

# *MacCulloch Field Decommissioning Programmes*

**ConocoPhillips**

*Subsea Infrastructure and associated  
Infield pipelines*

### Document Control

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## A. Table of Terms and Abbreviations

Abbreviation	Explanation
API	American Petroleum Institute gravity
bbl	Barrels
OPRED	Department for Business, Energy and Industrial Strategy
CA	Comparative Assessment
CoP	Cessation of Production
CNS	Central North Sea
EA	Environmental Assessment
EDC	East Drill Centre
EIA	Environmental Impact Assessment
EIC	Energy Industry Council
EMS	Environmental Management System
FPSO	Floating Production Storage and Offtake vessel
HLV	Heavy Lift Vessel
KP	Kilometre Point
KPI	Key Performance Indicator
LAT	Lowest Astronomical Tide
MAT	Master Application Template
MeOH	Methanol
NORM	Naturally Occurring Radioactive Material
mmbbls	Million barrels
NSP	North Sea Producer
NSPC	North Sea Production Company
OGA	Oil and Gas Authority
OGUK	Oil and Gas United Kingdom
P&A	Plug and Abandon
PLEM	Pipeline End Manifold
PMT	Project Management Team
PWA	Pipeline Works Authorisation
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SAT	Subsidiary Application Template
SCI	Site of Community Importance
SFF	Scottish Fishermen's Federation
SLV	Single Lift Vessel
SS	Subsea
SSIV	Subsea Isolation Valve
STOOIP	Stock Tank Original Oil In Place
SCAT	Supply Chain Action Plan
Te	Tonne
RSR	Repsol-Sinopec
Tscf	Trillion standard cubic foot
UKCS	United Kingdom Continental Shelf
WDC	West Drill Centre
X-trees	Xmas Trees

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## **1. Executive Summary**

### **1.1. Combined Decommissioning Programmes**

This document contains two decommissioning programmes for the MacCulloch Field:

- (1) MacCulloch subsea installations
- (2) MacCulloch intra field pipelines

The North Sea Producer Floating Production Storage and Offtake (FPSO) vessel was removed from the field in August 2015 and decommissioning of this vessel is the responsibility of the vessel owners and is therefore not considered in this programme. The FPSO does not form part of these Decommissioning Programmes but is referenced in this document for completeness.

### **1.2. Requirement for Decommissioning Programmes**

#### **Installations:**

In accordance with the Petroleum Act 1998, ConocoPhillips (U.K.) Limited, as Operator of the MacCulloch Field and on behalf of the Section 29 notice holders (see Table 1.2 and Section 8), is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning of the MacCulloch subsea facilities and mooring system detailed in Section 2 of this programme.

#### **Pipelines:**

In accordance with the Petroleum Act 1998, ConocoPhillips (U.K.) Limited as Operator and on behalf of the Section 29 notice holders of the MacCulloch pipelines (see Table 1.4 and Section 8), is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the pipelines detailed in Section 2 of this programme.

In conjunction with public, stakeholder and regulatory consultation, the decommissioning programmes are submitted in compliance with national and international regulations and with consideration of OPRED guidelines.

Preparation for decommissioning of the MacCulloch Field started on the 3rd May 2015 following the Cessation of Production which was approved by OGA on the 14<sup>th</sup> May 2015. The first phase of decommissioning continued until August 2015 when the North Sea Producer, the FPSO vessel, was removed from the area. During this initial decommissioning phase, the pipelines were flushed and made hydrocarbon free and the risers and mid water arches were retrieved for recycling/disposal. In 2017, all of the wells were successfully suspended with two isolation barriers using a Light Well Intervention Vessel, the Helix Well Enhancer. The schedule outlined in section 6.3 is for a full decommissioning programme.

### **1.3. Introduction**

The MacCulloch field is in UK Central North Sea (CNS) Block 15/24b, in a water depth of 149 metres. Developed in 1996/97 the field had an expected life of ten years. Production commenced via the FPSO in August 1997.

The MacCulloch field was developed using an FPSO vessel, the North Sea Producer. This vessel was owned by the North Sea Production Company (NSPC). MacCulloch production was via two

Drill Centres, West (WDC) and East (EDC), located 1.6 km and 2.9 km to the West and South East of the vessel location respectively.

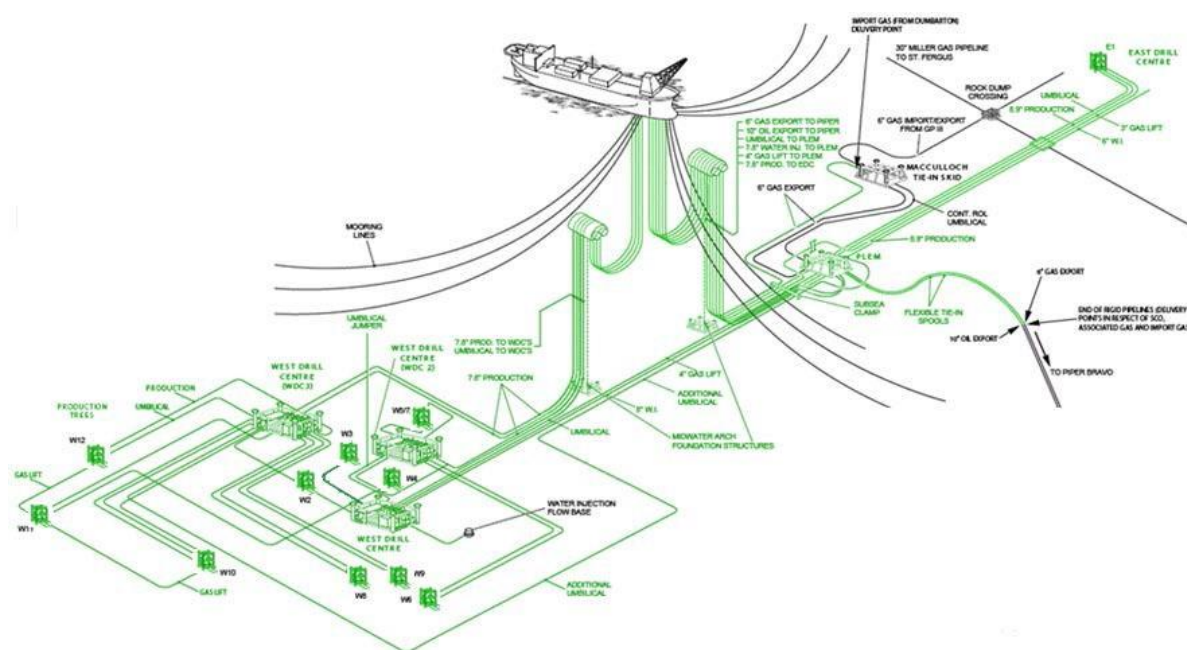
Eleven gas lifted production wells produced through two drill centres. Ten wells produced through three flexible flowlines from WDC and one well produced from EDC. Oil and gas were exported from the FPSO vessel to the Repsol Sinopec (RSR) Operated Piper Bravo platform through the RSR owned 10" oil pipeline and 6" gas pipeline.

The MacCulloch reservoir produced light crude, 32-37° API. At the point of development, recoverable reserves were estimated at 58 mmbbls. On 3<sup>rd</sup> May 2015 the field had produced 119 mmbbls (a 50% recovery factor) from an estimated 241 mmbbls STOPIP.

Producing around 60,000bbl/day at its peak, production declined to around 7,200 bbl/day gross with five wells remaining online and an average water cut of ~88% prior to the MacCulloch Cessation of Production.

The remaining decommissioning process for the MacCulloch assets will be achieved by the removal, dismantling and disposal of subsea facilities and the well plugging and abandonment programme as outlined in table 1.5.

The NSP FPSO was disconnected from the MacCulloch infrastructure in 2015 following a pipeline flushing programme, these works were conducted via an exchange of correspondence agreed with OPRED. Thereafter the vessel was taken to Teesside by the owners for reuse and recycling. In 2017 the MacCulloch Owners undertook a well intervention campaign, installing 2 verified well suspension barriers (bridge plugs) in each well, one deep and one shallow, to isolate the Xmas-trees from the reservoir pressure. Pressure gauges were installed in each well to allow ongoing monitoring of the well suspension barriers.



**Figure 1.1 MacCulloch Subsea Facilities**

MacCulloch subsea facilities for which the MacCulloch Field Owners are responsible for decommissioning is highlighted green in Figure 1.1. The MacCulloch Field Owners are also responsible for the decommissioning of the mooring system and anchors, currently resting on the seabed post disconnection from the FPSO.

Infrastructure not falling under ConocoPhillips responsibility for decommissioning and not covered by this Decommissioning Programmes includes:

- The FPSO vessel (owned by NSPC)
- Rigid export pipelines (owned by Repsol Sinopec)
- Infrastructure associated with Donan gas export tie-ins (owned by the Donan Field Owners, Operated by Maersk Oil)

## 1.4. Overview of Installations and Pipelines Being Decommissioned

### 1.4.1. Installations

Table 1.1 Installations being Decommissioned			
Field Names		Quad / Block	
Fields	MacCulloch	Production Type	Oil
Water Depth	149 m	UKCS block	Quad 15 Blocks 24B

Surface Installations			
Number	Type	Topsides Weight (Te)	Jacket Weight (Te)
0	n/a	n/a	n/a

Subsea Installations		Number of Wells	
Number	Type	Number	Type
4**	Manifolds	13*	subsea

\* please reference table 2.5 for full details.

\*\* The PLEM is included in this table.

Mooring System	
Anchors	Anchor Chains and Wires
9	9

Drill Cuttings Piles		Distance to Median	Distance from nearest UK coastline
Number of Piles	Total Est volume m <sup>3</sup>	km	km
0	0	46 km	172 km

See Figure 1.1 for further details.

Table 1.2 Installation Section 29 Notice Holder Details		
Section 29 Notice Holders	Registration Number	Equity Interest
ConocoPhillips (U.K.) Limited	00524868	40%
Eni UK Limited	00862823	40%
Noble Energy (OILEX) Limited	00797339	14%
Rigel Petroleum (NI) Limited	NI029801	6%



## 1.4.2. Pipelines

Table 1.3 Pipelines being Decommissioned		
Number of Pipelines	22	See table 2.3

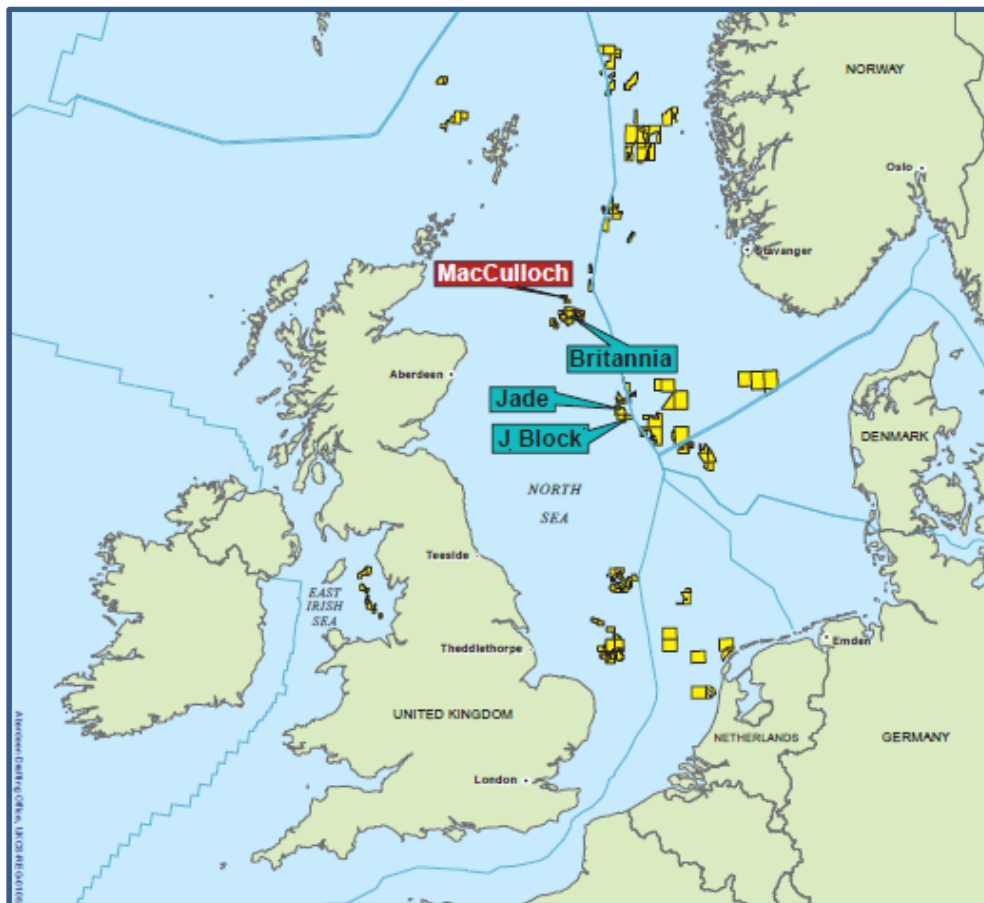
Table 1.4 Pipeline Section 29 Notice Holder Details		
Section 29 Notice Holders	Registration Number	Equity Interest
ConocoPhillips (U.K.) Limited	00524868	40%
Eni UK Limited	00862823	40%
Noble Energy (OILEX) Limited	00797339	14%
Rigel Petroleum (NI) Limited	NI029801	6%

## 1.5. Summary of Proposed Decommissioning Programme

Table 1.5 Summary of Decommissioning Programmes		
Selected Option	Reason for Selection	Proposed Decommissioning Solution
<b>1. Topsides</b>		
N/A	N/A	Production was via an FPSO that was removed from the area in August 2015
<b>2. Jackets</b>		
N/A	N/A	Production was via an FPSO.
<b>3. Subsea Installations</b>		
Three Drill Centres. Complete removal (The drill centres piles will be cut 3 metres below seabed), dismantlement and reuse/recycling and disposal	Meets OPRED regulatory requirements. Equipment is obsolete. To leave a clear seabed.	Removed by construction support vessel, transported to appropriate land-based facility for dismantlement, recycling and disposal.
<b>4. Pipelines, Flowlines and Umbilical's</b>		
Pipelines, PLEM, and SSIV's have been cleaned/ flushed.	Minimal seabed disturbance, lower energy usage reduced risk to personnel and to leave a clear seabed	Pipelines were flushed prior to removal of the FPSO.  All buried pipeline, flowlines and umbilical's will be removed for recycling and disposal per recommendations of the Comparative Assessment.

Table 1.5 Summary of Decommissioning Programmes		
Selected Option	Reason for Selection	Proposed Decommissioning Solution
<b>5. Well Abandonment Operations</b>		
Permanent well Plug and Abandonment (P&A).	Meets HSE and OGA regulatory requirements	Abandonment in accordance with Oil and Gas UK Guidelines for the Suspension and Abandonment of Wells. Work will proceed when all required permits have been acquired.
<b>6. Drill Cuttings</b>		
None required.	No Drill Cuttings Piles have been identified by seabed survey.	None required.
<b>7. Interdependencies</b>		
The FPSO has been removed from the field area. The Donan Field disused gas export pipeline ties into the MacCulloch gas export pipeline via the MacCulloch tie in skid.		

## 1.6. Field Location Including Field Layout and Adjacent Facilities



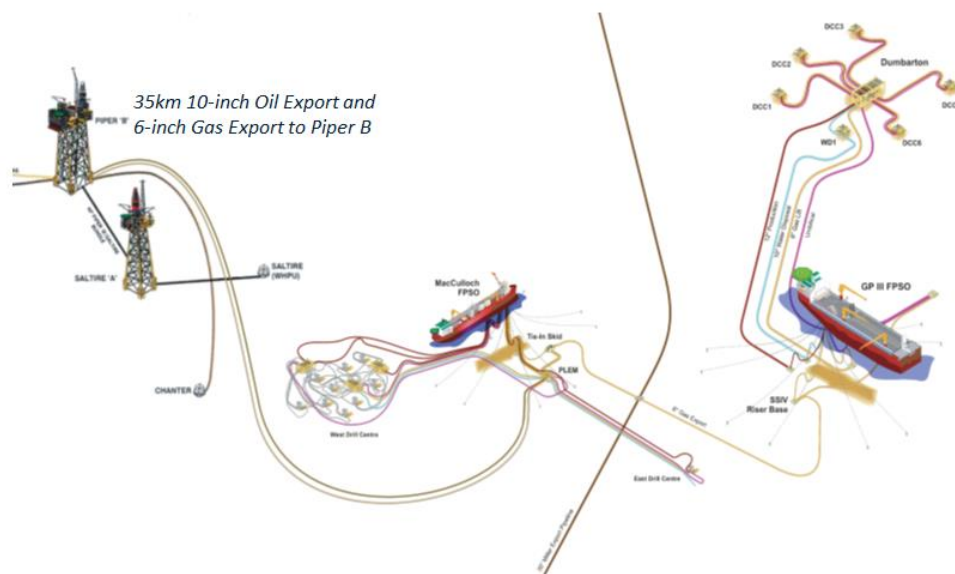
**Figure 1.2 – MacCulloch Field Location Map**

The MacCulloch field was a standalone developed using an FPSO. Oil and gas was exported to the Piper platform prior to onward transportation to the Flotta Oil Terminal.

Table 1.6 List of Adjacent Facilities					
Owner	Name	Type	Distance / Direction	Information	Status
Maersk Oil	Donan	FPSO Global Producer III	~10km NE	Donan Fields exports gas via the MacCulloch to Piper.	Operational
Repsol Sinopec Energy (UK) Ltd	Piper B	Oil Installation	~30km NW	MacCulloch Oil and Gas was exported to Piper	Operational
Repsol Sinopec Energy (UK) Ltd	Flotta Oil Terminal	Oil Terminal	Canmore at Scapa Flow	MacCulloch Oil was exported to Flotta	Operational
BP	Miller 30" Gas Pipeline	Pipeline	Proximal to the east drill centre	The production umbilical's from the east drill centre cross this Pipeline	Disused

**Impacts of Decommissioning Proposals**

There is no anticipated impact on adjacent facilities from the decommissioning of the MacCulloch facilities. The Donan gas export route is unused and the Piper facilities have not received oil or gas from MacCulloch since May 2015.



**Figure 1.3 – Adjacent Facilities to the MacCulloch Field**

## 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 MacCulloch Field are listed below:

1. ConocoPhillips participates in the PILOT Share Fair events providing one to one sessions with the UK supply chain on the CNS 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. ConocoPhillips has developed a Supply Chain Action Plan (SCAP) that has been shared with the OGA.
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)

Decommissioning of the North Sea Producer FPSO and associated topsides was completed by the MacCulloch Field owners and the owners of the installation, the North Sea Production Company (NSPC) under approval granted via an exchange of correspondence with OPRED. The North Sea Producer FPSO weighted 99,800 te and was sited at location 58° 19' 27.399" N 00° 41' 53.594" E. Decommissioning of the topsides facilities is not considered in this decommissioning programme.

### 2.2. Subsea Installations and Stabilisation Features

<b>Table 2.2 Subsea Installations and Stabilisation Features</b>				
<b>Subsea Installations and Stabilisation Features</b>	<b>Number</b>	<b>Total Weight (Te)</b>	<b>Locations</b>	<b>Comments</b>
Wellheads	13	225	WDC 457 251.44N 365 173.65E EDC 464 653.00N 368 440.00E	The only exploration well not suspended is the 15/24b-5 well
Well Control Modules	10	20	As above	Located at the drill centres
Manifolds*	4	274	As above	PLEM WDC1, WDC2, WDC3
Manifold piles	16	240	As above	As above
Templates	0	0	N/A	N/A
Protection Frames**	0	0	N/A	N/A
SSIV***	2	Integral	Within the PLEM	N/A
Mid-water arch base	2	104	467 149.3N 366 800,0N	MacCulloch 500m zone
Mid water arch base piles	4	80	As above	MacCulloch 500m zone
Mid-water arch buoyancy tanks (Inc. tethers)	2	170	Recovered	Recovered
Lateral pipeline restraint (Inc. pile)	1	25	Recovered	MacCulloch 500m zone
Concrete mattresses	0	0	N/A	MacCulloch Field wide
Grout bags	3920****	98	N/A	MacCulloch Field wide
Formwork	0	0	N/A	N/A
Froned mats	0	0	N/A	N/A
Rock dump	0	0	N/A	N/A
Other	0	0	N/A	N/A

Note:

\*Tie-in skid not included (To be included in the Donan Field Decommissioning Programme)

\*\*Built-in tree protection frames included in wellhead data

\*\*\*Both SSIVs are built into the PLEM manifold and will be decommissioned as one component

\*\*\*\*Assumes an average grout bag weight of 25 kgs

## 2.3. Pipelines Including Stabilisation Features

**Table 2.3 Pipeline/ Flowline/ Umbilical Information**

Description	Pipeline No (as per PWA)	Diameter (inches)	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points	Burial Status/Average Depth of Cover 'DOC' (m) **	Pipeline Status	Original / Current Content
Production Flowline and Jumper	PL1326	7.8"/4.0"	1.6	Steel with finathene sheath.	Oil	Riser-WDC3 W2-WDC3 W3-WDC3 W8-WDC3 W9-WDC3	16m exposed, remaining length trenched & buried Average DOC 0.55	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons
Production Jumper	PL1326JW10	4"	0.1	Steel with finathene sheath.	Oil	WDC3-W2 & WDC3-W3 & WDC3-W8 & WDC3-W9 WDC3-W10	On seabed, covered by concrete mattresses Surface laid	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons
Production Flowline	PL1327	7.8"	1.4	Steel with finathene sheath.	Oil	Riser-WDC3	20m exposed, remaining length trenched & buried Average DOC 0.57	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons
Production Jumper	PL1327JW12	6"	0.1	Steel with finathene sheath.	Oil	WDC3-W12	On seabed, covered by concrete mattresses Surface laid	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons
Production Flowline and Jumpers	PL1328	7.8"/4.0"	1.5	Steel with finathene sheath.	Oil	Riser-WDC2 W4-WDC2 W5-WDC2 W6-WDC2	38m exposed, remaining length trenched & buried Average DOC 0.51	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons

**Table 2.3 Pipeline/ Flowline/ Umbilical Information**

Description	Pipeline No (as per PWA)	Diameter (inches)	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points	Burial Status/Average Depth of Cover 'DOC' (m) **	Pipeline Status	Original / Current Content
Production Jumper	PL1328JW11	4"	0.2	Steel with finathene sheath.	Oil	WDC2-W4 WDC2-W5/7 WDC2-W6 WDC2-W11	On seabed, covered by concrete mattresses Surface laid	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons
Production Flowline	PL1329	8.9"	2.8	Steel with finathene sheath.	Oil	Riser-EDC	83m exposed, remaining length trenched & buried Average DOC 0.60	Out of use	Production Fluids / Untreated seawater with <30mg/l hydrocarbons
Gas Lift Flowline	PL1330	4"/3.0"/2.5"	2.3	Steel with finathene sheath.	Gas	PLEM-WDC WDC-W4 WDC-W3 WDC-W2 WDC-WDC2 WDC2-W5 WDC2-W6 WDC-WDC3 WDC3-W8 WDC3-W9	65m exposed, remaining length trenched & buried Average DOC 0.77	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbon
Gas Lift Jumper	PL1330JW10	2.5"	0.1	Steel with finathene sheath.	Gas	WDC-WDC2 WDC-WDC3 WDC2-W5/7 WDC2-W6 WDC3-W8	On seabed, covered by concrete mattresses Surface laid	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbons
Gas Lift Flowline	PL1331	3"	2.8	Steel with finathene sheath.	Gas	PLEM-EDC	57m exposed, remaining length trenched & buried Average DOC 0.97	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbons

**Table 2.3 Pipeline/ Flowline/ Umbilical Information**

Description	Pipeline No (as per PWA)	Diameter (inches)	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points	Burial Status/Average Depth of Cover 'DOC' (m) **	Pipeline Status	Original / Current Content
Water Injection Flowline	PL1332	8"/4.0"	2.0	Steel with finathene sheath.	Water	PLEM-WDC WDC-WI	52m exposed, remaining length trenched & buried Average DOC 0.65	Out of use	Water / Seawater I
Water Injection Flowline	PL1333	6"	2.8	Steel with finathene sheath.	Water	PLEM-EDC	49m exposed, remaining length trenched & buried Average DOC 0.81	Out of use	Water / Seawater
Chemical/ Control Umbilical	PL1334 PL1334.1-5	NA	2.3	Steel Armour Wires, Binding Tape, Polypropylene	Chemicals, Hydraulic Fluids	PLEM-WDC3 WDC3-WDC WDC-WDC2 WDC-W2 WDC-W3 WDC-W4 WDC2-W5/7 WDC-W6 WDC3-W8 WDC3-W9 WDC3-W10 WDC3-W11 WDC3-W12 Riser-WDC	PL1334 - 562m exposed, remaining length trenched & buried Average DOC 0.67  PL1334.1-5 On seabed, covered by concrete mattresses Surface laid	Out of use	NA / Seawater
Chemical/ Control Umbilical	PLU1334JW10	NA	0.1	Steel Armour Wires, Binding Tape, Polypropylene	Chemicals, Hydraulic Fluids	WDC3-W10	On seabed, covered by concrete mattresses Surface laid	Out of use	NA / Seawater
Power & Signal	PL1334.2JW10	NA	0.1	Steel Armour Wires, Binding Tape, Polypropylene	Power	WDC3-W10	On seabed, covered by concrete mattresses Average DOC 0.65	Out of use	NA



**Table 2.3 Pipeline/ Flowline/ Umbilical Information**

Description	Pipeline No (as per PWA)	Diameter (inches)	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points	Burial Status/Average Depth of Cover 'DOC' (m) **	Pipeline Status	Original / Current Content
Chemical/ Control Umbilical	PLU1334JW11	NA	0.1	Steel Armour Wires, Binding Tape, Polypropylene	Chemicals, Hydraulic Fluid	WDC3-W11	On seabed, covered by concrete mattresses Surface laid	Out of use	NA / Seawater
Chemical/ Control Umbilical	PLU1334JW12	NA	0.1	Steel Armour Wires, Binding Tape, Polypropylene	Chemicals, Hydraulic Fluid	WDC3-W12	On seabed, covered by concrete mattresses Surface laid	Out of use	NA / Seawater
Chemical/ Control Umbilical	PL1335	NA	3.0	Steel Armour Wires, Binding Tape, Polypropylene	Power	Riser-EDC	53m exposed, remaining length trenched & buried Average DOC 0.81	Out of use	NA / Seawater
Oil Export	PL1336	10"	0.1	Rigid Steel Pipeline	Oil	Within PLEM	On seabed within PLEM (disconnected)	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbons /l
Gas Export	PL1337	6"	0.1	Rigid Steel Pipeline	Gas	Within PLEM	On seabed within PLEM (disconnected)	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbons /l
Gas Lift Jumper	PL2569	2.5"	0.1	Steel with finathene sheath.	Gas	W10-W11	On seabed, covered by concrete mattresses Surface laid	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbons /l
Gas Lift Jumper	PL2571	2.5"	0.1	Steel with finathene sheath.	Gas	W11-W12	On seabed, covered by concrete mattresses Surface laid	Out of use	Gas / Untreated seawater with <30mg/l hydrocarbons

Note \*Table reflects the current status following the completion of the first phase of decommissioning

\*\*Data taken from the most recent survey

**Table 2.4 Subsea Pipeline Stabilisation Features**

<b>Stabilisation Feature</b>	<b>Total Number*</b>	<b>Weight (Te)*</b>	<b>Locations</b>	<b>Exposed / Buried / Condition</b>
<i>Concrete mattresses</i>	30	180	<i>PL1326</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	22	132	<i>PL1327</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	26	156	<i>PL1328</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	50	300	<i>PL1329</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	15	90	<i>PL1330</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	13	78	<i>PL1331</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	22	132	<i>PL1332</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	19	114	<i>PL1333</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	27	162	<i>PL1334.1-5</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	22	130	<i>PL1334</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
	45	272	<i>PL1335</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
<i>Grout bags</i>	<i>Approx. 2800</i>	<i>90</i>	<i>West and East Drill Centres at Manifolds</i>	<i>Exposed during 2008, 2012, 2014 surveys</i>
<i>Formwork</i>	<i>None</i>			
<i>Froned mats</i>	<i>None</i>			
<i>Rock Dump</i>	<i>None</i>			
<i>Other</i>	<i>None</i>			

**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. The 191 Te mattresses quoted in the table above are located on the main flowlines however there are also a large amount of mattresses located at the drill centres (circa 220) used as a stabilisation feature for jumpers i.e. total number of mattresses circa 510.

The pipeline listing reflects the current status following the initial phase of decommissioning conducted in 2015.

## 2.4. Wells

Table 2.5 Well Information			
Subsea Wells	Designation	Status	Category of Well
GB_015_24B_E01	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W02	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W03	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W04	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W06	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W07	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W08	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W09	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W10	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W11	Oil Production	Plugged	SS 4-4-3
GB_015_24B_W12	Oil Production	Plugged	SS 4-4-3
GB_015_24B_WEB	Water Injection – Top Hole Only	Suspended	SS 0-0-3
GB_015_24B_5	Appraisal	Suspended	SS 3-4-3

*Note:* Status of wells prior to commencement of P&A campaign 2018

For further details of well categorisation see OGUK guidelines for the Suspension or Abandonment of Wells –Issue 6 –June 2018.

## 2.5. Drill Cuttings

Table 2.6 Drill Cuttings Pile Information		
Location of Pile Centre (Latitude / Longitude)	Seabed area (m <sup>2</sup> )	Estimated volume of cuttings (m <sup>3</sup> )
No cuttings pile present	0	0

When drilling the MacCulloch wells, drill cuttings were transferred to a skip and shipped onshore (in line with the ConocoPhillips' practice associated with wells drilled with oil-based muds). Therefore, there are no contaminated cutting piles present and no decommissioning actions will be required. A 2012 Fugro survey (Fugro, 2013) found no evidence of cuttings piles in the MacCulloch field.

## 2.6. Inventory Estimates

Table 2.7 Current Installation Material Functional Category Summary							
Installation	Haz Mat / NORM	Concrete	Ferrous Metal	Non-Ferrous Metal	Plastics	Other Non-Haz	Total
	Te	Te	Te	Te	Te	Te*	Te
Mid water arches	0	0	450	0	0	1	451
Risers	0	0	368	0	53	0	421
Manifolds	0	0	320	0	0	1	321
Mooring System	0	0	1530	0	0	0	1530
<b>Total</b>	<b>0</b>	<b>0</b>	<b>2668</b>	<b>0</b>	<b>53</b>	<b>2</b>	<b>2723</b>

*Note\** Weights exclude the calculated 831 Te marine growth associated with MacCulloch field inventory

Table 2.8 Pipeline and Mattress Material Functional Category Summary								
Installation	Description	Haz Mat / NORM	Concrete	Ferrous Metal	Non-Ferrous Metal	Plastics	Other Non-Haz	Total
		Te	Te	Te	Te	Te	Te*	Te
Pipelines **	PL1326-37 PL2569 PL2571	0	0	1712	0	149	0	1861
Mattresses	-	0	3060	0	0	0	0	3060
<b>Total</b>		<b>0</b>	<b>3060</b>	<b>1712</b>	<b>0</b>	<b>149</b>	<b>0</b>	<b>4921</b>

*Note* \*Weights exclude the calculated 831 Te marine growth associated with MacCulloch field inventory

\*\*Pipelines include jumpers and umbilicals.

Please reference the Environmental Assessment for further details.

### **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 MacCulloch Subsea facilities 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 MacCulloch facilities were identified. The MacCulloch facilities 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 the facilities is to remove, dismantle and dispose of them, ensuring a high level of material recycling.

#### **3.1. Topsides**

Not Applicable. No topside facilities are to be decommissioned in this programme. The FPSO was removed from the field area by the vessel owners in August 2015 and subsequently berthed at Teesside.

#### **3.2. Jacket**

Not Applicable. No Jacket is to be decommissioned

### 3.3. Subsea Installations and Stabilisation Features

Table 3.1 Subsea Installations and Stabilisation Features			
Subsea installations and stabilisation features	Number	Option	Disposal Route
Wellheads	13	Full Removal	Return to shore for re-use or recycling
Manifolds	4	Full Removal	Return to shore for re-use or recycling
Mid water arch bases	2	Full Removal	Return to shore for re-use or recycling
Templates	0	None	None
FPSO Anchors	9	Leave in situ*	None
FPSO Anchor Chains	9	Full Removal	Return to shore for recycling
Protection frames	0	None	None
SSIV	0	None	None
Concrete mattresses	0	None	None
Grout bags	0	None	None
Formwork	0	None	None
Froned mats	0	None	None
Rock dump	0	None	None
Other	0	None	None

Note \*due to the significant depth of burial

### 3.4. Pipelines

#### 3.4.1. Decommissioning Options

Table 3.2: Pipeline or Pipeline Groups / Decommissioning Options			
Pipeline or Group (as per PWA)	Condition of line / group	Whole Group	Decommissioning Options considered
PL1326-1337 PL2569 PL2571 Pipelines	Trenched, Buried, spanning	Pipelines will be disconnected on seabed	Partial and total removal has been considered
PL1326-1337 PL2569 PL2571 Jumpers	Surface laid on seabed, covered by concrete mattresses	Jumpers will be disconnected on seabed	Full removal

### 3.4.2. Comparative Assessment Method

A two-phase process was used; initial 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 the pipelines, mattresses and mooring system included within the scope of the decommissioning programme 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.

Five decommissioning options were identified and considered by ConocoPhillips for assessment of Technical Feasibility of the decommissioning of the infield pipelines; these included:

- Decommission in situ, no intervention
- Decommission in situ, burial of exposed sections
- Decommission in situ, rock dump exposed sections
- Partial removal and burial
- Complete Removal

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.

In each case two options were taken forward; for the flowlines and umbilical's the options were partial removal and full removal; the options for the concrete mattresses were leave in situ and full removal and the options for mooring system partial removal and full removal.

Based on technical feasibility and the risk of major operations failure, all five decommissioning options progressed to the second phase of the comparative assessment

<b>Table 3.3: Outcomes of Comparative Assessment</b>		
<b>Pipeline or Group</b>	<b>Recommended Option</b>	<b>Justification</b>
PL1326 PL1327 PL1328 PL1329 PL1330 PL1331 PL1332 PL1333 PL1334 PL1335 PL1336 PL1337 PL2569 PL2571	Full Removal	Pipelines and mattress were subject to a formal comparative assessment which concluded that full removal of the exposed pipelines and mattress was the preferred option

### 3.5. Pipeline Stabilisation Features

Table 3.4: Pipeline Stabilisation Features			
Stabilisation features	Number	Option	Disposal Route
Concrete mattresses	510*	Mattress were subject to a formal comparative assessment which concluded that removal of the exposed mattress was the preferred option, however in the event of practical difficulties OPRED will be consulted.	Return to shore for reuse or recycling
Grout bags	2800	Grout bags were subject to a formal comparative assessment which concluded that removal of the exposed grout bags was the preferred option, however in the event of practical difficulties OPRED will be consulted.	Return to shore for reuse or recycling
Formwork	None	NA	NA
Froned mats	None	NA	NA
Rock dump	None	NA	NA
Other			

Note: \*Quantities of mattress and grout bags based on previous studies Pipeline & Mattress Historical & Present Conditions Review (2135-REP-002) completed at the MacCulloch field.



### 3.6. Wells

<b>Table 3.5: Well Plug and Abandonment</b>
<p>The wells which require 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.</p> <p>The 13 conventionally completed wells (11 production wells, one unfinished injector and the appraisal well) will be plugged and abandoned by a semi-submersible Mobile Offshore Drilling Unit in an estimated 460-day programme of work, which will commence in 2019.</p> <p>A Master Application Template (MAT) and the supporting Subsidiary Application Templates (SATs) will be submitted in support of all well plug and abandonment activities.</p>

### 3.7. Drill Cuttings

#### 3.7.1. Drill Cuttings Decommissioning Options

Not applicable, a 2012 Fugro survey (Fugro, 2013) found no evidence of cuttings piles from around the MacCulloch Facilities covered by this decommissioning programme.

### 3.8. Waste Streams

<b>Table 3.6: Waste Stream Management Methods</b>	
<b>Waste Stream</b>	<b>Removal and Disposal method</b>
Bulk liquids	All flow lines, pipelines, risers and well-heads were emptied of production fluids and cleaned to a defined level of cleanliness. The disposal route for all effluent arising from the drain-down and flushing of hydrocarbon systems was to the Flotta terminal for onward processing (for further information see the MacCulloch DCA/16 MAT)
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	NORM has not been identified with the remaining MacCulloch facilities. Where any product containing, or suspected to contain, NORM materials are recovered they will 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 (EIA Section 8).
Asbestos	Asbestos has not been identified with the remaining MacCulloch facilities. In the event that any Asbestos is identified it will be taken onshore with the infrastructure identified for removal for handling at the appropriately permitted disposal yard prior to onshore disposal.
Other hazardous wastes	No other hazardous wastes have been identified with the remaining MacCulloch facilities. In the event that any hazardous wastes are

	identified they will 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 proven materials re-use and recycling performance including the use of innovative materials management practices to minimise the quantity of materials disposed.

<b>Table 3.7: Inventory Disposition</b>			
	<b>Total inventory Tonnage</b>	<b>Planned Tonnage to shore</b>	<b>Planned Tonnage Decommissioned in situ</b>
Installations	2723	2723	0
Pipelines	1861	1861	0
Mattresses	3060	3060	0
Total	7644	5730	0

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.

## Environmental Impacts Assessment

### 4.1. Environmental Sensitivities (Summary)

Table 4.1: Environmental Sensitivities	
Environmental Receptor	Main Features
Conservation interests	<p><b>Annex I Habitats</b> There are a number of pockmarks present in the vicinity, varying in size between &lt;10 and 190 m across, with depths of up to 5.5 m below the surrounding seabed and gradients of up to 13° (Gardline, 2016). The Environmental baseline survey did not find any active pockmarks in the decommissioning area (Fugro, 2013).</p> <p>The MacCulloch Field is located approximately 10.5 km west of the Scanner Pockmark Special Area of Conservation (SAC).</p> <p>Annex I habitats occurring in this area include submarine structures made by leaking gases</p> <p><b>Annex II Species</b> Annex II species likely to be sighted within the MacCulloch field include harbour porpoise, bottlenose dolphin, grey seals and common or harbour seals.</p>
Seabed	<p>The nature of seabed sediments in the MacCulloch area of the North Sea results from a combination of hydrographic conditions, bathymetry and sediment supply. Sediments classified as either sand or muddy sand cover approximately 65% and 20% of the sea floor, respectively, in this area of the central North Sea. Gravelly sand, and small patches of gravel and sandy mud cover the remainder.</p> <p>There is no evidence of bedrock, pockmarks or unusual or irregular bedforms.</p> <p>Dominant taxa are typical of the very fine and silty sand sediments present across the decommissioning area.</p>
Fish	<p>The MacCulloch field is located within the spawning grounds of cod, <i>Nephrops</i> and Norway Pout.</p> <p>The infrastructure also lies within the nursery grounds throughout the year for anglerfish, blue whiting, cod, European hake, herring, ling, mackerel, <i>Nephrops</i>, Norway pout, sandeel, spotted ray, spurdog and whiting.</p>
Fisheries	<p>Fishing activity in the MacCulloch field is described as low.</p> <p>The MacCulloch field is situated within <i>Nephrops</i> fishing grounds and due to the relative close proximity to the main fishing harbours on the east coast of Scotland; these grounds experience a high presence of Scottish fishing vessels throughout the year. Fishing vessels active in the region include both UK and Danish vessels.</p>
Marine Mammals	<p>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, killer whale, bottlenose dolphin, Risso's dolphin and common dolphin.</p>

Table 4.1: Environmental Sensitivities	
Environmental Receptor	Main Features
	Pinnipeds sighted in the area include grey seals and harbour or common seals. Grey and harbour seals have breeding colonies on Orkney and Shetland, and can travel considerable distances from their haul-out sites on feeding trips. However, neither species of pinniped have been observed within, or in the vicinity of, Block 15.
Birds	<p>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.</p> <p>The overall seabird vulnerability to surface pollution in the decommissioning area is classified as moderate. July, August, October and November are the most sensitive times of year for seabirds, with vulnerability to oil pollution classified as high to very high.</p>
Onshore Communities	An onshore decommissioning facility will be used that complies with all relevant permitting and legislative requirements.
Other Users of the Sea	<p><b>Shipping</b> Shipping density in the area of the infrastructure to be decommissioned is considered to be low.</p> <p><b>Oil &amp; Gas Industry</b> Within the MacCulloch field 32 wells have been drilled. Twenty-two pipelines and cables associated with oil production and export intersect the field.</p> <p>See table 1.6 for a list of adjacent facilities.</p> <p><b>Offshore Renewables</b> There are no existing offshore wind farm licence (Round 1, 2 or 3 or Scottish Territorial Waters) or marine energy (wave and tidal) development areas within the vicinity of the MacCulloch field (ES Section 4)</p>
Atmosphere	Local atmospheric emissions arise from the MacCulloch operations, vessel use and nearby oil and gas facilities.

## 4.2. Potential Environmental Impacts and their Management

The potential environmental impacts associated with MacCulloch decommissioning activities have been assessed and it is concluded that the proposed decommissioning of the MacCulloch field can be completed without causing significant adverse impact to the environment. The results of the Environmental Assessment will accompany the Decommissioning Programmes.

The EA identifies potential environmental impacts by identifying interactions between the proposed decommissioning activities and the associated environmental receptors. The EA 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
Subsea Installation Removal	Energy use and atmospheric emissions.	<p>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.</p> <p>Vessel operations will be minimised where practical.</p>
	Underwater noise.	<p>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.</p> <p>There is no intention to use underwater explosives during these activities.</p>
	Accidental hydrocarbon release.	The CNS Oil Pollution Emergency Plan will be updated in agreement with OPRED to include all planned decommissioning operations.
	Seabed disturbance.	<p>The decommissioning operations will be carefully designed and executed so as to minimise the area of seabed that will be disturbed.</p> <p>The introduction of new material to the marine environment is to be avoided or minimised throughout the proposed operations.</p>
Pipeline Removal	Energy use and atmospheric emissions.	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.
	Underwater noise (EA Section 9)	The EA noise assessment has been completed to determine the likely impact of noise generated by the proposed operations on marine mammals in the surrounding area.

Table 4.2: Environmental Impact Management		
Activity	Main Impacts	Management
		The results of the assessment will be used during the planning of vessel operations.
Pipeline Removal	Seabed disturbance.	The operations to fully remove all infrastructure will be carefully designed and executed so as to minimise the area of seabed that will be disturbed. Full removal of all infrastructure (excluding anchors) will eliminate any future seabed disturbance.
	Discharges to sea.	The pipelines have been flushed prior to cutting of the pipeline ends and removal.  A chemical risk assessment was undertaken prior to commencing pipeline flushing and disconnect in accordance with The Offshore Chemicals Regulations 2002 (as amended 2011).
Stabilisation Material Removal	Seabed disturbance.	Rapid recovery of seabed. Activities covered on EA Justification and Marine Licence.
Decommissioning Drill Cuttings Piles	No drill cuttings piles present	No drill cuttings piles present.

*Note:* The overtrawlability surveys within the Drill Centres 500m zone will be conducted at the time of decommissioning the MacCulloch field.

#### 4. Interested Party Consultations

Table 5.1 Summary of Stakeholder Comments		
Stakeholder	Comment	Response
Statutory Consultees (GMS, SFF, NFFO, NIFPO)		
Other (Visned)		
Public		

## **5. 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, 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 OPRED.

### **6.2. Post-Decommissioning Debris Clearance and Verification**

A post decommissioning site and pipelines surveys will be carried out around a 500m radius of installation sites. A post decommissioning 100-meter-wide pipelines corridor survey will also be conducted. Oil and Gas seabed debris will be recovered for onshore disposal or recycling in line with existing disposal methods.

Independent verification of seabed state will be obtained by trawling the FPSO location and the two drill centres. The outcomes of the overtrawl surveys will be reported in the Close Out Report.

### 6.3. Schedule

The pipeline and the removal of the subsea infrastructure are expected to be complete in one summer session.

Table 6.1 – Decommissioning Schedule														
Activity	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Final Clean	■													
Disconnect	■													
Removal FPSO	■													
3D HR Survey		■												
LWIV Works			■											
Well P&A					■									
Sub-sea removal								■						
Post Removal Survey												■		
Close Out Report														■

*A second post removal survey will be conducted if required*

### 6.4. Costs

The decommissioning costs will be provided separately to OPRED and OGA.

### 6.5. Close Out

In accordance with OPRED guidelines a close out report will be submitted to OPRED within 12 months of completion of the offshore decommissioning scope covered by this decommissioning document. A pipeline and 500m safety zone surveys will be carried out. The close out report will contain the results of the debris removal surveys 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 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. All pipeline routes will be the subject of surveys when the decommissioning activity covered by this decommissioning document has concluded.

The requirement for future surveys will be discussed and agreed with OPRED.



## 6. Supporting Documents

Table 7.1 - Supporting Documents	
Document Number	Title
RPS-CNS-M-MAC-X-HS-02-00002	Environmental Assessment
RPS-CNS-M-MAC-X-HS-02-00003	Comparative Assessment
J-1-22-2237-2(1).	Fugro (2013). MacCulloch Environmental Monitoring Survey, UKCS Block 15/24b, July/August 2012, Project No. J36292, Report No.: Fugro EMU/J-1-22-2237-2(1).
10714.1	Gardline (2016). Debris Clearance Survey, UKCS Block 15/24, February 2016, Project Number 10714.1.

## 7. Partner Letters of Support