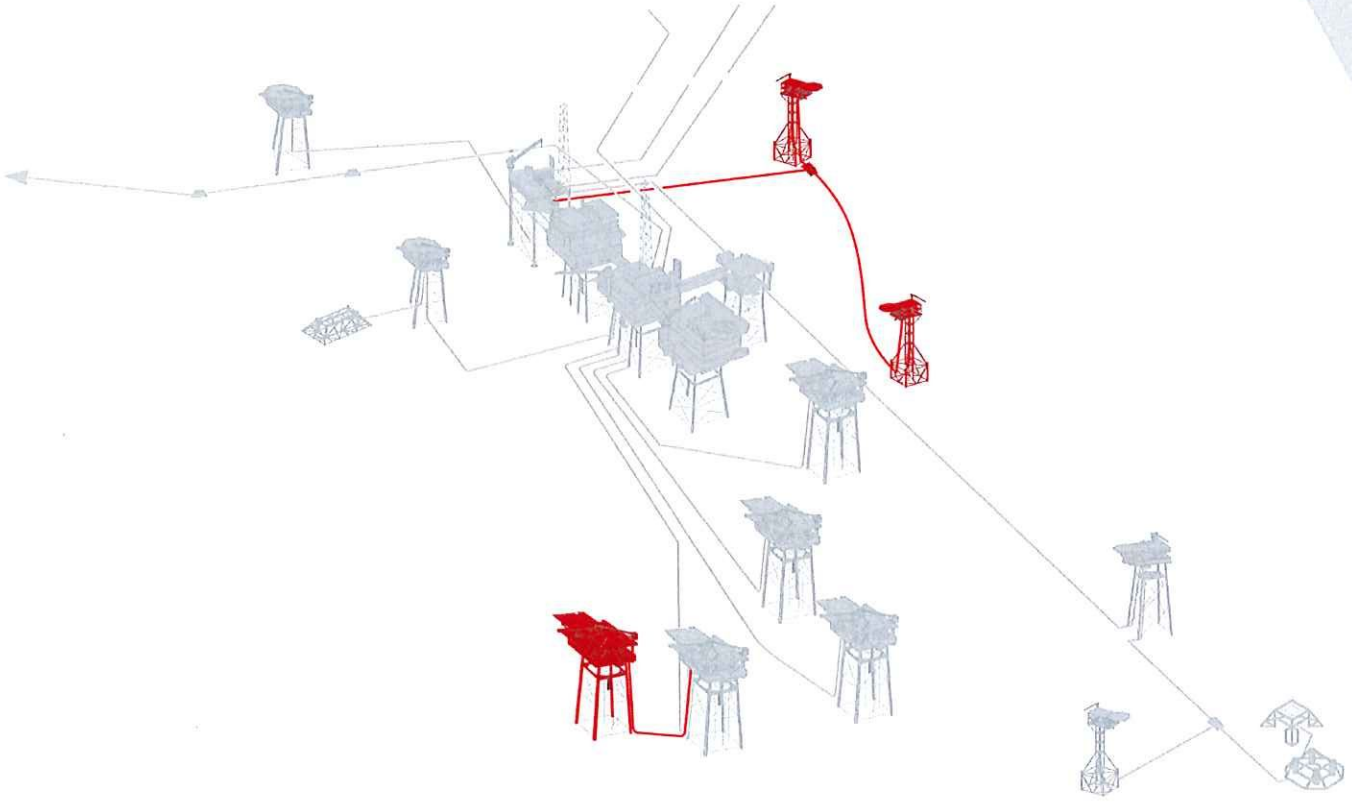
ConocoPhillips

Decommissioning Programmes

FINAL VERSION



LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD & Associated Infield Pipelines

Document Control

Approvals

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Distribution List

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A. Table of Terms and Abbreviations

Abbreviation	Explanation
Bscf	Billions of standard cubic feet
CA	Comparative Assessment
CoP	Cessation of Production
BEIS	Department for Business, Energy and Industrial Strategy
EIA	Environmental Impact Assessment
EMS	Environmental Management System
ES	Environmental Statement
HLV	Heavy Lift Vessel
KP	Kilometre Point
KPI	Key Performance Indicator
LAT	Lowest Astronomical Tide
LOGGS	Lincolnshire Offshore Gas Gathering System
MeOH	Methanol
NORM	Naturally Occurring Radioactive Material
NUI	Normally Unattended Installation
OD	LOGGS Satellite Vampire OD
OGA	Oil and Gas Authority
OGUK	Oil and Gas United Kingdom
P&A	Plug and Abandon
PMT	Project Management Team
PWA	Pipeline Works Authorisation
SCI	Site of Community Importance
SLV	Shear Leg Vessel
SNS	Southern North Sea
Te	Tonne
TGT	Theddlethorpe Gas Terminal
Tscf	Trillion standard cubic foot
UKCS	United Kingdom Continental Shelf
UR	LOGGS Satellite Vulcan UR
VO	LOGGS Satellite Viscount VO

B. Table of Figures and Tables

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1. Executive Summary

1.1. Combined Decommissioning Programmes

This document contains six decommissioning programmes; for three Lincolnshire Offshore Gas Gathering System (LOGGS) Satellite installations and pipelines:

(1) Vulcan UR installation
(2) Vulcan UR interfield pipelines for the associated notices served under Section 29 of the Petroleum Act 1998
(3) Viscount VO installation
(4) Viscount VO interfield pipelines for the associated notices served under Section 29 of the Petroleum Act 1998
(5) Vampire OD installation
(6) Vampire OD interfield pipelines for the associated notices served under Section 29 of the Petroleum Act 1998

1.2. Requirement for Decommissioning Programmes

Installations:

In accordance with the Petroleum Act 1998, ConocoPhillips (U.K.) Limited as Operator of the Vulcan, Viscount and Vampire fields and on behalf of the Section 29 notice holders (see Tables 1.2a – 1.2c and Section 8), is applying to the Department for Business, Energy and Industrial Strategy to obtain approval for decommissioning of the Vulcan UR, Viscount VO and Vampire OD installations detailed in Section 2 of this document. Valkyrie is an extended reach well drilled from the Vampire OD platform and has no separate installation and hence no separate programme.

Pipelines:

In accordance with the Petroleum Act 1998, ConocoPhillips (U.K.) Limited as Operator, and on behalf of the Section 29 notice holders (see Table 1.4a – 1.4c and Section 8), is applying to the Department for Business, Energy and Industrial Strategy to obtain approval for decommissioning of the Vulcan UR, Viscount VO and Vampire OD interfield pipelines and one subsea manifold detailed 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 5 year decommissioning project beginning October 2015.

1.3. Introduction

The decommissioning programmes comprise of 3 installations (Vulcan UR, Viscount VO, Vampire OD) and their associated pipelines. These cover 4 fields in the LOGGS area (Vulcan, Viscount, Vampire and Valkyrie) and are located approximately 120km east of the Lincolnshire coast.

The field areas developed with wells from the LOGGS Satellites covered by this document are in the following Quads/Blocks:

- Vulcan UR 49/21a and 48/25b,
- Viscount, Vampire, Valkyrie: 49/16

The LOGGS area gas fields were discovered from 1970 onwards and production commenced in 1988. The three LOGGS satellites covered within this document have produced 302bscf*, and have ceased production.

*Note: Includes 88bscf from the Valkyrie field and 20bscf from the UR03 well drilled from Vulcan UR into the Vulcan RD area

Cessation of Production approvals are as follows:

Field	Submission Date	Approval Date
Vulcan UR (platform & wells only)	17 September 2015	12 November 2015
Viscount VO	21 August 2015	8 December 2015
Vampire OD	14 July 2016	22 July 2016
Valkyrie OD*	14 July 2016	22 July 2016

*Valkyrie is an extended reach well from the Vampire OD platform – no separate installation or separate Section 29 notice.

LOGGS VO, OD and UR satellites are small installations with total combined Topsides, Jacket and pile weights ranging from 1,137Te to 2,637Te. They stand in 27m – 36m of water and are each tied back to the LOGGS complex (Viscount VO via subsea manifold at Vampire OD, and Vulcan UR via Vulcan RD) by individual buried pipelines between 4km and 11km in length.

The small size, shallow water depth and design life of these satellites has determined the philosophy of Decommissioning, which will be to:

- Plug and Abandonment (P&A)
- Remove the platforms and subsea manifold and protection structure
- Decommission the flushed cleaned pipelines in situ.

The other installations and pipelines in the LOGGS area 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 Installation Being Decommissioned - Vulcan UR			
Field Name		**Quad / Block**	
Fields	Vulcan (UR only)	**Production Type**	Gas/condensate
Water Depth	36 m	**UKCS block**	Quad 48 Block 25b Quad 49 Block 21a

Surface Installation			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
1	Fixed steel jacket	916	1138

Subsea Installations		Number of Wells	
Number	**Type**	**Platform**	**Subsea**
0	-	8	0

Drill Cuttings Piles		Distance to Median	Distance from nearest UK coastline
Number of Piles	**Total Est volume m^3**	**km**	**km**
0	0	Vulcan UR 71km	Vulcan UR 57km

Table 1.1b Installation Being Decommissioned - Viscount VO			
Field Name		**Quad / Block**	
Fields	Viscount	**Production Type**	Gas/condensate
Water Depth	32 m	**UKCS block**	Quad 49 Block 16a

Surface Installation			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
1	Fixed steel jacket	330	731

Subsea Installations		Number of Wells	
Number	**Type**	**Platform**	**Subsea**
0	-	3	0

Drill Cuttings Piles		Distance to Median	Distance from nearest UK coastline
Number of Piles	**Total Est volume m^3**	**km**	**km**
0	0	Viscount VO 56km	Viscount VO 74km

Table 1.1c Installation Being Decommissioned - Vampire OD			
Field Name		**Quad / Block**	
Fields	Vampire Valkyrie	**Production Type**	Gas/condensate Gas/condensate
Water Depth	27 m	**UKCS block**	Quad 49 Block 16a

Surface Installation			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
1	Fixed steel jacket	345	587

Subsea Installations		Number of Wells	
Number	**Type**	**Platform**	**Subsea**
0	-	3	0

Drill Cuttings Piles		Distance to Median	Distance from nearest UK coastline
Number of Piles	**Total Est volume m^3**	**km**	**km**
0	0	Vampire OD 61km	Vampire OD 72km

Table 1.2a Installation Section 29 Notice Holders Details – Vulcan UR		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	34.25%
ConocoPhillips (U.K.) Alpha Limited	02374592	7.875%
ConocoPhillips Developments Limited	02180666	7.875%
Arco British Limited LLC	FC005677	7.875%
BP Exploration (Alpha) Limited	01021007	42.125%

Table 1.2b Installation Section 29 Notice Holders Details – Viscount VO		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	20%
ConocoPhillips Petroleum Limited	01247477	30%
BP Exploration (Alpha) Limited	01021007	30%
BP Exploration Beta Limited	00895797	20%

Table 1.2c Installation Section 29 Notice Holders Details – Vampire OD		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	20%
ConocoPhillips Petroleum Limited	01247477	30%
BP Exploration (Alpha) Limited	01021007	30%
BP Exploration Beta Limited	00895797	20%

1.4.2. Pipelines

Table 1.3 Pipelines Being Decommissioned		
Number of Pipelines	6	See Table 2.3
Subsea manifold and protection structure	1	See Table 2.3

Table 1.4a Pipelines Section 29 Notice Holders Details – Vulcan UR		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	34.25%
ConocoPhillips (U.K.) Alpha Limited	02374592	7.875%
ConocoPhillips Developments Limited	02180666	7.875%
Arco British Limited LLC	FC005677	7.875%
BP Exploration (Alpha) Limited	01021007	42.125%

Table 1.4b Pipelines Section 29 Notice Holders Details – Viscount VO		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	20%
ConocoPhillips Petroleum Limited	01247477	30%
BP Exploration (Alpha) Limited	01021007	30%
BP Exploration Beta Limited	00895797	20%

Table 1.4c Pipelines Section 29 Notice Holders Details – Vampire OD		
Section 29 Notice Holders	**Registration Number**	**Equity Interest**
ConocoPhillips (U.K.) Limited	00524868	20%
ConocoPhillips Petroleum Limited	01247477	30%
BP Exploration (Alpha) Limited	01021007	30%
BP Exploration Beta Limited	00895797	20%

1.5. Summary of Proposed Decommissioning Programmes

Table 1.5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
1. Topsides		
Complete removal, dismantlement and reuse/recycling and disposal.	Topsides past design life, equipment obsolete and degraded, or recovery no longer economic.	Removed wholly 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		
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		
N/A	N/A	N/A
4. Pipelines, Flowlines and Umbilicals		
Pipelines will be flushed and decommissioned in situ. Concrete mattresses and other pipeline stabilisation structures will be decommissioned in situ.	In situ decommissioning with minimum intervention option: All mattresses would be left in situ in their current state to maintain pipeline stabilisation. Minimise disturbance of the established environment. Reduce the requirement for the introduction of new material (Rock Dump) to the Site of Community Importance (SCI).	Mobile hydrocarbons in the pipelines will be flushed prior to subsea disconnection from the Satellite. Pipelines would be left open and flooded with seawater with cut ends only to be rock dumped as required to a maximum of 25Te per cut pipeline end. 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.
Complete removal (3m below seabed), dismantlement and reuse/ recycling and disposal of subsea manifold and protection	Meets BEIS regulatory requirements.	Removed and transported to appropriate land based facility for dismantlement, recycling and disposal. Concrete mattresses and grout bags required for access will be removed and

Table 1.5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
structure that is associated with the Vampire OD pipelines decommissioning programme.		transported onshore for recycling and disposal.
5. Well Abandonment Operations		
Permanent Well Plug & Abandonment (P&A)	Meets OGA Regulatory requirements	Abandonment in accordance with Oil and Gas UK Guidelines for the suspension and abandonment of wells
6. Drill Cuttings		
None required.	No Drill Cuttings Piles have been identified by seabed survey.	None required.
7. Interdependencies		
Platform Removal can only occur after Well P&A and Topsides / Pipeline cleaning. Vulcan UR to Vulcan RD gas and methanol pipeline cleaning (PL462 and PL463) was completed in Q1 2016.		

1.6. Field Location including Field Layout and Adjacent Facilities

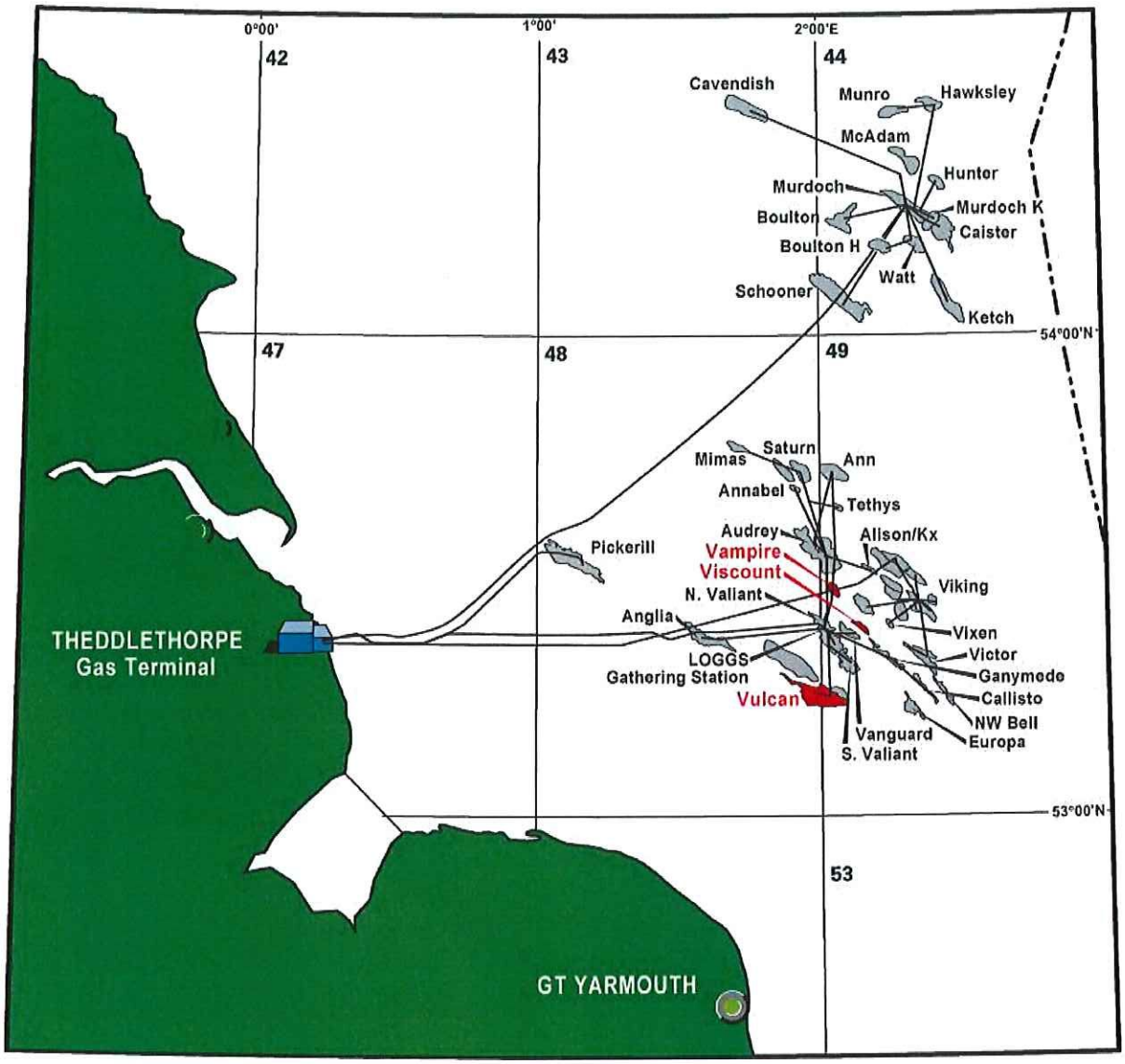


Figure 1.1 – LOGGS Area Location in UKCS

The Vulcan UR, Viscount VO and Vampire OD satellite developments are part of the ConocoPhillips Southern North Sea (SNS) Gas Operations. The installations and pipelines covered by these decommissioning programmes are highlighted in the Field Layout Figure 1.2

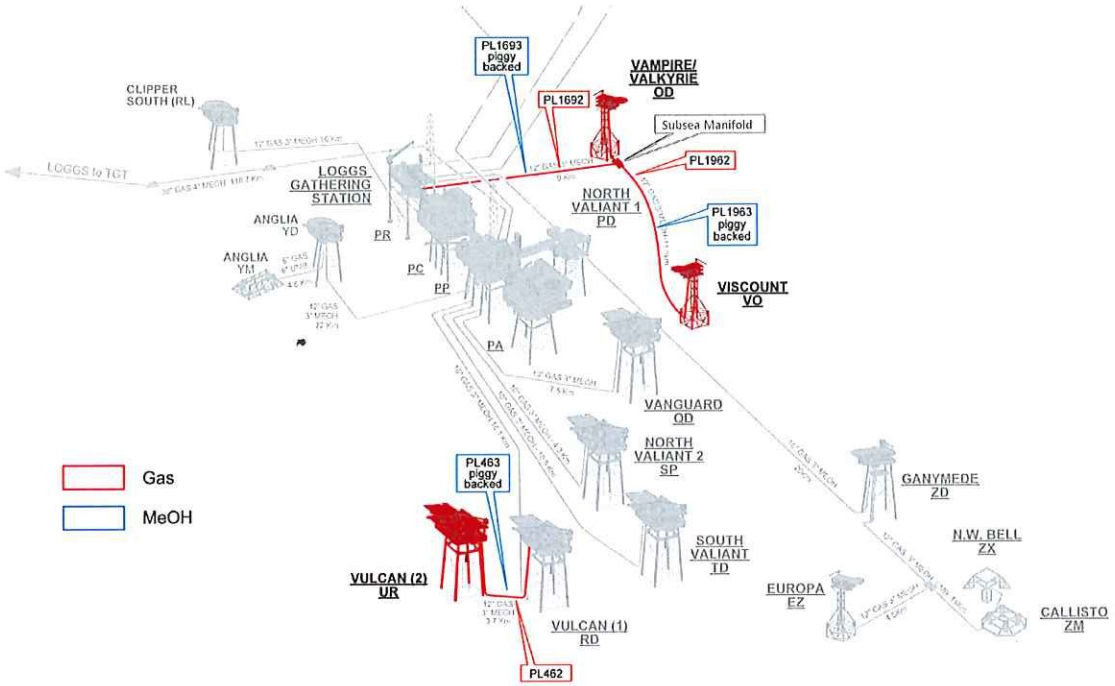


Figure 1.2 – LOGGS Fields Layout

Facilities adjacent to the satellites that are potentially impacted by these Decommissioning Programmes are listed below in Table 1.6 and highlighted in Figure 1.3.

Table 1.6 List of Adjacent Facilities					
Owner	**Name**	**Type**	**Distance/Direction**	**Information**	**Status**
ConocoPhillips / BP	Vulcan RD	Normally Unmanned Installation	UR to RD 4km	The Vulcan RD platform is not anticipated to cease production until after the end of 2017. Cessation of Production approval received from OGA in May 2017.	Operational
Centrica	PL947	12" Gas Pipeline	Ann XM to LOGGS PR (42km)	Crosses under PL1962 & PL1963	Operational
Centrica	PL496	20" Gas Pipeline	Audrey WD to LOGGS PP (17km)	Crosses under PL1692 & PL1693	Operational
Centrica	PL497	3" MeOH Pipeline	LOGGS PP to Audrey WD (17km)	Piggy backed onto PL496. Crosses under PL1692 & PL1693	Operational
ConocoPhillips / BP	PL0454	36" Gas Pipeline	LOGGS PP to TGT (119km)	Crosses under PL1692 & PL1693	Operational
ConocoPhillips / BP	PL0455	4" MeOH Pipeline	TGT to LOGGS PP (119km)	Crosses under PL1692 & PL1693	Operational
ConocoPhillips / BP	PL27	28" Gas Pipeline	Viking AR to TGT (139km)	Proximal to Vampire OD (0.4km)	Out of use
ConocoPhillips / BP	PL161	3" MeOH Pipeline	TGT to Viking AR (139km)	Piggy backed onto PL27. Proximal to Vampire OD (0.4km)	Out of use
ConocoPhillips / BP	PL2643	16" Gas Pipeline	Viking to LOGGS (27km)	Proximal to Viscount VO (0.5km)	Out of use
ConocoPhillips / BP	PL2644	3" MeOH Pipeline	Viking to LOGGS (27km)	Piggy backed onto PL2643. Proximal to Viscount VO (0.5km)	Out of use
ConocoPhillips / BP	LOGGS PR	Manned Installation	Vampire/Valkyrie OD to LOGGS PR 9km	Vampire/Valkyrie OD and Viscount VO produce through the LOGGS PR platform of the LOGGS Complex.	Operational

Impacts of Decommissioning Proposals
No anticipated impact on adjacent facilities if pipelines left in situ

Figure 1.3 - Adjacent Facilities (highlighted in yellow)

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 LOGGS Satellites 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 programme 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)
Vulcan UR	Fixed steel jacket	Lat: 53.257 North / 53° 15.4' North Long: 1.964 East / 01° 58.2' East	916	1	1138	4	4	583
Viscount VO	Fixed steel jacket	Lat: 53.386 North / 53° 23.2' North Long: 02.145 East / 02° 08.9' East	330	1	731	4	4	203
Vampire OD	Fixed steel jacket	Lat: 53.465 North / 53° 27.9' North Long: 02.038 East / 02° 02.5' East	345	1	587	4	4	205

*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)*

Figure 2.1.1 Photograph of Vulcan UR

Figure 2.1.2 Photograph of Viscount VO

Figure 2.1.3 Photograph of Vampire OD

2.2. Subsea Installations and Stabilisation Features

Table 2.2 Subsea Installations and Stabilisation Features				
Subsea installations and stabilisation features	**Number**	**Size / Weight (Te)**	**Locations WGS84 Format**	**Comments / Status**
Wellheads	0	0	None	None present
Manifolds	0	0	None	None present
Templates	0	0	None	None present
Protection frames	0	0	None	None present
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

Vampire subsea manifold is listed as part of the Vampire OD associated pipelines in Table 2.3c and not as a subsea installation in the above Table 2.2.

2.3. Pipelines Including Stabilisation Features

Table 2.3a Pipeline / Flowline / Umbilical Information - Vulcan UR 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	PL462	12	3.7	Steel with concrete and coal tar coatings	Gas, Condensate, produced water	Vulcan UR to Vulcan RD	Trenched, Buried, 0% exposed (0m)* no reportable spans**	Out of use	Treated seawater with Oil in Water of <30mg/l
MeOH pipeline Piggy backed onto PL462	PL463	3	3.7	Steel with Fusion bonded epoxy (FBE) powder coating	MeOH, corrosion inhibitor	Vulcan RD to Vulcan UR	Trenched, Buried 0% exposed (0m)* no reportable spans**	Out of use	Treated seawater with Oil in Water of <30mg/l

Note * As per latest pipeline surveyed length
Note ** As per FishSAFE requirements

Table 2.3b Pipeline / Flowline / Umbilical Information – Viscount VO 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	PL1962	12	11. 3	Steel with 3-layer polypropylene coating	Gas, Condensate, produced water	Viscount VO to Vampire OD (pipeline tee manifold)	Trenched, Buried, 0.03% exposed (3m)* no reportable spans**	Out of use	Gas, Condensate, produced water
MeOH pipeline Piggy backed onto PL1962	PL1963	3	11.3	Steel with 3-layer polypropylene coating	MeOH, corrosion inhibitor	Vampire OD (pipeline tee manifold) to Viscount VO	Trenched, Buried 0.03% exposed (3m)* no reportable spans**	Out of use	MeoH, corrosion inhibitor

Note * As per latest pipeline surveyed length
Note ** As per FishSAFE requirements

Table 2.3c Pipeline / Flowline / Umbilical Information – Vampire OD 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	PL1692	12	9.0	Steel with 3-layer polypropylene coating	Gas, Condensate, produced water	Vampire OD to LOGGS PR	Trenched, Buried, 0.0% exposed (0m)* no reportable spans **	Out of use	Gas, Condensate, produced water
MeOH pipeline Piggy backed onto PL1692	PL1693	3	9.0	Steel with 3-layer polypropylene coating	MeOH, corrosion inhibitor	LOGGS PR to Vampire OD	Trenched, Buried 0.0% exposed (0m)* no reportable spans**	Out of use	MeoH, corrosion inhibitor
Subsea manifold in respect of the Vampire OD associated pipelines decommissioning programme	N/A	N/A	N/A	35 Te subsea manifold and protection frame with 300 grout bags (12 Te)*** that will be removed to gain access to the subsea manifold	Gas, Condensate, produced water	Location: 53°27' 56.69" N 02° 2' 35.76"E	Exposed above the seabed	N/A	Gas, Condensate, produced water

Note * As per latest pipeline surveyed length
Note ** As per FishSAFE requirements
Note *** Average weight of grout bag estimated at 40 kg

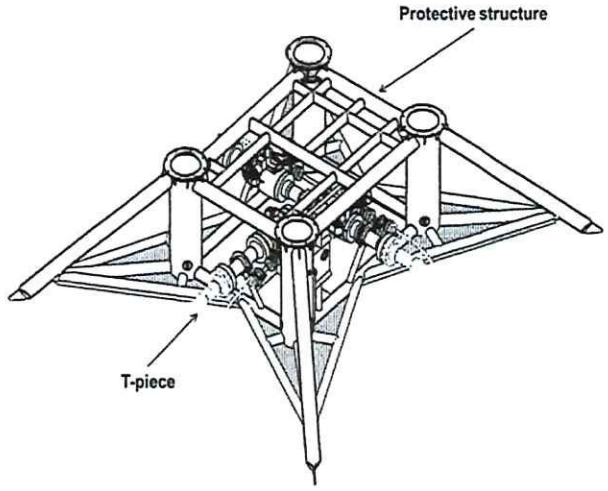


Figure 2.1.4 Schematic of subsea manifold between Vampire OD, Viscount VO and LOGGS PR

Table 2.4a Subsea Pipeline Stabilisation Features – Vulcan UR associated pipelines				
Stabilisation Feature	**Total Number#**	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Concrete mattresses	1	6	PL462 and PL463 at KP 3.711 – KP3.713 (under pipe)	Mattress exposed in 2014 surveys
Grout bags	0	0	PL462 and PL463	
Formwork	0	0	PL462 and PL463	
Frond mats	0	0	PL462 and PL463	
Rock Dump	470m		PL462 & PL463 at two locations: KP-0.011 – KP0.350, KP3.591 – KP3.700 (2008 Survey)	Pipeline protected by rock dump at both platform approaches, with some rock dump sections partially buried (2014 survey)

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 has been estimated from visual survey data for the UR pipelines (PL462, PL463).

Note ** KP 0.00 is at the Vulcan UR end of the pipeline for PL462/3.

Table 2.4b Subsea Pipeline Stabilisation Features – Viscount VO associated pipelines				
Stabilisation Feature	**Total Number#**	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Concrete mattresses	32	192	PL1962 and PL1963 at two locations: KP-0.030 – KP0.007 and KP11.273 – KP11.317	32 linklok mattresses were installed. The mattresses were found to be in burial in the 2012 survey.
Grout bags	10.5m length		PL1962 and PL1963 at two locations: KP-0.035 – KP-0.030 and KP11.315 – KP11.320 (as-built)	Grout bags located underneath the tie-in spool. The presence of the grout bags has not been recorded in the most recent surveys.
Formwork	0	0	PL1962 and PL1963	
Frond mats	5	30	PL1962 and PL1963	5 frond linklok mattresses were installed. 1 mattress was observed to be in exposure in the 2006 survey, the mattress was observed to be in complete burial during subsequent surveys.
Rock Dump	979m		PL1962 & PL1963 at thirteen locations: KP0.011 – KP0.125, KP1.410 – KP1.452, KP1.492 – KP1.500, KP2.035 – KP2.061, KP5.225 – KP5.452, KP5.388 – KP5.395, KP5.612 – KP5.647, KP6.434 – KP6.471, KP7.090 – KP7.380, KP10.224 – KP10.237, KP10.270 – KP10.290, KP11.085 – KP11.130, 11.150 – KP11.265 (as-built)	Pipeline protected by rock dump at crossing, trench transition and upheaval buckling mitigation locations. Some rock dump sections were found to be partially buried (2009, 2014 survey).

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 has been estimated from as-built data for the VO (PL1962, PL1963) pipelines.

Note ** KP 0.00 is at the Viscount VO end of the pipeline for PL1962/3.

Table 2.4c Subsea Pipeline Stabilisation Features – Vampire OD associated pipelines				
Stabilisation Feature	**Total Number#**	**Weight (Te)***	**Locations****	**Exposed / Buried / Condition**
Concrete mattresses	58	348	PL1692 and PL1693 at three locations: KP-0.059 – KP-0.042, KP-0.031 – KP0.010 and KP9.079 – KP9.121	OD 500m zone mattresses exposed in 2012 survey, PR 500m zone mattresses buried in 2014 survey.
Grout bags	8.7m length ~300		PL1692 and PL1693 at two locations: KP-0.046 – KP-0.041 and KP-0.036 – KP-0.032 (as-built) Associated with subsea manifold and protection structure at Vampire	Exposed in 2012 survey. Grout bags were laid exposed around the legs of the structure and below the spool pieces to support the tie-in spools and mitigate scour around the structure. Latest inspection reports indicated that the grout bags are partially exposed.
Formwork	0	0	PL1692 and PL1693	
Frond mats	0	0	PL1692 and PL1693	
Rock Dump	657m		PL1692 & PL1693 at fifteen locations: KP0.000 – KP0.095, KP0.147 – KP0.151, KP0.304 – KP0.307, KP0.732 – KP0.737, KP1.888 – KP1.897, KP2.705 – KP2.726, KP2.879– KP 2.900, KP3.083 – KP3.105, KP3.842 – KP3.854, KP4.039 – KP4.050, KP4.772 – KP4.778, KP6.374 – KP6.380, KP8.527 – KP8.559, KP8.602 – KP8.617, KP8.655 – KP9.050 (as built)	Pipeline protected by rock dump at crossing, trench transition and upheaval buckling mitigation locations. Some rock dump sections were found to be partially buried (2011, 2012 survey).

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 has been estimated from as-built data for the OD (PL1692, PL1693) pipelines.

Note ** KP 0.00 is at the Vampire OD end of the pipeline for PL1692/3.

2.4. Wells

Table 2.5a Well Information - Vulcan UR			
Platform Wells	**Designation**	**Status**	**Category of Well**
GB_048_25b_U01	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_048_25b _U02	Gas Production	Abandoned Phase 3	PL 4-3-3
GB_048_25b _U03	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_048_25b _U04	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_048_25b _U06	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_048_25b _U07	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_048_25b _U08	Gas Production	Abandoned Phase 3	PL 4-3-3
GB_048_25b _U09	Gas Production	Abandoned Phase 3	PL 4-3-3
Subsea Wells	**Designation**	**Status**	**Category of Well**
0	Not Applicable	N/A	Not Applicable

Table 2.5b Well Information - Viscount VO			
Platform Wells	**Designation**	**Status**	**Category of Well**
GB_049_16_W01Z	Gas Production	Plugged	PL 3-3-3
GB_049_16_W02Z	Gas Production	Plugged	PL 3-3-3
GB_049_16_W03	Gas Production	Abandoned Phase 2	PL-0-0-3
Subsea Wells	**Designation**	**Status**	**Category of Well**
0	Not Applicable	N/A	Not Applicable

Table 2.5c Well Information - Vampire OD			
Platform Wells	**Designation**	**Status**	**Category of Well**
GB_049_16_11 (Valkyrie*)	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_049_16_V02	Gas Production	Abandoned Phase 3	PL 3-3-3
GB_049_16_V03Y	Gas Production	Abandoned Phase 3	PL 3-3-3
Subsea Wells	**Designation**	**Status**	**Category of Well**
0	Not Applicable	N/A	Not Applicable

** Valkyrie extended reach well drilled from the Vampire platform*

Note: Status of wells as at October 2017

For further details of well categorisation see OGUK guidelines for the Suspension or Abandonment

of Wells –Issue 5 –July 2015.

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 2013d] found no evidence of cuttings piles from around the LOGGS Satellites covered by these decommissioning programmes. The dynamic marine environment has resulted in the redistribution of drill cuttings.

2.6. Inventory Estimates

Table 2.7 Installation Material Functional Category Summary							
Installation	**Haz Mat / NORM Te**	**Concrete Te**	**Ferrous Metal Te**	**Non-Ferrous Metal Te**	**Plastics Te**	**Other Non-Haz Te***	**Total Te**
Vulcan UR	78	0	1916	0	0	60	**2054**
Viscount VO	22	0	1017	0	0	23	**1062**
Vampire OD	22	0	886	0	0	26	**934**
Total	**122**	**0**	**3819**	**0**	**0**	**109**	**4050**

*Note** *Weights exclude the calculated 162Te marine growth associated with the three assets*

Table 2.8a Pipeline Material Functional Category Summary - Vulcan UR							
Pipeline No	Description	Haz Mat / NORM Te	Concrete Te	Ferrous Metal Te	Non-Ferrous Metal Te	Plastics Te	Other Non-Haz Te
PL462	Gas pipeline	33	369	489	0	0	0
PL463	Piggy backed MeOH pipeline	0	0	102	0	0	0
	Mattresses	0	6	0	0	0	0
Total		**33**	**375**	**591**	**0**	**0**	**0**

Table 2.8b Pipeline Material Functional Category Summary - Viscount VO							
Pipeline No	Description	Haz Mat / NORM Te	Concrete Te	Ferrous Metal Te	Non-Ferrous Metal Te	Plastics Te	Other Non-Haz Te
PL1962	Gas pipeline	1	0	1491	0	25	0
PL1963	Piggy backed MeOH pipeline	0	0	241	0	6	0
	Mattresses	0	192	0	0	0	0
Total		**1**	**192**	**1732**	**0**	**31**	**0**

Table 2.8c Pipeline Material Functional Category Summary - Vampire OD							
Pipeline No	Description	Haz Mat / NORM Te	Concrete Te	Ferrous Metal Te	Non-Ferrous Metal Te	Plastics Te	Other Non-Haz Te
PL1692	Gas pipeline	1	0	1190	0	20	0
PL1693	Piggy backed MeOH pipeline	0	0	192	0	5	0
	Subsea manifold	0	0	35	0	0	0
	Mattresses	0	348	0	0	0	0
Total		**1**	**348**	**1417**	**0**	**25**	**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.
Options considered for re-use of the LOGGS Satellites were:

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

No economic or technical hydrocarbon developments local to any of the LOGGS Satellites were identified. The LOGGS Satellites are past, or nearing, their design life, require refurbishment; contain obsolete control systems and components all of which makes their re-use uneconomic and therefore non-viable.

The selected option for each of the LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD is to remove, dismantle and dispose of them, ensuring a high level of material recycling. Note that the decommissioning of the Vulcan RD satellite and associated pipelines is subject to a future decommissioning programme.

3.1. Topsides

3.1.1. Topsides Descriptions

Vulcan UR
The Vulcan UR topsides are a minimal facility designed for use as a NUI which extends 35m above Lowest Astronomical Tide (LAT). The Topsides weigh 916Te, have a deck size of 23.8m by 25.5m and comprise of a wellbay, production test manifold, local equipment room, temporary refuge, control room, battery room, diesel power generation, pedestal crane and Helideck.

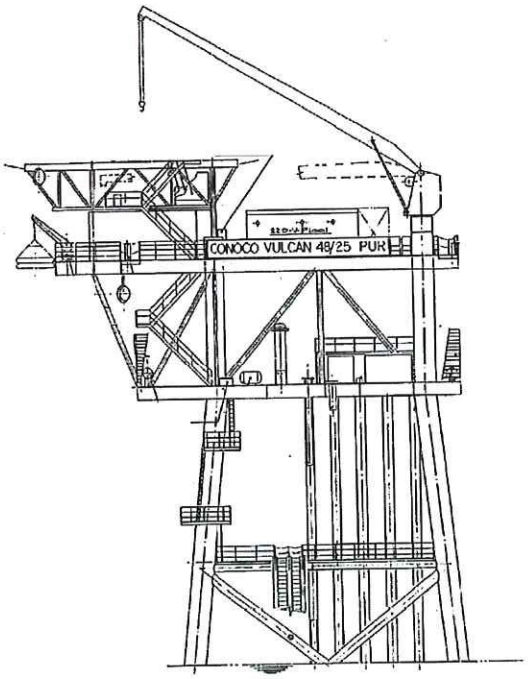


Figure 3.1.1 Vulcan UR Topsides

Viscount VO

The Viscount VO topsides are a minimal facility designed for use as a NUI which extends 32m above LAT. The Topsides weigh 330Te have a deck size of 20.3m by 15.9m and comprise of a wellbay, production test manifold, local equipment room, temporary refuge, diesel power generation and tank, water tank, pedestal crane and Helideck.

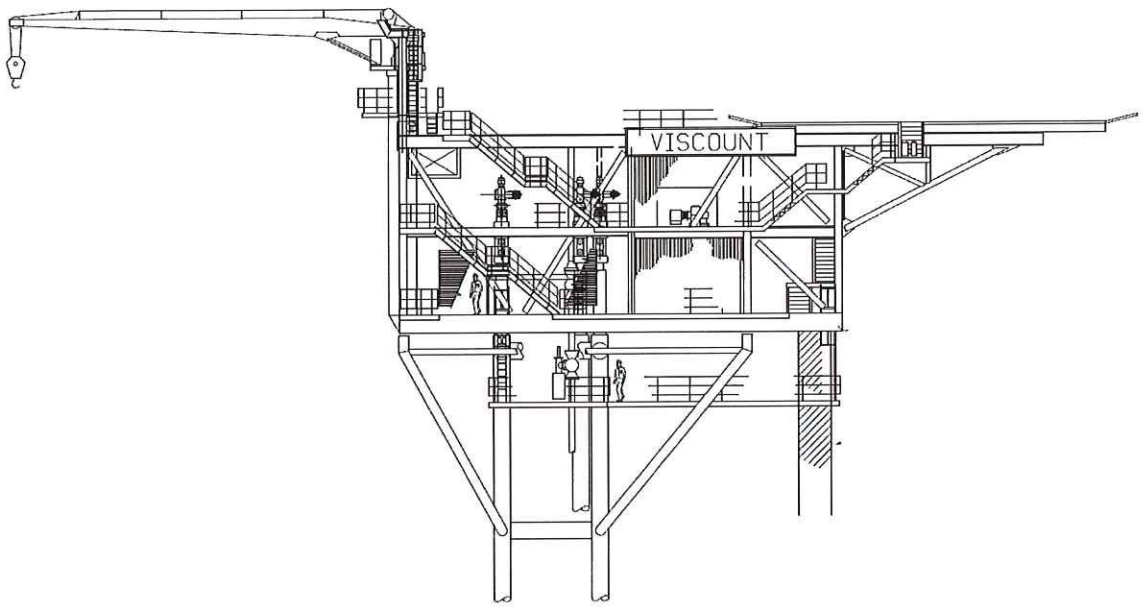


Figure 3.1.2 Viscount VO Topsides

Vampire OD

The Vampire OD topsides are a minimal facility designed for use as a NUI which extends 27m above LAT. The Topsides weigh 345Te have a deck size of 20.3m by 15.9m and comprise of a wellbay, production test manifold, local equipment room, temporary refuge, diesel power generation and tank, water tank, pedestal crane and Helideck.

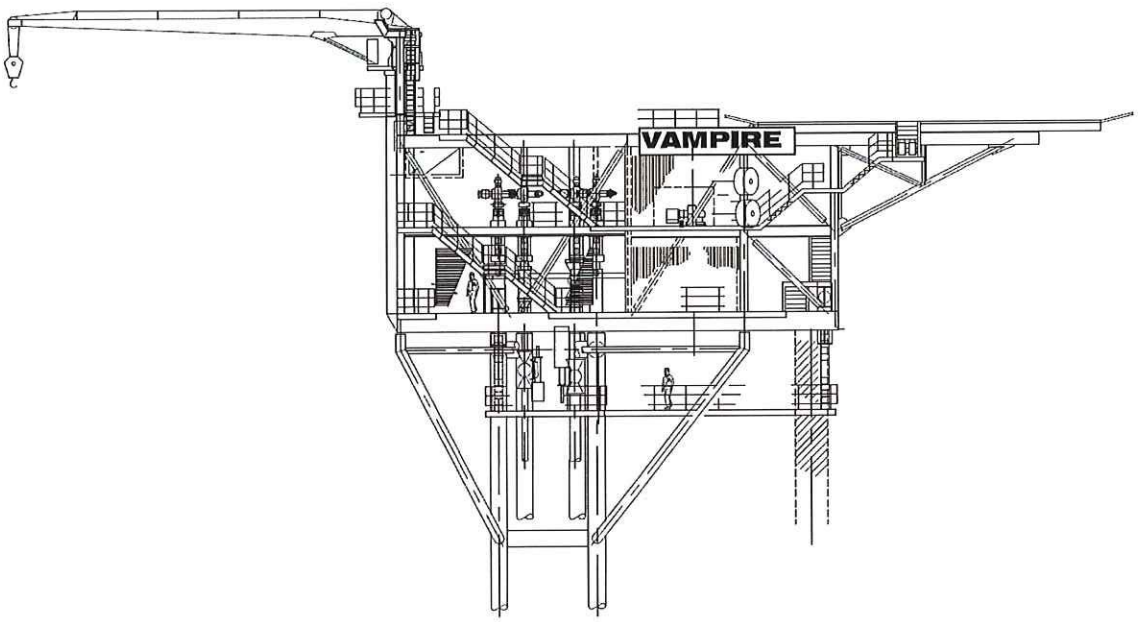


Figure 3.1.3 Vampire OD Topsides

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**
On-board hydrocarbons	Process fluids	Will be flushed, Nitrogen purged and vented.
Produced solids	Sand, NORM	Produced solids 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 disposal.
Chemicals and lubricating oils	Chemicals and lubricants	Chemicals and lubricating oils will be drained and returned onshore for disposal.

3.1.2 Removal Methods

Given the size and weight of the Topsides and Jackets, it is likely that removal will be modular in nature for each of the Satellites.

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	
Method	**Description**
Single lift removal complete with Jacket by HLV / Monohull crane vessel / SLV	Removal of Topsides 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.	**Removal of Topsides in a single lift followed by Jacket.** UR: Topsides lift, then 4x jacket leg extensions lift, then jacket lift VO: topside lift, then jacket lift OD: topside lift, then jacket lift Removal to be undertaken with a shear leg Heavy Lift Vessel. **Transportation to shore for dismantlement, disposal and recycling.** **Trans-frontier shipment of waste will not be required.**

Note: ☑ Option Considered in Comparative Assessment

3.2. Jackets

The jackets of the Vulcan UR, Viscount VO and Vampire OD Satellites are single jacket structures, each with 4 legs and 4 piles.

3.2.1. Jacket Decommissioning Overview

All Jackets will be removed to 3m below the seabed. The Topsides of the LOGGS Satellites will be removed separately from the Jackets.

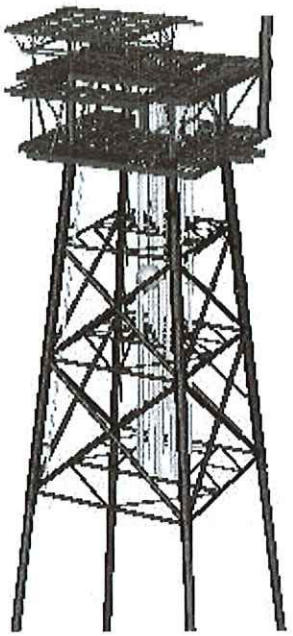


Figure 3.2.1 Vulcan UR Jacket Elevation

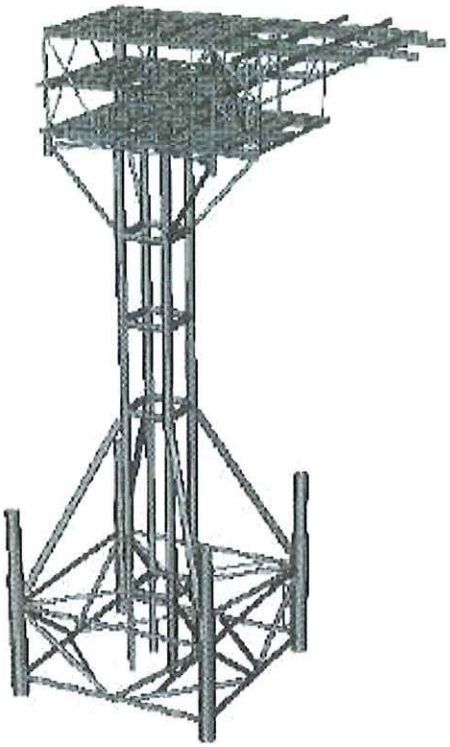


Figure 3.2.2 Viscount VO Jacket Elevation

Figure 3.2.3 Vampire OD 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 and 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 Jacket and Topsides in separate lifts.** UR: Topside lift, then 4x jacket leg extensions lift, then jacket lift VO: topside lift, then jacket lift OD: topside lift, then jacket lift **Transportation to shore for dismantlement, disposal and recycling.** **Trans-frontier shipment of waste will not be required.**

Note: ☑ Option Considered in Comparative Assessment

3.3. Subsea installations and stabilisation features

Table 3.4 Subsea Installations and Stabilisation features			
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

3.4. Pipelines

3.4.1. 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 this Decommissioning Document 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 3.5: Pipeline or Pipeline Groups / Decommissioning Options

Pipeline or Group (as per PWA)	Condition of line / group	Whole or part of pipeline / group	Decommissioning Options considered*
PL462, PL463 PL1962, PL1963 PL1692, PL1693	Trenched, Buried, spanning	Pipelines will be disconnected on seabed at Satellite end to facilitate Satellite Removal and the Hub end to complete the pipeline decommissioning. UR Pipeline at Vulcan RD end will be disconnected as part of the RD satellite decommissioning***, and the VO/OD pipelines at Vampire OD end (tee) will be disconnected as part of the OD decommissioning.	1, 2, 4, 5, 6, 7, 8, 9
Manifold	1 exposed manifold	Complete removal (3m below seabed). Removed and transported to appropriate land based facility for dismantlement, recycling and disposal.	None other
Protection frame	1 exposed protection frame	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.

*** The decommissioning of the Vulcan RD satellite and associated pipelines is subject to a future decommissioning programme.

3.4.2. Comparative Assessment Method

A two phased process was initiated comprising of multidisciplinary workshops followed by the assessment compilation and option selection. The purpose of the comparative assessment being to identify the best overall option for decommissioning of each of the six pipelines included within the scope of the decommissioning programmes in view of the pipeline status, condition and environmental setting.

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 considered for assessment of the 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.

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 3.6: Outcomes of Comparative Assessment		
Pipeline or Group	**Recommended Option***	**Justification**
PL462, PL463 PL1962, PL1963 PL1692, PL1693	Option 7 Leave in place	Pipelines and mattresses 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 - Vulcan UR			
Stabilisation features	**Number**	**Option**	**Disposal Route**
Concrete mattresses	1	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 (associated with pipelines)	0.0m 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		None required
Frond mats	0	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 dump	470m	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

Table 3.7b Pipeline Stabilisation features - Viscount VO			
Stabilisation features	**Number**	**Option**	**Disposal Route**
Concrete mattresses	32	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 (associated with pipelines)	10.5m 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		None required
Frond mats	5	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 dump	979m	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

Table 3.7c Pipeline Stabilisation features - Vampire OD			
Stabilisation features	**Number**	**Option**	**Disposal Route**
Concrete mattresses	58	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 (associated with pipelines)	8.7m 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
Grout bags (associated with subsea manifold and protection structure)	~300	Removal of grout bags obstructing access to subsea manifold where feasible to do so.	Removed grout bags transported to appropriate land based facility for recycling and disposal.
Formwork	None		None required
Frond mats	0	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 dump	657m	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

3.6. Wells

Table 3.8: Well Plug and Abandonment
The wells which remain to be abandoned, as listed in Section 2.4 (Table 2.5) will be plugged and abandoned in accordance with OGUK Guidelines for the suspension and abandonment of wells. The 14 LOGGS Satellite wells will be plugged and abandoned by a Jack up Mobile Offshore Drilling Unit. Vulcan UR P&A was conducted in 2016 in 141.3 days, Vampire and Valkyrie P&A commenced in August 2017 and Viscount will commence plug and abandonment operations in November 2017. 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, 2013d] found no evidence of cuttings piles from around the LOGGS Satellites covered by these decommissioning programmes.

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 9 & 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 - Vulcan UR			
	Total Inventory Tonnage	**Planned Tonnage to shore***	**Planned Tonnage Decommissioned in situ**
Installations	2637	2054	583 (Below Mudline)
Pipelines	993	0	993
Mattresses	6	0	6

Note* Excludes 71.88Te marine growth associated with the installation jackets and weight

Table 3.10b Inventory Disposition - Viscount VO			
	Total Inventory Tonnage	Planned Tonnage to shore*	Planned Tonnage Decommissioned in situ
Installations	1264	1061	203 (Below Mudline)
Pipelines	1764	0	1764
Mattresses	192	0	192

Note* Excludes 58.41Te marine growth associated with the installation jackets and weight

Table 3.10c Inventory Disposition - Vampire OD			
	Total Inventory Tonnage	Planned Tonnage to shore*	Planned Tonnage Decommissioned in situ
Installations	1137	932	205 (Below Mudline)
Pipelines**	1443	0	1443
Subsea Manifold	35	35	0
Mattresses	348	0	318

Note* Excludes 31.48Te marine growth associated with the installation jackets and weight
Note** Pipeline weights are inclusive of subsea manifold.

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	
Environmental Receptor	**Main Features**
Conservation interests	**Annex I Habitats** The LOGGS Satellite installations are located within the North Norfolk Sandbanks and Saturn Reef Site of Community Importance (SCI), currently under consideration as a UK Special Area of Conservation (SAC). Annex I habitats occurring in this area include sandbanks which are slightly covered by seawater all of the time and biogenic reef habitats formed by *Sabellaria spinulosa*. **Annex II Species** Annex II species likely to be sighted within the LOGGS area include harbour porpoise, grey seals and common or harbour seals (ES Section 4.2). The LOGGS Satellite installations are located within the Southern North Sea Candidate Special Area of Conservation (cSAC) designated in January 2017 for the protection of the Annex II species harbour porpoise *Phocoena phocoena.* The cSAC ranges in depth with the majority of the site shallower than 40m, and characterised by its sandy, coarse sediments which cover much of the site. The habitat of the designated site is thought to be preferred by harbour porpoise, likely due to availability of prey.
Seabed	The seabed in the vicinity of the LOGGS Satellite installations comprises of ripples and sand formations. The sediments are comprised of fine to coarse 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, 2013b) (ES Section 4.2.6). There is no evidence of bedrock, pockmarks or unusual or irregular bedforms. Dominant taxa are typical of the mobile sands and coarser sediments present across the decommissioning area. There is a high probability of *Sabellaria spinulosa* across the region. Aggregations of *Sabellaria spinulosa* were observed at the Viscount VO site (Fugro 2013b). However, these aggregations appeared flattened, possibly due to trawling, and were not considered to be reef (ES Section 4.2.6).

Table 4.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Fish	The LOGGS satellite installations are located within the spawning grounds of mackerel, herring, 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 throughout the year for mackerel, herring, cod, whiting, plaice, lemon sole, sandeel, Nephrops and tope shark (ES Section 4.4)
Fisheries	Fishing activity in the LOGGS area is described as moderate to low. Vessel Monitoring Satellite data indicates that the majority of the fishing effort is targeted out with the area. The Netherlands have the greatest fishing interests in the area with between 30-35 vessels engaged in fishing the grounds within which the decommissioning infrastructure is situated; however this is lower than activity observed further south. The Dutch vessels consist predominantly of beam trawlers fishing for demersal species. However, there is shift to electric beam trawl gear which requires a clean seabed; as a result fewer vessels are fishing near the current infrastructure (ES Section 4.8.1).
Marine Mammals	The main cetacean species occurring in the 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 4.6).
Birds	Seabirds found in the North Sea waters include fulmars, gannets, auks, gulls and terns. Peak numbers of seabirds occur following the breeding season and through winter. The overall seabird vulnerability to surface pollution in the decommissioning area is classified as moderate. March, August, November and December are the most sensitive times of year for seabirds, with vulnerability to oil pollution classified as very high (ES Section 4.5).
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 with a shipping route between the Vulcan UR installation and the Viscount VO and Vampire OD installations. (ES Section 4.8.4).

Table 4.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
	Oil & Gas Industry The infrastructure is located in the SNS gas basin which is currently home to 177 installations, eight of which are currently listed as un-operational (ES Section 4.8.2). See table 1.6 for a list of adjacent facilities. **Offshore Renewables** Hornsea Windfarm Zone / Njord Offshore Wind Farm is 40km north of Vampire OD. East Anglia is 47km south of Viscount VO. (ES Section 4.8.3).
Atmosphere	Local atmospheric emissions arise from the LOGGS operations, vessel use and nearby oil and gas facilities (ES Section 7).

4.2. Potential Environmental Impacts and their Management

4.2.1. Environmental Impact Assessment Summary

The potential environmental impacts associated with the LOGGS Satellites decommissioning activities have been assessed and it is concluded that the proposed decommissioning of the LOGGS satellites are unlikely to result in any significant environmental impacts. 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 7)	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 8)	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

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
		be used during the planning of vessel operations.
	Accidental hydrocarbon release (ES Section 12)	Hydrocarbon inventories are to be removed from the topsides prior to commencing removal operations. The SNS Oil Pollution Emergency Plan will be updated in agreement with BEIS to include all planned decommissioning operations.
Jacket Removal	Energy use and atmospheric emissions (ES Section 7)	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 8)	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 currently no intention to use explosives during these activities.
	Accidental hydrocarbon release (ES Section 12)	The SNS Oil Pollution Emergency Plan will be updated in agreement with BEIS to include all planned decommissioning operations.
	Seabed disturbance (ES Section 9)	The decommissioning operations will be carefully designed and executed so as to minimise the area of seabed that will be disturbed within the SCI. The introduction of new material to the marine environment is to be avoided or minimised throughout the proposed operations.
	Energy use and atmospheric emissions (ES Section 7)	All engines, generators and combustion plant on the vessels will be well maintained and

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
Decommissioning Pipelines		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 8)	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 the subsea manifold activities.
	Seabed disturbance (ES Section 9)	The operations to remove the pipeline ends and subsea manifold will be carefully designed and executed so as to minimise the area of seabed that will be disturbed within the SCI. Any rock introduced to the SCI will be minimised and will be carefully placed using a suitable vessel. 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. The subsea T-piece will be flushed and cleaned prior to removal. A chemical risk assessment will be undertaken and operations permitted under the Offshore Chemicals Regulations 2002 (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

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
		the receptors would be via the interstitial spaces in seabed 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).
	Accidental hydrocarbon release (ES Section 12)	Hydrocarbon inventories are to be removed from the subsea manifold prior to commencing removal operations. The SNS Oil Pollution Emergency Plan will be updated in agreement with BEIS to include all planned decommissioning operations.
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 zones where stabilisation features predominantly exist. Stabilisation features inherently overtrawlable by design.
Subsea Installation Removal	None	N/A
Decommissioning Drill Cuttings	No drill cuttings piles present	No drill cuttings piles present.

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: While we would endeavour to monitor this particular program of work with regards to the number of mattresses being left in situ the Federation has no other adverse comments.	Comments Noted
Statutory Consultees (GMS)	- Tampnet's fibre optic cable passes close to the area as noted in the Environmental Statement. Due to the very close proximity, it is vital to discuss the proposed operations with the cable owner to ensure there are no conflicts and that any interactions do not cause any danger to the integrity of their asset. - During any decommissioning operations, notice should be provided to the cable industry through ESCA (European Subsea Cables Association), or the Kingfisher fortnightly bulletin to inform other sea users ensure that any cable operations that could be taking place in the area at the time (maintenance or new installations) are not adversely impacted. - If clearance or recovery of out of service cables is required during operations there are guidelines from the ICPC (International Cable Protection Committee) regarding industry standard guidelines for this activity if any such operations are planned. They mostly relate to recovery prior to installation of a new cable system, but many of the principles will apply when looking at any recovery operation if it is deemed necessary. The OOS cable	Comments Noted

	owner will need to be confirmed to ensure that the systems are correctly charted and are definitely out of service prior to recovery.	
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. Programme 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 and 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 these Decommissioning Programmes 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 the LOGGS satellite installation sites. Oil and Gas seabed debris will be recovered for onshore disposal or recycling in line with existing disposal methods. The pipeline route within the LOGGS 500m zone will be surveyed as per the pipeline integrity inspection schedule for the LOGGS complex 500m zone. Independent verification of seabed state within the 500m zones will be obtained by trawling the platform area of each Satellite and the subsea manifold. This will be followed by a statement of clearance to all relevant governmental departments and statutory consultees.

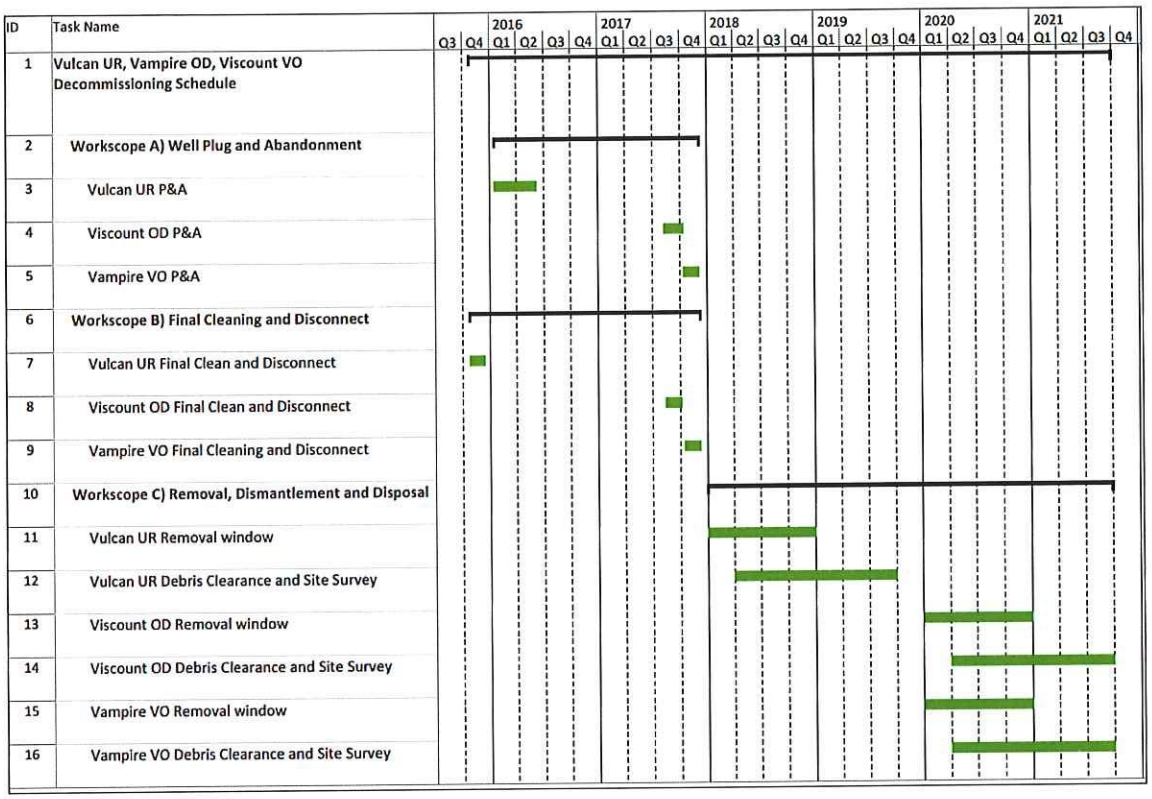
Based on the findings from the Comparative Assessment the Decommission in situ – minimum intervention is the preferred pipeline decommissioning option for LDP1. The evaluation criteria which contributed to the conclusions were safety, environment and cost. The location of the installations and pipelines in the North Norfolk Sandbanks and Saturn Reef Site of Community Importance (SCI) 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 SCI. Oil and gas debris activity and verification along the remaining pipeline corridor of the infield pipeline sections not subject to actual decommissioning works, will be provided by ConocoPhillips. This activity will reflect the environmental setting of the North Norfolk Sandbanks and Saturn Reef Site of Community Importance.

The outcomes of the overtrawl in the 500m zones and the alternative survey methods of the pipelines will be reported in the Close Out Report.

6.3. Schedule

A schedule of the proposed activities is outlined in the Gantt chart below. The timing of the activities is indicative of the current decommissioning plan, however actual execution will be dependent on the pace of the activities in the SNS-wide decommissioning campaign leading up to these activities and is subject to annual budgetary reviews.



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 Programme costs

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
Vulcan UR	Provided to BEIS*											
Viscount VO												
Vampire OD												
Valkyrie												
LDP1 Total												

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

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

Table 6.1: Decommissioning Costs

6.5. Close Out

On completion of the offshore decommissioning works covered by the scope of this document a Close Out Report will be submitted in accordance with the requirements in operation at that time. The close out report will contain debris removal and 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 once the offshore decommissioning work scope covered by these Decommissioning Programmes 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 Programmes' workscope 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-02-00004	Environmental Statement
BMT-SNS-V-XX-X-HS-02-00003	Comparative Assessment
COP-SNS-P-XX-X-HS-02-00001	Supporting Information for Cumulative Environmental Impact Assessment

8. Partner Letters of Support

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Decommissioning Business Manager
North Sea

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20th November 2017

Offshore Petroleum Regulator for Environment
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Manager

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Mobile 07825 675 964
sandra.turin@bp.com

Dear Fiona,

PETROLEUM ACT 1998
LOGGS Satellites Vulcan UR, Viscount VO and Vampire OD Satellites and Associated Infield Pipelines Decommissioning Programmes

We acknowledge receipt of your letter dated 14th November 2017.

We, Arco British Limited LLC (company number FC005677), a company incorporated in the United States and with an overseas company address at 1209 Orange Street, Wilmington, Delaware, De 19801, United States, as a holder of a section 29 notice relative to the LOGGS Satellite Vulcan UR field 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 Portman House, 2 Portman Street, London, W1H 6DU, to submit on our behalf an abandonment programme relating to LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD & Associated Infield Pipelines as directed by the Secretary of State on 14th November 2017.

We confirm that we support the proposals detailed in the LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD & Associated Infield Pipelines Decommissioning Programme dated 15th November 2017, which is to be submitted by ConocoPhillips (U.K.) Limited in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours sincerely,

Sandra Turin
Decommissioning Business Manager
For and on behalf of Arco British Limited, LLC (company number FC005677)

[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

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20th November 2017

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LOGGS Satellites Vulcan UR, Viscount VO and Vampire OD Satellites and Associated Infield Pipelines Decommissioning Programmes

We acknowledge receipt of your letter dated 14th November 2017.

We, BP Exploration Beta Limited (company number 00895797), a company incorporated in a company incorporated in England and having a registered office at Chertsey Road, Sunbury on Thames, Middlesex, TW16 7BP, as a holder of a section 29 notice relative to the LOGGS Satellites Viscount VO, Vampire OD 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 Portman House, 2 Portman Street, London, W1H 6DU, to submit on our behalf an abandonment programme relating to LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD & Associated Infield Pipelines as directed by the Secretary of State on 14th November 2017.

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Sandra Turin
Decommissioning Business Manager
For and on behalf of BP Exploration Beta Limited (company number 00895797)

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LOGGS Satellites Vulcan UR, Viscount VO and Vampire OD Satellites and Associated Infield Pipelines Decommissioning Programmes

We acknowledge receipt of your letter dated 14th November 2017.

We, BP Exploration (Alpha) Limited (company number 01021007), a company incorporated in England and having a registered office at Chertsey Road, Sunbury on Thames, Middlesex, TW16 7BP, as a holder of a section 29 notice relative to the LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD 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 Portman House, 2 Portman Street, London, W1H 6DU, to submit on our behalf an abandonment programme relating to LOGGS Satellites Vulcan UR, Viscount VO, Vampire OD & Associated Infield Pipelines as directed by the Secretary of State on 14th November 2017.

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