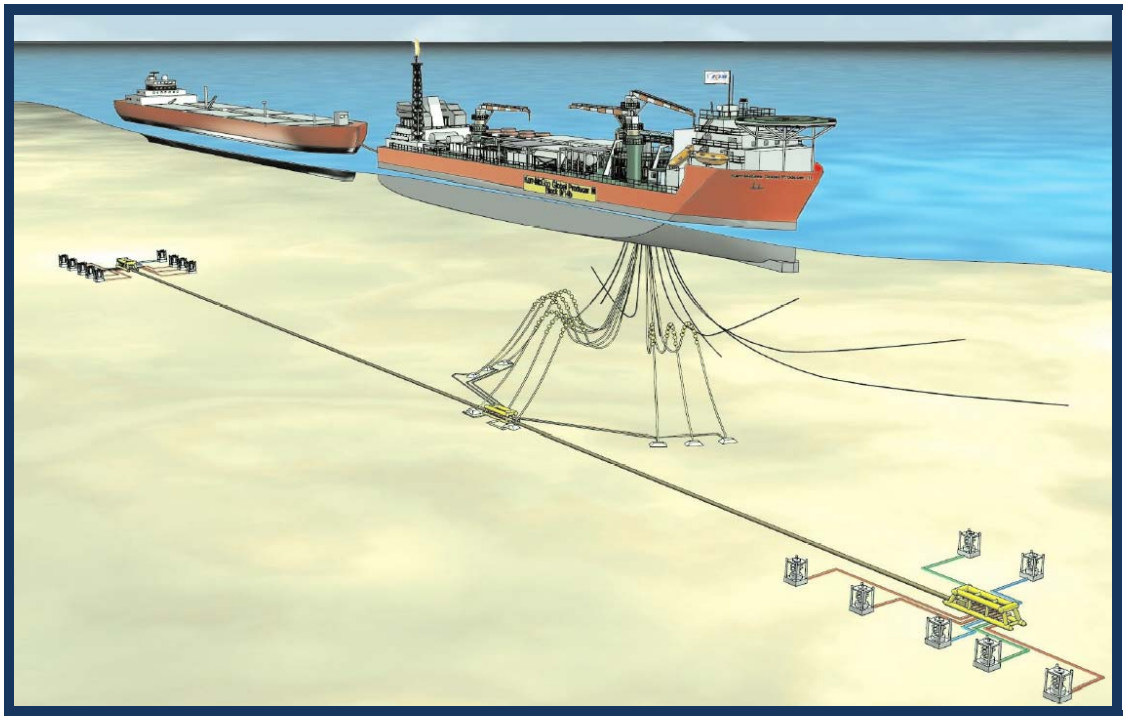
MAERSK OIL



Leadon Decommissioning Programmes

FINAL
November 2015

LEA-LEA108-SU-RE-0019

Document Control

Approvals

	Name	Signature	Date
Prepared by	M Simms		24/11/2015
Reviewed by	D Macleod		24/11/2015
Approved by	G Corr		24/11/2015

Revision Control

Revision No	Reference	Changes/Comments	Issue Date
0	Draft Programmes	Issued for Public Consultation	20/05/2015
1	Programmes	Issued for DECC Approval	13/07/2015
2	Final Programmes	Issued "Final" for DECC Approval	24/11/2015

Distribution List

Name	Company	No of Copies
Helen Macarthur	DECC - Offshore Decommissioning Unit	1

Department of Energy & Climate Change

MAERSK OIL

Contents

A. Terms and Abbreviations

Abbreviation	Explanation
ALARP	As Low As Reasonably Practical
BVS	Beryl Valve Structure
CAPEX	Capital Expenditure
CDTM	Controlled Depth Tow Method
CEFAS	Centre for Environment Fisheries & Aquaculture Science
CO2	Carbon Dioxide
COP	Cessation of Production
DECC	Department of Energy and Climate Change
DSV	Diving Support Vessel
DTI	Department for Trade and Industry
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
ES	Environmental Statement
FEED	Front End Engineering & Design
FPSO	Floating Production Storage and Offloading
ft	Feet
GMS	Global Marine Systems Ltd
GPIII	Global Producer III
GVI	General Visual Inspection
HCV	Heavy Construction Vessel
HP	High Pressure
Hs	Significant Wave Height
IMO	International Maritime Organisation
IR	Individual Risk
JIP	Joint Industry Project
JNCC	Joint Nature Conservation Committee
Kg	Kilogram
Km	Kilometre
KN	Kilonewton
LAT	Lowest Astronomical Tide
LTOBM	Low Toxicity Oil Based Mud
LSA	Low Specific Activity

m3	cubic meters
MCA	Marine & Coastguard Agency
MEG	Monoethylene Glycol
MLS	Midline Structure
mm	millimetre
MODU	Mobile Offshore Drilling Unit
MONS	Maersk Oil North Sea UK Limited
NBR	North Bundle Replacement
NFFO	National Federation of Fishermen's Organisations
NIFF	Northern Ireland Fishermen's Federation
NNS	Northern North Sea
NORM	Naturally Occurring Radioactive Material
NOX	Nitrogen Oxide
OBM	Oil Based Mud
ODU	Offshore Decommissioning Unit
OSPAR	Convention for the Protection of the Marine Environment of the North East Atlantic
P&A	Plug and Abandonment
PLL	Potential Loss of Life
ppm	Parts per million
psi	Pounds per Square Inch
PL	Pipeline No.
ROV	Remotely Operated Vehicle
RQ	Risk Quotient
SAC	Special Area of Conservation
SFF	Scottish Fishermen's Federation
SOX	Sulphur Oxide
SWL	Safe working load
Te	Tonne
ToP	Top of Pipeline
TPOSA	Transportation, Processing and Operational Services Agreement
UKCS	United Kingdom Continental Shelf
UKHO	United Kingdom Hydrographic Office
WIL	Well Intervention Vessel
WO	Work Over
WPA	Well Plug & Abandonment

B. Figures

C. Tables

1 EXECUTIVE SUMMARY

1.1 Combined Decommissioning Programmes

This document covers two decommissioning programmes (DP) for:

1. Leadon installations
2. Leadon pipelines

Both decommissioning programmes address the facilities outlined in the relevant notices served under Section 29 of the Petroleum Act 1998.

1.2 Requirement for Decommissioning Programmes

Installations:
In accordance with the Petroleum Act 1998, the Section 29 notice holders of the Leadon Installations (see Table 1.2) are applying to the Department of Energy and Climate Change (DECC) to obtain approval for decommissioning the installations detailed in Section 2.1 and 2.2 of this programme.

Pipelines:
In accordance with the Petroleum Act 1998, the Section 29 notice holders of the Leadon pipelines (see Table 1.4) are applying to the Department of Energy and Climate Change to obtain approval for decommissioning the pipelines detailed in Section 2.3 of this programme.

In conjunction with public, stakeholder and regulatory consultation, the decommissioning programmes are submitted in compliance with national and international regulations and DECC guidelines. The decommissioning activities outlined in this document are expected to take up to five years from approval of the programmes. Some preparatory works such as mattress removal have commenced at Leadon and are detailed in section Table 2-4.

1.3 Introduction

The Leadon Field is located on the United Kingdom Continental Shelf (UKCS), approximately eight (8) kilometres east of the Beryl Field and twenty five (25) kilometres from the Gryphon Field. The Leadon Field straddles UKCS Blocks 9/14a and 9/14b in the NNS. The Leadon Field was discovered in 1979 by the British National Oil Corporation and then developed following the drilling of an appraisal well by Kerr-McGee in 1998. Production from the field commenced in 2001.

A cessation of production application was submitted in 2004 and approved in 2006, with the FPSO and mooring system relocated to the Donan Field in 2006 in agreement with DECC. Various resale and reuse options were considered for the subsea infrastructure but were not considered economically viable.

The Leadon Field was produced via the floating production storage and offloading vessel (FPSO) known as Global Producer III (GPIII): crude oil was exported by offshore tanker loading and fuel gas was imported via a four (4) inch flexible flowline connected to the Beryl Alpha platform. There are a total of 18 wells in the Leadon Field between the two drill centres; Drill Centre A (North towhead) has seven production wells, one water injector and one suspended well. Drill Centre B (South Towhead) consists of three production wells, one water injector, one aquifer well and four suspended wells. Drill Centre A and B are linked to a mid-line structure, close to the FPSO centre location by a 42.5in and 47.5in bundle sections.

With the need to minimise safety and environment at risk at the centre of the decision making process, a comprehensive assessment of available decommissioning options for the remaining infrastructure concluded the following:

1. All of the subsea wells will be plugged and abandoned in accordance with Oil and Gas UK and Maersk Oil well abandonment guidelines and standards.

2. The FPSO (Global Producer III) and mooring system was removed in 2006 in agreement with DECC under correspondence.

3. The structures, spool-pieces, control jumpers and associated equipment will be removed and returned to shore for recycling or disposal. Risers were removed from site in 2007 and disposed of onshore in agreement with DECC.

4. The bundle will be left in-situ with the ends made safe through the use of rock-dump and its over-trawlability confirmed.

5. All Concrete mattresses will be recovered.

Following public, stakeholder and regulatory consultation, the decommissioning programmes are submitted without derogation and in full compliance with DECC guidelines. The decommissioning programmes explain the principles of the project and are supported by an environmental assessment.

1.4 Overview of Installations & Pipelines Being Decommissioned

1.4.1 Installations

Table 1-1: Installations Being Decommissioned			
Field:	**Leadon**	**Production Type**	**Oil/Gas**
Water Depth (m)	**120**	**UKCS block**	**9/14**
Surface Installation			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
1	FPSO	85,943	n/a
Subsea Installations		**Number of Wells**	
Number	**Type**	**Platform**	**Subsea**
6	**Riser Bases (6)**	**n/a**	**18**
Drill Cuttings piles		**Distance to median**	**Distance from nearest UK coastline**
Number of Piles	**Total Estimated volume (m^3)**	**km**	**km**
0	n/a	n/a	305

Table 1-2: Installations Section 29 Notice Holders Details		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
Maersk Oil North Sea UK Limited	03682299	0% (Operator)
Maersk Oil UK Limited	00946986	100%

1.4.2 Pipelines

Table 1-3: Pipelines Being Decommissioned		
Number of Pipelines	**3**	**(See Table 2-3)**

Table 1-4: Pipelines Section 29 Notice Holders Details		
Section 29 Notice Holder	**Registration Number**	**Equity Interest (%)**
Maersk Oil UK Limited	00946986	100%

1.5 Summary of Proposed Decommissioning Programmes

Table 1-5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
1. Topsides		
n/a	n/a	n/a
2. Floating Facility		
Removal and re-use	Vessel suitable for re-use	Disconnected following agreement with the then governing body Department of Trade & Industry (DTI) and relocated to the Donan Field, UKCS in 2006. CoP of the Leadon Field commenced 1st January 2005.
3. Subsea Installations		
Riser bases to be removed	To leave a clear seabed	Riser bases will be removed to shore for disposal / recycling
4. Pipelines, Flowlines & Umbilicals		
Risers PL1842.5, PL1841.1, PL1842.1, PL1842/1.4, PL1841.3, PL1843, PL1841.2, PL1842.2 to be removed	Already removed	Risers were removed from seabed in 2007 and disposed of onshore in agreement with DECC
North Towhead & South Towhead to be removed	To leave a clear seabed	Towheads will be removed to shore for disposal / recycling. The towhead structures are expected to be disconnected from the bundle using cutting tools for recovery.
Midline Structure to be removed	To leave a clear seabed	The MLS will be removed to shore for disposal / recycling. The MLS is expected to be disconnected from the North and South bundles using cutting tools for recovery.
North Bundle PL1841 (PL1841.1, PL1841.2, PL1841.3, PL1841.4, PLU1841.5) &	Significantly reduced risk to personnel, reduced seabed disturbance, minimal environmental impact, technological	Maersk Oil's proposal is, in respect of the short to medium term, that the 4.2km pipeline bundle, consisting of two sections 42.5" diameter and 47.5" diameter respectively will be decommissioned in-situ, with the North & South towheads and MLS

Table 1-5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
South Bundle PL1842 (PL1842.1, PL1842.2, PL1842.3, PL1842.4, PL1842.5, PLU1842.6) to be rendered over-trawlable and left in situ	constraints	removed with the cut ends rock dumped to render the bundles over-trawlable. An inspection and monitoring regime will be implemented and is detailed in Table 3-3. Maersk Oil will continue to assess the development of technologies to recover the bundle at a future date. If a suitable method to recover the bundle sections is not available by the time the bundle carrier pipe is considered a potential snagging risk to trawling gear the entire length of bundles PL1841 & PL1842 will be rock-dumped. If an area of perceived vulnerability is identified as localised e.g. an area of freespan it is to be expected that localised remedial works to correct the freespan will be undertaken.
Partial removal of PL1895	Safety concerns lifting aged concrete mattresses in the vicinity of in-service pipelines	It is intended to partially recover flowline PL1895 from Leadon MLS up to the edge of the Beryl 500m zone, circa 6.8km. The remaining 500m section inside Beryl 500m zone will be recovered at a future date under a separate DP. Further details are given in Table 1-6.
Removal of spools (PL1841.1JP5, PL1841.1JP8, PL1841.1JP10, PL1841.1JP6, PL1841.1JP9, PL1841.1JP3, PL1841.1JP4, PL1841.2JP5, PL1841.2JP8, PL1841.2JP10, PL1841.2JP6, PL1841.2JP9, PL1841.2JP3, PL1841.2JP4, PL1841.3, PL1841.3JP5, PL1841.3JP8, PL1841.3JP10, PL1841.3JP6, PL1841.3JP9, PL1841.3JP3, PL1841.3JP4, PL1841.3JWI1, PL1841.4, PL1841.4JWI1, PL1842.1JP1, PL1842.1JP2, PL1842.1JP7, PL1842.2JP1, PL1842.2JP2, PL1842.1JP7, PL1842.3JP7, PL1842.3JPAQ2, PL1842.3JP2, PL1842.3JP1, PL1842.4JWI12, PL1842.5JAQ2), grout bags, mattresses and control jumpers (PLU1841.5JP4, PLU1841.5JP3, PLU1841.5JP9, PLU1841.5JWI1,	To leave a clear seabed	Spools, mattresses, grout bags and control jumpers at Leadon location to be removed to shore for disposal / recycling. Mattresses and grout bags used for crossings and stabilisation of PL1895 inside the Beryl 500m area will be recovered during deferred recovery of the remaining 500m section of PL1895.

Table 1-5: Summary of Decommissioning Programmes		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution**
PLU1841.5JP6, PLU1841.5JWI4, PL1841.5JP10, PL1841.5JP5, PL1841.5JP8, PLU1842.6JP1, PLU1842.6JP2, PLU1842.6JWI2, PLU1842.6JAQ2, PLU1842.6JP7, PL1843)		
5. Wells		
Wells to be abandoned in accordance with Oil & Gas UK and Maersk Oil UK guidelines for the suspension and abandonment of wells	Meets DECC regulatory requirements	Operations are subject to on-going engineering and as such, the finalised methods may differ from those described in this document. A final decision on the P&A campaign and schedule will be made following a commercial tendering process, the timing of which will be between 2014 and 2019 depending on MODU market capacity and availability. All appropriate permits and consents under the relevant regulations will be submitted in support of works carried out via the DECC PETS online Portal, to the HSE and the DECC Offshore Inspectorate as required.
6. Drill Cuttings		
Leave in place to degrade naturally	Cuttings piles fall below the OSPAR 2006/5 thresholds	Left undisturbed on seabed
7. Interdependencies		
None		

1.6 Field Location Including Field Layout and Adjacent Facilities

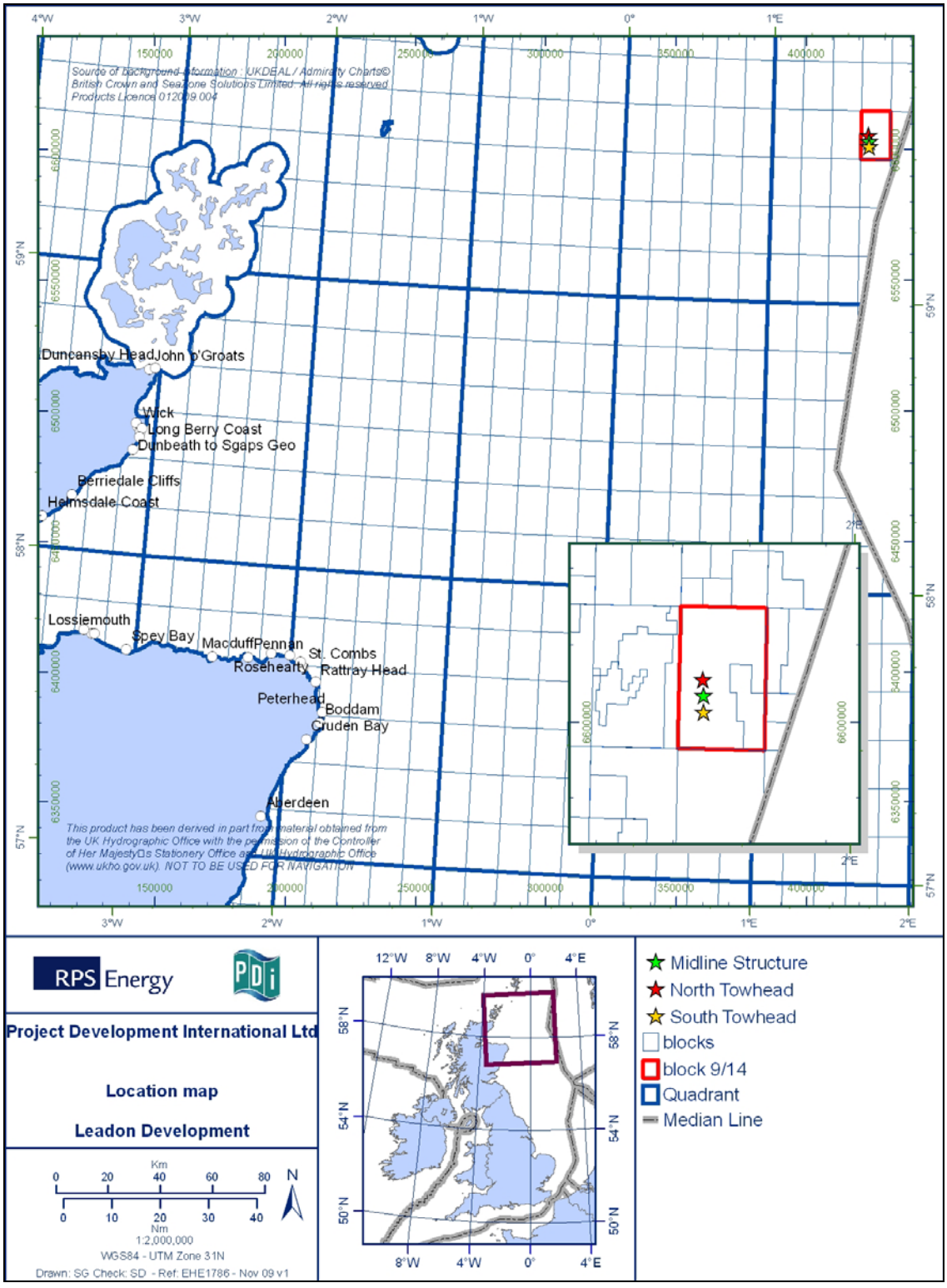


Figure 1-1: Field Location in UKCS

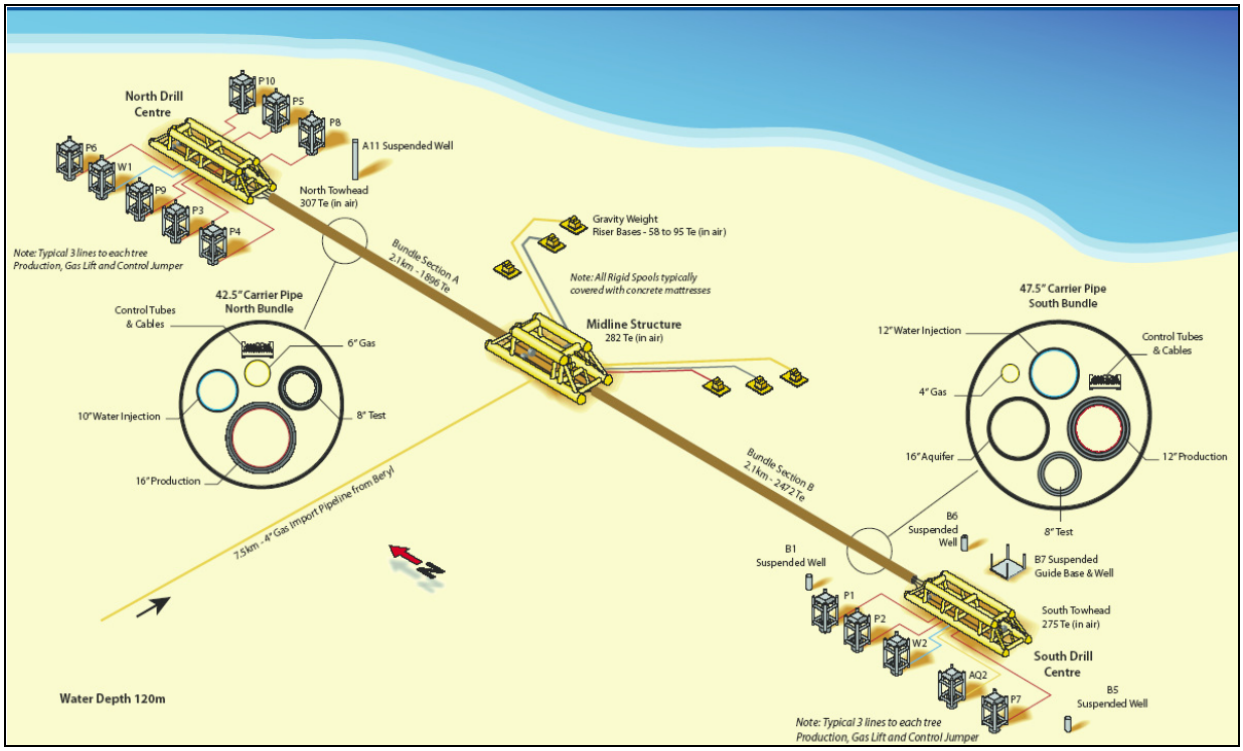


Figure 1-2: Field Layout

Table 1-6: Adjacent Facilities					
Owner	**Name**	**Type**	**Distance/Direction**	**Information**	**Status**
Apache	Beryl Alpha	Valve structure and crossings	7.3km West	The 4" gas import flowline, PL1895 is routed from the MLS at Leadon to the Beryl valve skid (BVS) inside the Beryl 500m zone. Flowline PL1895 crosses the following pipelines inside the Beryl 500m zone: 1. PL381 – 32" Oil to SPM3 2. PL354 – SS48 6" Gas Lift 3. PL1840 – Skene Bundle 4. PL353 – SS48 6" Flowine 5. PL1696 – Buckland Bundle 6. n/a – SS48 umbilical Flowline PL1895 is crossed by the following pipeline inside the Beryl 500m zone: 1. PL1840 – Skene NBR	Suspended

Impacts of Decommissioning Proposals
Operations at the Beryl valve skid are necessary to flood and vent flowline PL1895 prior to disconnection from the Beryl valve skid which remains operational and the Leadon midline structure. As this activity takes place within the Beryl 500m zone this activity may be undertaken by the Beryl owners in the interests of limiting the number of vessels working in proximity to Beryl and would be subject to inter-company agreements. PL1895 will be severed at the edge of the Beryl 500m zone and the 6.8km out-with Beryl recovered and disposed of onshore. The cut location at the edge of Beryl 500m zone will be left in an over-trawlable state. Inspection and monitoring of the partially buried section of PL1895 within the Beryl 500m zone is the responsibility of the Leadon Owners under the existing Leadon over Beryl Transportation, Processing and Operating Services Agreement. The remaining section of PL1895 and associated stabilisation & crossing mattresses will be removed at a future date and will be subject to a separate decommissioning programme. Synergies will be sought to ensure optimised removal of the remaining section of PL1895 e.g. executed as part of the Beryl decommissioning

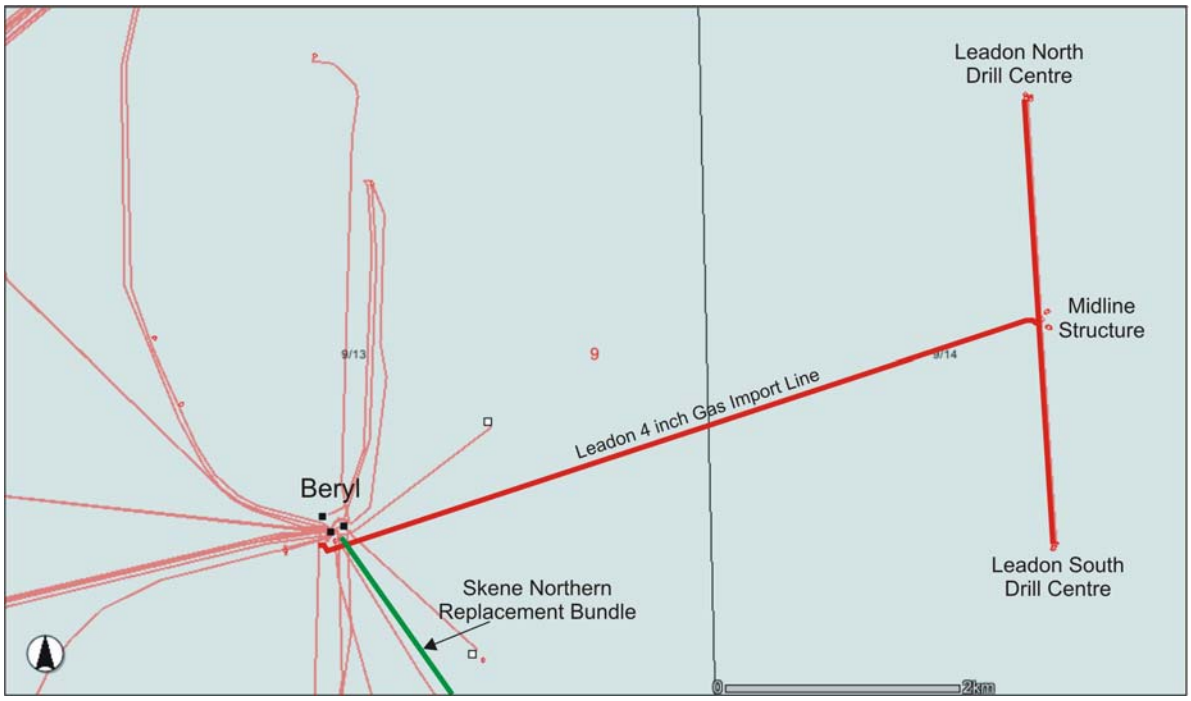


Figure 1-3: Adjacent Facilities

1.7 Industrial Implications

The Leadon riser bases, North & South towheads, MLS, spools, mattresses, grout bags, control jumpers will be removed over a series of manageable campaigns from a DSV and CSV. Flowline PL1895 will be partially removed as part of the deconstruct campaigns. To ensure commercial value for the project the campaigns will ideally be executed during the summer period.

The methodology to recover the large structures will be subject to the results of a technical and commercial assessment of recovery options including, but not limited to, cutting the towheads into manageable lifts, recovery by a HLV (heavy lift vessel) and techniques proposed by salvage and decommissioning contractors.

The decommissioning strategy will aim to P&A the wells in an efficient and cost-effective manner by minimising the (re)location activities of the drill rig and to perform multiple well P&A operations in continuation.

A constraint currently exists between the P&A and the DSV scopes with P&A unable to begin until the trees connecting spools are disconnected from the towheads. An agreement is in place with DECC to allow these preparatory works to begin subject to having the requisite permits in place.

A contract is in place with the Scottish Fishermen's Federation (SFF) for a guard vessel and would be extended to cover over-trawlability trials.

2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Surface Facilities

Table 2-1: Surface Facilities Information								
Name	Facility Type	Location	Topsides/Facilities		Jacket (if applicable)			
			Weight (Te)	No of modules	Weight (Te)	Number of legs	Number of piles	Weight of piles (Te)
n/a								

2.2 Subsea Installations including Stabilisation Features

Table 2-2: Subsea Installations and Stabilisation Features					
Subsea installations including Stabilisation Features	Number	Size/Weight (Te)	Location		Comments/Status
Riser Base (Umbilical RB)	1	4.8 x 4.0 x 3.5, 59Te	WGS84 Decimal	59.334522 01.392628	Riser bases are all gravity base structures
			WGS84 Decimal Minute	59° 20.071'N 1° 23.558'E	
Riser Base (12" Aquifer RB)	1	6.2 x 6.0 x 6.1, 95Te	WGS84 Decimal	59.334548 01.392721	
			WGS84 Decimal Minute	59° 20.073'N 1° 23.563'E	
Riser Base (6" GI RB)	1	5.9 x 5.3 x 6.1, 79Te	WGS84 Decimal	59.334557 01.392815	
			WGS84 Decimal Minute	59° 20.073'N 1° 23.569'E	
Riser Base (12" Production RB)	1	6.2 x 6.0 x 6.1, 95Te	WGS84 Decimal	59.334075 01.392750	
			WGS84 Decimal Minute	59° 20.045'N 1° 23.565'E	
Riser Base (8" Test RB)	1	5.9 x 5.3 x 6.1, 79Te	WGS84 Decimal	59.334051 01.392813	
			WGS84 Decimal Minute	59° 20.043'N 1° 23.569'E	

Table 2-2: Subsea Installations and Stabilisation Features					
Subsea installations including Stabilisation Features	**Number**	**Size/Weight (Te)**	**Location**		**Comments/Status**
Riser Base (6" GL RB)	1	5.9 x 5.3 x 6.1, 79Te	WGS84 Decimal	59.334047 01.392902	
			WGS84 Decimal Minute	59° 20043'N 1° 23.574'E	
			WGS84 Decimal Minute	59° 19402'N 1° 23.5783'E	
Concrete mattresses	See Table 2-4 for information regarding mattresses covering pipelines				
Grout bags	n/a	n/a	n/a		n/a

2.3 Pipelines Including Stabilisation Features

Table 2-3: Pipeline/Flowline/Umbilical Information									
Description	Pipeline Number (as per PWA)	Diameter (inches)	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points	Burial Status	Pipeline Status	Current Content
North Towhead	PL1841 (PL1841.1, PL1841.2, PL1841.3, PL1841.4, PL1841.5, PLU1841.5)	n/a	0.029	Carbon steel, stainless steel, duplex stainless, copper, aluminium, LDPE	Production fluid, gas, water, Transaqua HT2	North Towhead - North Bundle	Surface laid with a degree of natural backfill	Suspended	Internal lines flushed with 1600ppm TROS 650. Carrier pipe dosed with 50ppm biocide
North bundle, comprising of: 16” Production 8” Test (10”Sleeve) 10” Water Injection 6” Gas Lift Control lines	PL1841 (PL1841.1, PL1841.2, PL1841.3, PL1841.4, PL1841.5, PLU1841.5)	42.5	2.117	Carbon steel, stainless steel, duplex stainless, copper, aluminium, LDPE	Production fluid, gas, water, Transaqua HT2	North Bundle - MLS	Surface laid with a degree of natural backfill	Suspended	Internal lines flushed with 1600ppm TROS 650. Carrier pipe dosed with 50ppm biocide
Midline Structure		n/a	0.029	Carbon steel, stainless steel, duplex stainless, copper, aluminium, LDPE	Production fluid, gas, water, Transaqua HT2	North Bundle - South Bundle	Surface laid with a degree of natural backfill	Suspended	Internal lines flushed with 1600ppm TROS 650. Carrier pipe dosed with 50ppm biocide

South bundle, comprising of: 12" Production (16"Sleeve) 8" Test (10"Sleeve) 12" Water Injection 16" Aquifer 4" Gas Lift Control lines	PL1842 (PL1842.1, PL1842.2, PL1842.3, PL1842.4, PL1842.5, PLU1842.6)	47.5	2.137	Carbon steel, stainless steel, duplex stainless, copper, aluminium, LDPE	Production fluid , gas, water, Transaqua HT2	MLS – South Towhead	Surface laid with a degree of natural backfill	Suspended	Internal lines flushed with 1600ppm TROS 650. Carrier pipe dosed with 50ppm biocide
South Towhead	PL1842 (PL1842.1, PL1842.2, PL1842.3, PL1842.4, PL1842.5, PLU1842.6)	n/a	0.029	Carbon steel, stainless steel, duplex stainless, copper, aluminium, LDPE	Production fluid , gas, water, Transaqua HT2	South Bundle – South Towhead	Surface laid with a degree of natural backfill	Suspended	Internal lines flushed with 1600ppm TROS 650. Carrier pipe dosed with 50ppm biocide
Gas Import pipeline	PL1895	5.47	7.315	Carbon steel, stainless steel, Polyethylene TP11, Polyethylene TP14	Lift gas	MLS - BVS	Laid in a pre-cut trench with natural backfill.	Suspended	Lift gas with a 50m MEG/water slug at MLS end
P1 Production spool	PL1842.2 JP1	6.63	0.032	Duplex stainless	Production fluid	Tree P1 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P1 Gas lift spool	PL1842.3 JP1	2.37	0.032	Duplex stainless	Gas	Tree P1 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650

P1 E/H/C jumper	PLU1842.6 JP1	n/a	0.073	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P1 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
P2 Production spool	PL1842.2 JP2	6.63	0.028	Duplex stainless	Production fluid	Tree P2 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P2 Gas lift spool	PL1842.3 JP2	2.37	0.028	Duplex stainless	Gas	Tree P2 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P2 E/H/C jumper	PLU1842.6 JP2	n/a	0.063	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P2 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
W2 Water injection spool	PL1842.4 JWI2	6.63	0.021	Duplex stainless	Water	Tree W2 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
W2 E/H/C jumper	PLU1842.6 JPWI2	n/a	0.067	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree W2 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
AQ2 Aquifer spool	PL1842.5 JAQ2	6.63	0.036	Duplex stainless	Water	Tree AQ2 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
AQ2 Aquifer spool	PL1842.3 JAQ2	2.37	0.028	Duplex stainless	Gas	Tree AQ2 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
AQ2 E/H/C jumper	PLU1842.6	n/a	0.080	Nylon 11	Transaqua HT2 /	Tree AQ2 -	Surface laid	Suspended	Transaqua HT2 /

	JAQ2			[Besno P40 TLO]	Methanol	South Towhead			1600ppm TROS 650
P7 Production spool	PL1842.2 JP7	6.63	0.061	Duplex stainless	Production fluid	Tree P7 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P7 Gas lift spool	PL1842.3 JP7	2.37	0.061	Duplex stainless	Gas	Tree P7 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P7 E/H/C jumper	PLU1842.6 JP7	n/a	0.094	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P7 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
6" Gas Import spool	PL1843	6.63	0.160	Duplex stainless	Gas	6" Gas Import riser base - MLS	Surface laid	Suspended	Flushed with 1600ppm TROS 650
12" Aquifer spool	PL1842.5	12.75	0.124	Duplex stainless	Water	12" Aquifer riser base - MLS	Surface laid	Suspended	Flushed with 1600ppm TROS 650
12" Production spool	PL1842.1	12.75	0.119	Duplex stainless	Production fluid	12" Production riser base - MLS	Surface laid	Suspended	Flushed with 1600ppm TROS 650
8" Test	PL1842.2	8.63	0.131	Duplex stainless	Production fluid	8" Test riser base - MLS	Surface laid	Suspended	Flushed with 1600ppm TROS 650
6" Gas Lift	PL1841.3	6.63	0.155	Duplex stainless	Gas	6" Gas Lift riser base - MLS	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P6 Production spool	PL1841.1 JP6	6.63	0.047	Duplex stainless	Production	Tree P6 - South	Surface laid	Suspended	Flushed with

					fluid	Towhead			1600ppm TROS 650
P6 Gas lift spool	PL1841.3 JP6	2.37	0.047	Duplex stainless	Gas	Tree P6 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P6 E/H/C jumper	PLU1841.5 JP6	n/a	0.100	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P9 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
W1 Water injection spool	PL1841.4 JWI1	6.63	0.041	Duplex stainless	Water	Tree W1 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
W1 Water injection spool	PL1841.3 JWI1	2.37	0.041	Duplex stainless	Water	Tree W2 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
W1 E/H/C jumper	PLU1841.5 JWI1	n/a	0.082	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P9 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
P9 Production spool	PL1841.1 JP9	6.63	0.028	Duplex stainless	Production fluid	Tree P9 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P9 Gas lift spool	PL1841.3 JP9	2.37	0.028	Duplex stainless	Gas	Tree P9 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P9 E/H/C jumper	PLU1841.5 JP9	n/a	0.062	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P9 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650

P3 Production spool	PL1841.1 JP3	6.63	0.022	Duplex stainless	Production fluid	Tree P3 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P3 Gas lift spool	PL1841.3 JP3	2.37	0.022	Duplex stainless	Gas	Tree P3 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P3 E/H/C jumper	PLU1841.5 JP3	n/a	0.061	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P3 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
P4 Production spool	PL1841.1 JP4	6.63	0.035	Duplex stainless	Production fluid	Tree P4 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P4 Gas lift spool	PL1841.3 JP4	2.37	0.035	Duplex stainless	Gas	Tree P4 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P4 E/H/C jumper	PLU1841.5 JP4	n/a	0.060	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P4 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
P10 Production spool	PL1841.1 J10	6.63	0.022	Duplex stainless	Production fluid	Tree P10 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P10 Gas lift spool	PL1841.3 JP10	2.37	0.022	Duplex stainless	Gas	Tree P10 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P10 E/H/C jumper	PLU1841.5 JP10	n/a	0.067	Nylon 11 [Besno P40 TLO]	Transaqua HT2 /	Tree P3 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm

					Methanol				TROS 650
P5 Production spool	PL1841.1 JP5	6.63	0.022	Duplex stainless	Production fluid	Tree P5 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P5 Gas lift spool	PL1841.3 JP5	2.37	0.022	Duplex stainless	Gas	Tree P5 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P5 E/H/C jumper	PLU1841.5 JP5	n/a	0.058	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P3 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650
P8 Production spool	PL1841.1 JP8	6.63	0.028	Duplex stainless	Production fluid	Tree P8 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P8 Gas lift spool	PL1841.3 JP8	2.37	0.028	Duplex stainless	Gas	Tree P8 - South Towhead	Surface laid	Suspended	Flushed with 1600ppm TROS 650
P8 E/H/C jumper	PLU1841.5 JP8	n/a	0.067	Nylon 11 [Besno P40 TLO]	Transaqua HT2 / Methanol	Tree P3 - South Towhead	Surface laid	Suspended	Transaqua HT2 / 1600ppm TROS 650

Table 2-4: Subsea Pipeline Stabilisation Features				
Stabilisation Feature	**Total Number**	**Weight (Te)**	**Location(s)**	**Exposed/Buried/Condition**
Concrete mattresses (6x2x0.15m)	121	484 (4 tonnes each)	North Bundle (PL1841) - Mattresses laid over tree connecting spools between North towhead and trees P1, P2, W2, AQ2, P7 South Bundle (PL1842) - Mattresses laid over tree connecting spools between South towhead and trees P6, W1, P9, P3, P4, P10, P5, P8 Midline Structure (PL1841/1842) - Mattresses laid over connecting spools between MLS and riser bases It should be noted that 29 mattresses have been removed from the South cluster as part of preparative works undertaken in agreement with DECC during 2014	Laid on seabed surface
Concrete mattresses (6x3x0.15m)	57	342 (6 tonnes each)	Midline Structure (PL1841/1842) - Mattresses laid over connecting spools between MLS and riser bases	Laid on seabed surface
Concrete mattresses (5x3x0.3m)	24	192 (8 tonnes each)	4” Gas Import flowline (PL1895) - Mattresses are used for stabilisation at Beryl and Leadon ends of PL1895. Where the flexible exits the trench at	Laid on seabed surface

Table 2-4: Subsea Pipeline Stabilisation Features				
Stabilisation Feature	**Total Number**	**Weight (Te)**	**Location(s)**	**Exposed/Buried/Condition**
			Beryl A, the PL1895 is stabilised by 'stitch mattressing', an installation procedure where a number of concrete mattresses are placed at defined intervals. At Leadon the exposed end of PL1895 is protected by continuous concrete mattressing to the MLS	
Grout bags	Circa 2000	50 (25kg each)	North Bundle (PL1841) – Grout bags used as spool supports at the North towhead for tree connecting spools P6, W1, P9, P3, P4, P10, P5, P8 South Bundle (PL1842) – Grout bags used as spool supports at the North towhead for tree connecting spools P1, P2, W2, AQ2, P7 Midline Structure (PL1841/1842) – Grout bags used as spool supports at the MLS for the riser base spools	Exposed
Formwork	n/a	n/a	n/a	n/a
Frond Mats	n/a	n/a	n/a	n/a
Rock Dump	n/a	n/a	n/a	n/a

2.4 Wells

Table 2-5: Well Information			
Platform Wells	**Designation**	**Status**	**Category of Well**
n/a			
Subsea Wells **Well ID (Drilling ID)**			
A11 (09/14a-A11)	Aquifer	Suspended	1
P4 (9/14a-9)	Production	Shut-in	3
P9 (9/14a-N1z)	Production	Shut-in	3
P3 (9/14a-N2)	Production	Shut-in	3
P5 (9/14a-N3y)	Production	Shut-in	3
P6 (9/14a-N4)	Production	Shut-in	3
W1 (9/14a-N5)	Water injection	Shut-in	3
P8 (9/14a-N6y)	Production	Shut-in	3
P10 (9/14a-N7)	Production	Shut-in	3
P2 (9/14b-S1z)	Production	Shut-in	3
B5 (09/14b-S2)	Suspended	Suspended	3
B1 (09/14b-S3)	Conductor	Suspended	1
P1 (9/14b-S3a)	Production	Shut-in	3
W2 (9/14b-S4)	Water injection	Shut-in	3
AQ2 (9/14b-S5)	Aquifer	Shut-in	3
B6 (09/14b-S6)	Suspended	Suspended	3
P7 (9/14b-S7)	Production	Shut-in	3
B7 (09/14b-W3)	Water injection	Suspended	1

2.5 Drill Cuttings

(See Table 3-6 for further information)

Table 2-6: Drill Cuttings Piles Information		
Location of Pile Centre (Latitude/Longitude)	**Seabed Area (m^2)**	**Estimated volume of cuttings (m^3)**
undetectable	undetectable	undetectable

After analysis of the drilling data it was concluded that Leadon did not require further assessment, based on the following:

- Only two of the wells in the Leadon field are known to have been drilled with OBM discharge to sea.
- These two wells were drilled and cannot be seen as contributing to a single cuttings pile as defined by the OSPAR recommendation.

Although a number of wells have been drilled where the drilling history was unavailable, these were all either single well sites or drilled after the cessation of OBM discharge which is definitively known as being the 1st January 2001 in any field operated by Maersk Oil.

2.6 Inventory Estimates

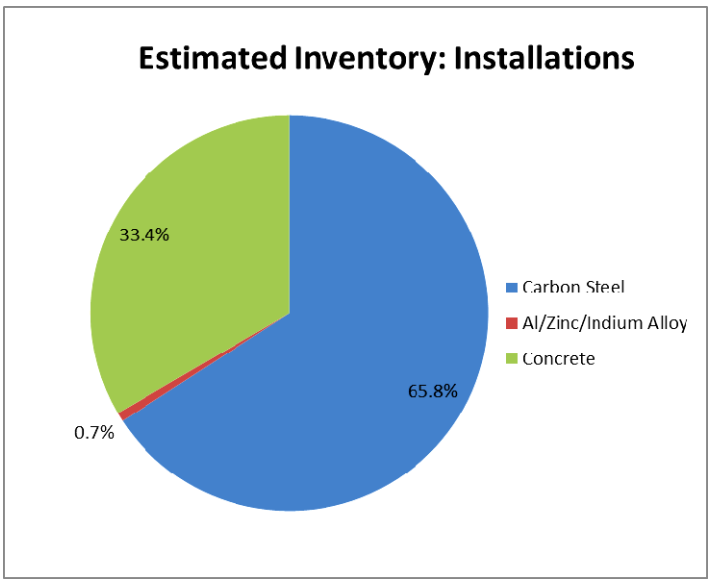


Figure 2-1 shows the inventory for the subsea installations. Carbon steel accounts for approximately two-thirds of the installations inventory with a third concrete. The remaining 0.7% of Aluminium/Zinc/Indium Alloy is used for cathodic protection of the subsea installation.

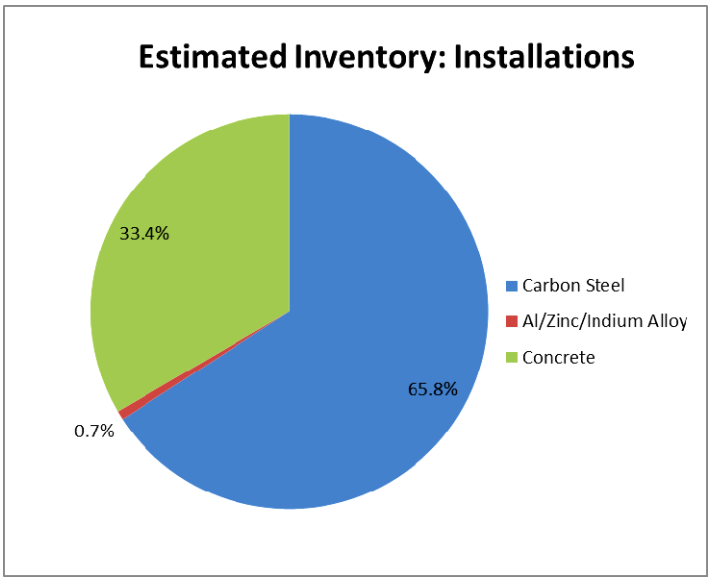


Figure 2-1: Pie Chart of Estimated Inventories (Installations)

The total mass is 3,039.7 Te.

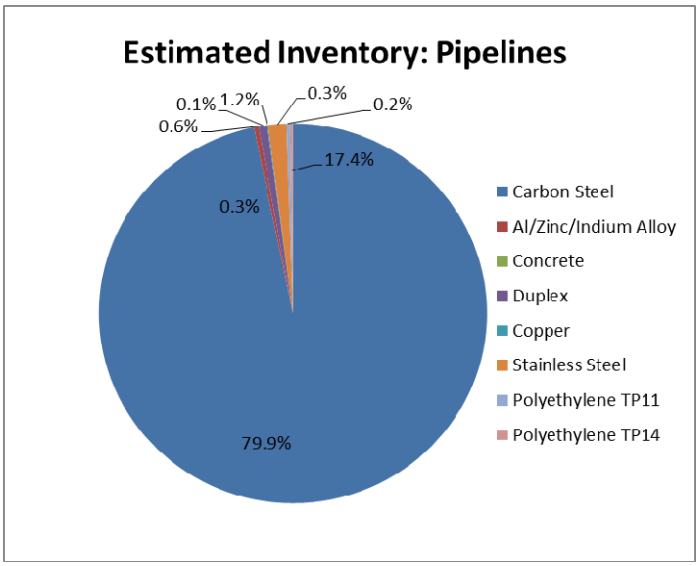


Figure 2-2 shows the inventory for the materials used in subsea pipelines including bundles, spools, control jumpers and flexible flowline PL1895. Carbon steel accounts for 79.9% with various ferrous, non-ferrous and polymers accounting for the remaining 20.1%.

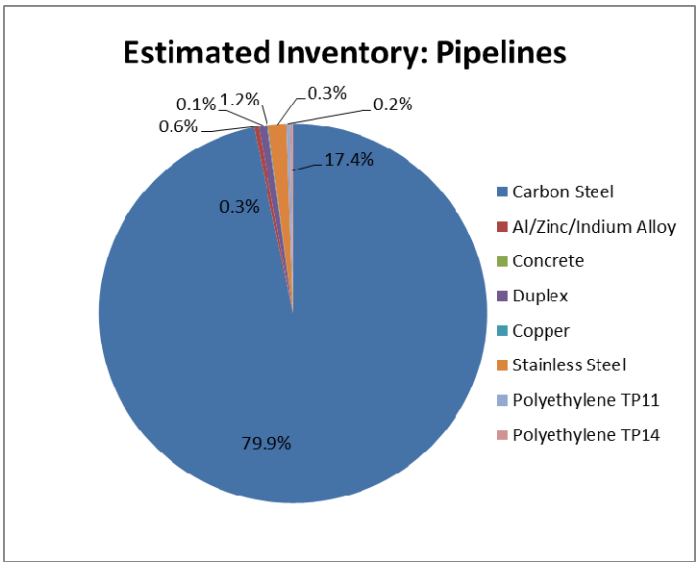


Figure 2-2: Pie Chart of Estimated Inventories (Pipelines)

The total mass is 4,821.3 Te.

3 REMOVAL AND DISPOSAL METHODS

In line with the waste hierarchy, the reuse of an installation (or parts thereof) was first in the order of preferred decommissioning options for assessment. Reuse of the bundle was dismissed at an early stage due to the technological challenges to refloat and relocate the bundle as detailed in Table 3-3. Equally reuse of the towheads as manifold structures at a new location was considered, however due to the age of the towheads and the generally bespoke design of manifolds this was not considered commercially viable.

The Maersk Waste Management Procedure shall be adhered to for all waste issues associated with the project.

It is intended that the recovered infrastructure will be returned to shore and transferred to a recognised decommissioning facility which will have all necessary approvals and licenses in place and possess the capability to recycle a significant percentage of the recovered material.

It is expected that the structures, flowline, spoolpieces and control jumpers would be cleaned before being largely recycled.

The concrete mattresses and set grout will be cleaned of any marine growth and most likely sent to landfill as they are not readily recyclable.

It is anticipated that the facility will be in the UK and as such no potential trans-frontier shipment of waste issues are expected. The final contractor for the onshore receipt and disposal of the Leadon infrastructure will be selected following a commercial tendering process.

3.1 Topsides

n/a

3.2 Subsea Installations and Stabilisation Features

Table 3-1: Subsea Installations and Stabilisation Features			
Subsea installation(s) and stabilisation feature(s)	**Number**	**Option**	**Disposal Route (if applicable)**
Riser Bases	6	Full recovery	Removal to shore for disposal and recycling
North & South Towheads	2	Full recovery	Removal to shore for disposal and recycling
MLS	1	Full recovery	Removal to shore for disposal and recycling
Concrete mattresses	est. 202	Full recovery	Removal to shore for disposal and recycling
Grout bags	circa 2000	Full recovery	Removal to shore for disposal and recycling
Formwork	n/a	n/a	n/a
Frondmats	n/a	n/a	n/a
Rock Dump	n/a	n/a	n/a
Other	n/a	n/a	n/a

3.3 Pipelines

Decommissioning Options:

Table 3-2: Pipeline or Pipeline Groups Decommissioning Options			
Pipeline or Group (as per PWA)	**Condition of line/group** (Surface laid/Trenched/ Buried/ Spanning)	**Whole or part of pipeline/group**	**Decommissioning Options* considered**
PL1841	Surface laid	North bundle	1, 2, 3, 4, 5, 6, 7
PL1842	Surface laid	South bundle	1, 2, 3, 4, 5, 6, 7
PL1895	Buried	6.8km section from Leadon MLS to edge of Beryl 500m zone to be recovered. Remaining 500m section of PL1895 between BVS and edge of Beryl 500m zone will be recovered under a separate decommissioning programme	8, 9, 10 (recover and cut on deck)

*Key to Options

1. Cut & recover
2. Remove towheads and tow bundle to shore
3. Rock dump bundle ends
4. Mattress bundle ends
5. Install concrete structure at bundle ends
6. Trench bundle in current location
7. Relocate cut bundle section
8. Remove – reverse reeling
9. Partial removal
10. Other

Comparative Assessment Method:

The proposed decommissioning solution was developed through an extensive programme of continual assessment which included screening sessions, comparative sessions and peer review involving appropriate industry representatives and stakeholders. In support of the review and decision-making process numerous supporting studies and analyses were undertaken including, but not limited to, bundle corrosion and degradation study, burial equipment study and bundle towing technical note.

The comparative assessment process was undertaken in accordance with the Petroleum Act 1998 and in-line with DECC guidance notes.

Particular focus was placed upon the decommissioning solution for the bundle which was subject to a further comparative assessment (CA2) to ensure the proposed solution was fully assessed. The comparative assessments will be hereafter referred to as either CA1 (Comparative Assessment 1) or CA2 (Comparative Assessment 2).

CA1 & CA2 were conducted using the selection criteria recommended by DECC to compare different options, namely safety, environmental impacts, CO_2 emissions, social impacts, technical feasibility and cost.

In accordance with DECC Guidance Notes (DECC 2011), the CA scope covered the comparison of the decommissioning options for all Leadon installations, pipelines and associated stabilisation.

Safety was addressed in the short and long-term, that is during the execute phase of decommissioning operations and the residual safety risk to other sea users where a leave in-situ option was considered.

The summary of the CA process does not provide further details where recovery and reuse/recycling onshore is the selected option, further details are given in Section 7 Supporting Documents.

Initially seven decommissioning options were considered for bundles PL1841 & PL1842 as part of CA1, these included:

1. Cut & recover
2. Remove towheads and tow bundle to shore
3. Rock dump bundle ends
4. Mattress bundle ends
5. Install concrete structure at bundle ends
6. Trench bundle in current location
7. Relocate cut bundle section

A brief summary of the assessment for each option in CA1 is given below:

1. Cut & recover

This operation involves the deployment and diver positioning of diamond wire cutting equipment at pre-determined points along the bundle. Cutting operations are controlled from the surface. The length of each section and lifting methodology are subject to the vessel used for recovery but would be expected to be between 20 and 25m. Once cutting operations are complete, divers will prepare equipment for recovery. Prior to recovery, the internals of the bundle will have to be secured in place.

2. Remove towheads and tow bundle to shore

The towheads and midline structure provide a dedicated mechanism to control the ballast of the bundle during installation. Without the structures in place there is no reliable method to recreate a controlled buoyancy method for large free filling bundles; another major technical issue would be to control the movement of the internals of the bundle during refloating and tow. It is anticipated there would be issues when crossing over third party assets and there is no available reception facility for the bundle.

3. Rock dump bundle ends / 4. Mattress bundle ends / 5. Install concrete structure at bundle ends

This option involves removal of the towheads and MLS then protecting the ends of the remaining bundle sections to leave them in an over-trawlable condition.
Confirmation of the over-trawlability will be confirmed on completion of decommissioning activities by performing a series of trawl sweeps over the bundle sections and the installed end protection. The bundle sections will continue to be inspected and monitored for over-trawlability and general condition on a frequency to be agreed with DECC and the SFF. Further details of the scope of inspection and monitoring are given in Table 3-3.
As the UKCS decommissioning market develops, the safety and efficiency of bundle recovery techniques and equipment are expected to improve to a level that makes complete removal of the Leadon bundle viable. If a safe and proven bundle removal solution is available Maersk Oil will undertake the necessary steps to assess the full removal of bundles PL1841 & PL1842.

In the eventuality that a suitable bundle recovery solution is not considered feasible and the bundle has degraded to such a point that it poses a risk to other users of the sea, as concluded from future inspections, Maersk Oil will rock dump PL1841 & PL 1842 in their entirety.

6. Trench bundle in current location

There is no suitable equipment currently available for the burial of the 1200mm diameter bundle.

7. Relocate cut bundle section

This would involve similar challenges as summarised for option 2.
If the bundle were relocated to a subsea location i.e. a pre-cut trench there is a limited range of equipment available for creating a trench suitable for this diameter. The resulting berms would be a potential hazard for the other sea users.

Given the implications of a leave in-situ option for bundle sections PL1841 & PL1842 a second comparative assessment, CA2 was undertaken to further assess the highest ranking options from CA1 in greater detail:

1. Cut & recover
3. Rock dump bundle ends

Outcome of Comparative Assessment:

Table 3-3: Outcomes of Comparative Assessment

Pipeline or Group	Recommended Option*	Justification
PL1841 & PL1842	Option 3	The results of CA2 found that the leave in-situ option after rock dumping bundle ends was judged to be the best option in over 70% of the criteria assessed. Of note, there was a large disparity in the assessed safety risk (including other users of the sea). This increase in risk is not in accordance with the programme objectives to perform the decommissioning work scope with risks ensured as ALARP (as low as reasonably practicable). It is not envisaged that the infrastructure decommissioned in place will impact on the safety of navigation, due to its relatively low height above mean seabed level of approximately 2 metres when compared with the water depth (120m). The bundles presently have no free-spans along the length of the bundle (ref. 2013 survey) and historical surveys indicate that the quantity of natural backfill along the bundle length is gradually increasing over time. It is not expected that freespans will develop over time. Any perceived risk to other sea users will be

Table 3-3: Outcomes of Comparative Assessment		
		identified during periodic inspection and monitoring of the bundle sections. The scope of the inspection and monitoring survey would involve: • GVI along the length of the bundle • Burial status along the length of the bundle • Freespan identification • Wall thickness measurements of the carrier pipe • Over-trawl trials of the bundle and rock dumped ends It is anticipated that the burial status will continue to improve and as such it is unlikely that any freespan will develop. The capacity of the carrier pipe to withstand a trawl board strike is reliant on sufficient thickness of the carrier pipe. Carrier pipe wall thickness measurements will be used to develop the corrosion profile of the bundle to anticipate when a full rock dumping solution is required, in the event that a bundle recovery solution is not forthcoming. Preliminary corrosion analysis of the bundle conservatively assesses that the carrier pipe may be susceptible to the impact load of a trawl board after 60 years from disconnection from towheads and MLS Cathodic Protection system. As part of the assessment of a partial removal solution a quantitive risk assessment was undertaken to assess the risk to other users of the sea. The results of which can be referred to in *Other Users of the Sea PLL Study* Table 7-1 The frequency of the inspections will be agreed between Maersk Oil, DECC and the SFF. It is proposed that the outcome of the initial 12 month survey and the condition of the infrastructure decommissioned be used to perform a risk based assessment (using DNV Integrity Management of Submarine Pipelines DNV-RP-F116). This assessment will provide the basis of discussion with DECC to come to an agreement for the ongoing monitoring regime to be employed.
PL1895	Option 9	The results of the comparative assessment were to remove and recover the buried 4” flowline. The transition out It is expected that the remaining section of 4” gas import flowline will be removed. The remaining 500m section inside Beryl 500m zone will be recovered at a future date under a separate DP.

Bundle Removal:

Decommissioning of large diameter bundles is recognised as a general industry challenge, with no common approach to the recovery of large diameter bundles. The conclusion of a Joint Industry Project (JIP) report in 2013 was that there was no available technology to enable safe, diverless retrieval of large diameter bundles such as the Leadon bundle. This remains the case.

As one of many operators with a large diameter bundle, Maersk Oil is committed to proactively monitoring the capability of the supply chain in relation to bundle recovery by participating in recognised industry groups.

Maersk Oil has highlighted the challenges of full recovery in various decommissioning forums. As an active member of Decom North Sea (DNS), Maersk Oil remains in touch with the developing supply chain capabilities in this area, and has made itself available to openly share experience of the Leadon bundle. Further, Maersk Oil is a committee member of the recently launched Pipeline User Group (PLUG) Decom steering group which encourages knowledge sharing between operators, regulators and stakeholders including DECC, Marine Scotland and SFF. The aim of the forum is to understand and address challenges in the decommissioning industry. The current and future treatment of bundles forms part of PLUG Decom's focus and provides the appropriate industry-wide forum to continuously test whether the findings of the 2013 JIP report remain valid. Maersk Oil also understands that cutting methods will be one of ITF's (Industry Technology Facilitator's) top ten technology focuses.

On a regular basis, to be agreed between Maersk Oil and DECC, a meeting will take place to assess the available technology solutions to determine whether safe, reliable and cost effective bundle recovery becomes possible in advance of the commitment to fully rock dump the bundle pipeline.

3.4 Pipeline Stabilisation Features

Table 3-4: Pipeline Stabilisation Features

Stabilisation feature(s)	Number	Option	Disposal Route (if applicable)
Concrete mattresses	Circa 202	Full recovery. To remain in situ until pipeline crossings decommissioned.	Recover to shore. n/a.
Grout bags	Circa 2000	Full recovery.	To shore for disposal in landfill.
Formwork	n/a	n/a	n/a
Frond Mats	n/a	n/a	n/a
Rock Dump (te)	n/a	n/a	n/a.

3.5 Wells

Table 3-5: Well Plug and Abandonment
The Leadon field comprises 18 wells split between the North and South drill centres. Drill Centre A (North 9/14a) has seven production wells as well as one water injector and one suspended well. Drill Centre B (South 9/14b) consists of three production wells, one water injector, one aquifer and four suspended wells. Details of the wells are summarised in sections 2.2 and 2.4. The wells which remain to be abandoned will be plugged and abandoned in accordance with Oil and Gas UK and Maersk Oil Guidelines for the Suspension and Abandonment of Wells, Version 4, July 2012. Conductor strings will be cut in accordance with Oil and Gas UK Guidelines for the Suspension and Abandonment of Wells, Version 4, July 2012. All appropriate permits and consents under the relevant regulations will be submitted in support of works carried out via the DECC PETS online Portal, to the HSE and the DECC Offshore Inspectorate as required. A final decision on the P&A campaign and schedule will be made following a commercial tendering process. P&A operations are not expected to begin before mid-2015 with a 5 year period to abandon all Leadon wells. Given the variables involved in planning P&A activities including, but not limited to, a fluid exploration and development schedule, drill rig availability and rig rates it is unrealistic to provide a P&A schedule other than a milestone date for completion of all P&A activities.

3.6 Drill Cuttings

Drill Cuttings Decommissioning Options:

Table 3-6: Drill Cuttings Decommissioning Options		
How many drill cuttings piles are present?		0[1]
Tick options examined: ☐Remove and re-inject ☐Leave in place ☐Cover ☐Relocate on seabed ☐Remove and treat onshore ☐Remove and treat offshore ☐Other		
Review of Pile characteristics	**Pile**	
How has the cuttings pile been screened? (desktop exercise/actual samples taken)	n/a	
Dates of sampling (if applicable)		
Sampling to be included in pre-decommissioning survey?		
Does it fall below both OSPAR thresholds?		
Will the drill cuttings pile have to be displaced in order to remove the jacket?		
What quantity (m^3) would have to be displaced/removed?		

Table 3-6: Drill Cuttings Decommissioning Options	
Will the drill cuttings pile have to be displaced in order to remove any pipelines?	
What quantity (m^3) would have to be displaced/removed?	
Have you carried out a Comparative Assessment of options for the Cuttings Pile?	

[1] Based 'Technical Review of Data from around Maersk Oil's North Sea fields with regard to OSPAR Recommendation 2006/5' there were only 2 wells known to have been drilled with OBM, these were some distance apart from one another and cannot be seen as contributing to a single drill cuttings pile as defined by the OSPAR Recommendation.

Comparative Assessment Method:
n/a

Outcome of Comparative Assessment:
n/a

3.7 Waste Streams

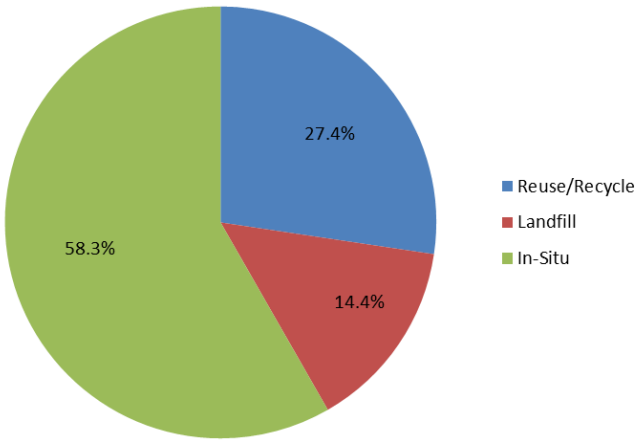
Table 3-7 and Table 3-8 provide an outline of the disposal routes for the items outlined in the inventory, and any associated materials contained within or on the outside of the remaining facilities. Further information on waste streams is provided in section 12 of the Leadon Environmental Statement (ES).

Table 3-7: Waste Stream Management Methods	
Waste Stream	**Removal and Disposal method**
Bulk liquids	n/a
Marine growth	Removed onshore if any marine growth is present and will be disposed in accordance with a Waste Management Plan.
NORM/LSA Scale	There is no historical evidence of NORM at the Leadon field in either the previously recovered flexible risers or the topside process vessels, therefore it is not anticipated any radioactive material will be encountered.
Asbestos	n/a
Other hazardous wastes	n/a
Onshore Dismantling sites	Appropriate licenced sites will be selected. Facility chosen by removal contractor must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver innovative recycling options.

Table 3-8: Inventory Disposition			
	Total Inventory Tonnage	Planned tonnage to shore	Planned left *in situ*
Installations	3040	3040	0
Pipelines	4821	240	4582

Figure 3-1 Figure 3-1: Pie Chart of Estimated Inventories (Pipelines)shows the planned disposal routes for the decommissioned material by percentage. Over half of the material is expected to remain in-situ and is comprised of the materials from PL1841 & PL1842. It is expected that approximately 2000te of material, mostly carbon steel, will be recycled/reused.

Figure 3-1: Pie Chart of Estimated Inventories (Pipelines)



4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Environmental Sensitivities

Section 3 of the ES (BMT Cordah, 2015) presents the findings of the Environmental Impact Assessment (EIA) undertaken by the Maersk Oil (Maersk) as part of the planning and consents process for the decommissioning of the Leadon Field subsea infrastructure. The purpose of the EIA is to identify, understand and communicate the likely significance of the environmental impacts and risks associated with the proposed project, to inform the decision making process. A summary of the environmental sensitivities of the Leadon area is provided in Table 4.1.

Table 4-1: Environmental Sensitivities

Environmental Receptor	Main Features
Conservation interests	No Annex I habitats have been observed in the immediate vicinity of the bundle locations during ROV surveys. Annex II species harbour porpoise are present in very high numbers in February, high in July and September, medium numbers in August and low numbers in December, January, April, May and June.
Seabed	Benthic communities in the Leadon area are similar to those found throughout a large surrounding area of the northern North Sea.
Fish	The Leadon Field lies within an area of high spawning intensity for Norway Pout (March to May) and a high nursery intensity nursery area for Blue whiting. The site sits in low intensity areas of spawning activity for cod (January to April), whiting (February to June), mackerel (May to August), and sandeels and a low intensity nursery area for whiting, mackerel, sandeel, herring, anglerfish, and hake. The site is in an area of undetermined spawning intensity for haddock (February to May) and saithe (January to April).
Fisheries	Overall, the relative fisheries value of ICES rectangle 48F1 in 2013 was considered to be moderate for demersal species and low for pelagic and shellfish species.
Marine Mammals	Marine mammals sighted in and around the Leadon area include minke whales, killer whales, white-beaked dolphins, white-sided dolphins and harbour porpoises. Peak sightings occur in summer months.
Birds	Seabird vulnerability to oil pollution in the Leadon area is “very high” in October, “high” in January, July, and November and “moderate” to “low” for the rest of the year. Overall vulnerability in the Leadon area is “moderate”.
Onshore Communities	A range of habitats including species-rich heathland, marshes and lochans, cliffs and rocky shores are found along the coastline of the Shetland. Several SPAs are located on the islands, notably Feltar, Noss, Fair Isle, Sumburgh Head and Mousa, the closest is located 155 km from the Leadon infrastructure. These sites are of importance for a number of northern breeding waders, as well as breeding seabirds.
Other Users of the Sea	Shipping traffic in the vicinity of Leadon Field is of very low density, with less than two vessels per day. In the immediate vicinity of the Leadon infrastructure there are no recorded wrecks (SeaZone, 2014). Blocks 9/13 and 9/14 do not lie within a designated military exercise area.
Atmosphere	Local atmospheric conditions will be influenced by emissions from vessel usage during decommissioning operations and adjacent (operational) oil and gas facilities. The Leadon infrastructure lies in an area of high oil and gas activity.

Further details of environmental sensitivities are described in Section 3 of the ES (BMT Cordah, 2015).

4.2 Potential Environmental Impacts and their Management

Environmental Impact Assessment Summary:

- The effects from seabed disturbance will be short-term and should be followed by natural re-colonisation by organisms. These activities will be planned and controlled to ensure careful placement of equipment thereby minimising the area affected. Impact caused by the protective rock dump footprint will be minimised by creating a seabed profile appropriate for the long-term protection of the pipeline bundle. In relation to fishing, the purpose of protective rock dump is to ensure that fishing gear will not be impeded as it travels across the bundle.
- The atmospheric emissions and energy use associated with the proposed decommissioning programme are not considered to be significant, given their relatively small scale in comparison with total UK emissions and the potential for cumulative or transboundary effects from activities is low.
- Materials brought to shore will be largely reused or recycled in line with the Waste Management Plan, quantity sent to landfill will be minimised where possible.
- There will be beneficial impacts from decommissioning the Leadon Field, both to the environment and to society. The area will be opened up to fishing and a larger area of habitat will be available for colonisation by benthic fauna and demersal fish. Material that can be brought to shore and recycled will reduce the requirement for new material to be produced with additional associated and environmental benefits.

Overall, the ES has evaluated the environmental risk and concludes that the decommissioning of the Leadon facilities can be completed without causing significant impact to the environment. Table 4.2 outlines how any potential environmental impacts will be managed to minimise the impact on the surrounding environment.

Table 4-2: Environmental Impact Management

Activity	Main Impacts	Management
Topsides Removal	n/a	n/a
Jacket(s) /Floating Facility Removal	n/a	n/a
Subsea Installations Removal	• Gaseous emissions from retrieval and disposal of equipment may cause temporary deterioration in local air quality and contribute to global processes such as global warming and acid rain deposition • Underwater noise • Disturbance to sediments and potential for	• All generators and engines will be maintained and operated to the manufacturers' standards to ensure maximum efficiency. • Offshore vessels will avoid concentrations of marine mammals • Minimize disturbance of seabed through planned and careful removal of structures. • Pre and post-seabed surveys. • As part of the Leadon decommissioning OPEP, Maersk have

Table 4-2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	debris to remain on the seabed. • Accidental hydrocarbon release • Gaseous emissions during cutting and re-cycling. Where materials are disposed of, use of landfill space and loss of resources. • Physical presence of decommissioning vessels cause potential interference with other sea users.	specialist oil spill response services provided by Oil Spill Response Ltd (OSRL). • Materials are re-used or re-cycled where possible. • Compliance with UK waste legislation and Duty of Care. • Use of designated licensed recycling and landfill sites only. • Prior to commencement of operations, the appropriate notifications will be made and maritime notices posted. • Appropriate navigation aids will be used to ensure other users of the sea are made aware of the presence of vessels.
Decommissioning Pipelines/Bundle (left in situ)	• Gaseous emissions from retrieval and disposal of equipment may cause temporary deterioration in local air quality and contribute to global processes such as global warming and acid rain deposition • Underwater noise • Damage or loss of fishing gear • Physical presence • Disturbance to sediments and potential for debris to remain on the seabed during cutting of the pipeline ends	• All generators and engines will be maintained and operated to the manufacturers' standards to ensure maximum efficiency. • Offshore vessels will avoid concentrations of marine mammals • This impact will be minimised by controlled rock dump over a minimal footprint. • On-going consultation with the SFF • The proposed rock dump will be designed to be over-trawlable • Subsea rock dump will be included on navigational charts • An over-trawlability survey should be performed to ensure that the rock dump gradient is within acceptable limits • Pre and post ROV surveys. • On-going liability.
Decommissioning Stabilisation Features	• Disturbance to sediments and potential for debris to remain on the seabed.	• Minimize disturbance of seabed through planned and careful removal of structures. • Post-decommissioning ROV surveys will be undertaken to ensure integrity of structure and to monitor environmental change.
Decommissioning Drill Cuttings	• Long term presence of hydrocarbons in sediments • Leaching of hydrocarbons into the surrounding sediments and water column	• Only two Leadon wells have been drilled with Oil Based Mud (OBM) discharge. • The two wells were drilled at some distance from each other and cannot be seen as contributing to a single cuttings pile as defined by the OSPAR recommendation. • Although drilling history was unavailable for a number of wells, these were single well sites or were drilled after the cessation of OBM discharge (1st January 2001 in Maersk fields).

Table 4-2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
		On this basis it is anticipated that no further decommissioning actions will be required for drill cuttings in the Leadon Field as per OSPAR 2006/5.

5 INTERESTED PARTY CONSULTATIONS

Consultations Summary:

Table 5-1: Summary of Stakeholder Comments		
Stakeholder	**Comment**	**Response**
United Kingdom Hydrographic Office	We would like to remind Maersk Oil that we require **FIVE WEEKS** advance notice of offshore activities to allow preparation of Admiralty Notices to Mariners. We should also be notified of any amendments to the existing installations as offshore work progresses (i.e. structure removal, structure height changes, new/altered aids to navigation).	Maersk Oil has been in contact with the UKHO to inform them of the planned works, duration and start date of decommissioning works at Leadon in 2015.
		On review of the intended work scope UKHO has advised that as long as a guard vessel is covering the planned work site a Navigational Warning is not considered necessary.
	Following completion of offshore work we require confirmation that the seabed is clear of debris, or details of the remaining debris/structures, before we can fully update our charts.	Maersk Oil will incorporate UKHO into the list of stakeholders to be notified of the completed Leadon work-scope to allow UKHO to accurately update charts in a timely manner.
	The company should also be advised to contact our Radio Navigation Warnings section 24 hours before offshore work is due to commence.	The Radio Navigation Warnings Team will be notified at least 24hours prior to arrival of vessels at Leadon
Joint Nature Conservation Committee	JNCC would like Maersk to invite them to participate in Comparative Assessment discussion and other workshops prior to submission of the decommissioning programme. This will enable JNCC to better understand the basis for conclusions underpinning the decommissioning projects.	The participants of the comparative assessment workshops are agreed on a project by project basis subject to their relevance to the options under assessment. In the case of Leadon Decommissioning the second comparative assessment involved an independent

Table 5-1: Summary of Stakeholder Comments		
Stakeholder	**Comment**	**Response**
		Environmental Consultant from RPS Energy. A detailed record of the CA sessions is available for review. JNCC will be considered for participation at future Maersk Oil comparative assessments and workshops.
Scottish Fishermen's Federation	Several face-to-face discussions were held between Maersk Oil and representatives of the SFF to discuss the proposed leave in-situ option. Details of which were explained as part of a SFF committee meeting Q3 2013 with feedback from the SFF given below: *"The committee appreciated being provided with the presentation which it found very informative.* *The committee was pleased to note that the planned 'Subsea Scopes I and II' involve the removal of all subsea structures, flexible flowlines, spool pieces, control jumpers and concrete mattresses.* *With regard to the remaining two pipeline bundle sections, it was noted that given the restraints of current technology, Maersk's selected decommissioning option is to rock cover the bundle ends and immediately thereafter for overtrawlable trials to take place. It was further noted that continuous integrity monitoring of the remaining bundles would be put in place; including the undertaking of periodical overtrawlable trials.* *As discussed at the SFF/Maersk meeting of 30th August, it remains the case that the preferred option for the SFF is the cutting and recovery of the bundles to shore. However, given the restraints of current technology as advised by Maersk at this meeting (and as highlighted in the Leadon Decommissioning presentation) and on the understanding that the described overtrawlable trials are performed at time of decommissioning and periodically thereafter, I can advise that, subject to agreement being reached on the frequency of the periodic overtrawlable trials, the*	The conditions to agreement of a leave in-situ option by the SFF have been addressed within the DP in sections Table 1-5 and Table 3-3.

Table 5-1: Summary of Stakeholder Comments		
Stakeholder	**Comment**	**Response**
	SFF would be prepared to support this course of action in the interim period until such time as future compatible technologies (which Maersk advised they are proactively seeking) become available with which to recover the Leadon bundles."	
National Federation of Fishermen's Organisations	No comments received	n/a
Northern Irish Fish Producers Organisation	No comments received	n/a
Global Marine Systems Limited	No comments received	n/a
Public	No comments received	n/a

6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

A Maersk Oil Project Management team will be appointed to manage suitable contractors and sub-contractors for the P&A of wells, removal of installations and pipelines and the associated onshore scopes to dispose or recycle waste material. Maersk Oil procedures for Health, Safety and Environmental control and hazard identification will be used. Maersk Oil will monitor and track the process of consents and the consultations required as part of this process. Any changes in detail to the offshore removal programme will be discussed with DECC.

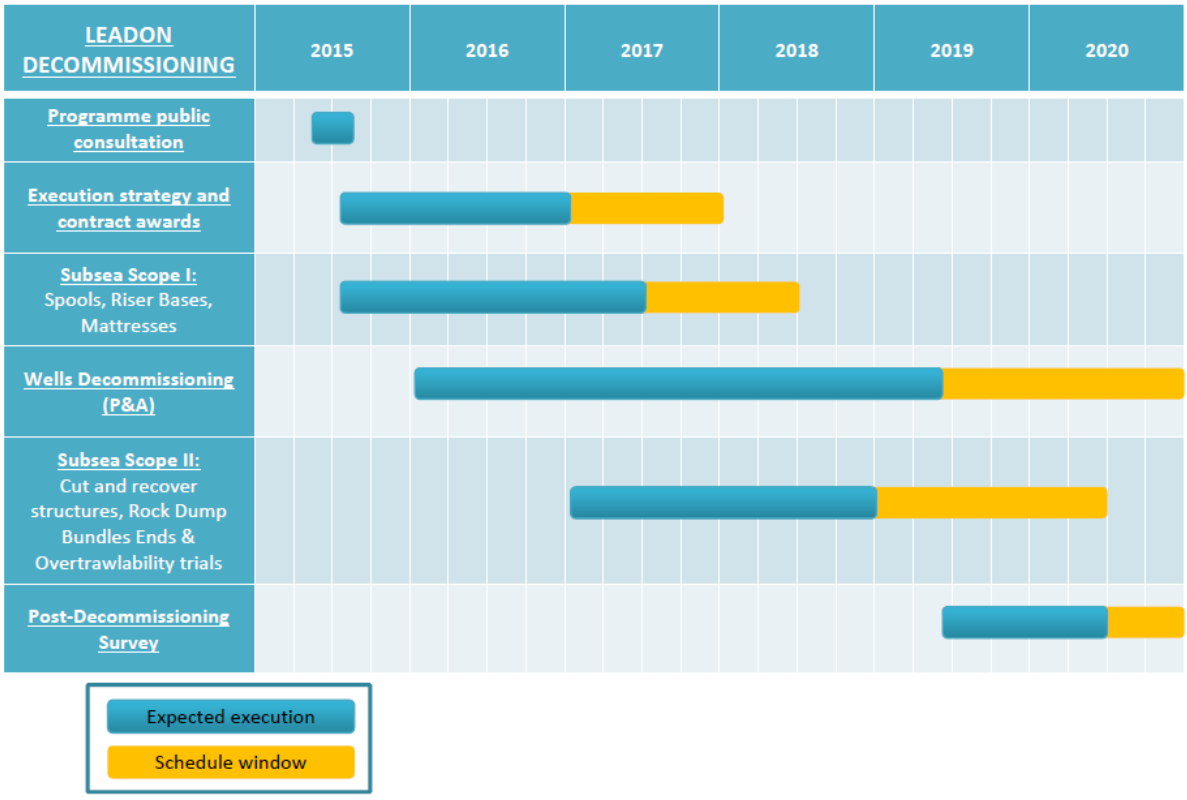
6.2 Post-Decommissioning Debris Clearance and Verification

A post decommissioning site survey will be carried out of the 500m radius around the North Cluster, South Cluster & MLS and a 200m corridor along pipeline routes PL1895, PL1841 & PL1842.
Recent surveys of the Leadon facilities suggest there is minimal debris accumulation. Any debris that is recovered will be sent to an onshore waste disposal or recycling site in line with existing disposal methods.
Upon the verification of the seabed clearance by an independent organisation a clearance certificate will be provided by the SFF and presented to DECC along with the decommissioning closeout report.

6.3 Schedule

Project Plan:

Figure 6-1: Gantt Chart of Project Plan



6.4 Costs

Table 6-1: Provisional Decommissioning Programmes Costs	
Item	**Estimated Cost (£m)**
Platform - Preparation / Removal and Disposal	n/a
Pipelines Decommissioning	Provide to DECC[1]
Subsea Installations and Stabilisation Features	Provide to DECC[1]
Well Abandonment	Provide to DECC[1]
Continuing Liability – Future Pipeline and Environmental Survey Requirements	Provide to DECC[1]
TOTAL	Provide to DECC[1]

[1] Costs for the above work scopes are commercially sensitive information which Maersk Oil will submit to DECC directly.

6.5 Close Out

In accordance with the DECC Guidelines, a Close Out Report will be submitted to DECC within 4 months of the completion of the offshore works explaining any variations to the Decommissioning Programmes, independent verification of seabed clearance and soil sampling and results of the first post-decommissioning environmental survey.

6.6 Post-Decommissioning Monitoring and Evaluation

A post-decommissioning environmental seabed survey of pipeline routes and structure sites will be undertaken once decommissioning activities have concluded. The survey will involve seabed sampling around the drill centre sites to assess the level of residue from drill cuttings. Should these be above acceptable levels additional sampling will be obtained 12 months later and assessed whether it is to be implemented into the on-going inspection and monitoring regime.

The environmental survey will form part of the as-built dossier compiled by the subsea decommissioning contractor and subsequently will be included as part of the close out report issued to DECC. After the results of the environmental survey have been issued to DECC and reviewed, a post-monitoring survey regime will be agreed between DECC and the SFF.

7 SUPPORTING DOCUMENTS

Table 7-1: Supporting Documents	
Document Number	*Title*
URN 09D/734; Version 6 March 2011	Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998
OP071	Oil and Gas UK and Maersk Oil Guidelines for the Suspension and Abandonment of Wells, Version 4, July 2012
ERT 1868	Technical Review of Data from around Maersk Oil's North Sea fields with regard to OSPAR Recommendation 2006/5
LEA-LEA108-SU-IR-0002	Leadon Decommissioning Inventory
LEA-LEA108-SU-RE-0012	Leadon Environmental Statement, 2015
LEA-LEA108-SU-RE-0007	Leadon Decommissioning Option Screening Summary
LEA-LEA108-SU-RE-0002	Leadon Decommissioning FEED Study Report
5079630/029/029/RP001/A	Leadon Decommissioning Options Comparative Risk Assessment
LEA-LEA108-SU-RE-0004	Leadon Decommissioning Comparative Assessment Report
LEA-LEA108-SU-RE-0020	Comparative Assessment II Report
LEA-LEA108-SU-RE-0015	Bundle Corrosion and Long Term Protection Assessment
LEA-LEA108-SU-RE-0010	Leadon Decommissioning Burial Equipment Study
LEA-LEA108-SU-TN-0006	Technical Note: Surface Towing
LEA-LEA108-SU-RE-0016	Bundle Tow Summary
LEA-LEA108-PM-RE-0001	Leadon Decommissioning: Stakeholder Management Plan
LEA-LEA108-SU-RE-0011	Bundle Survey Comparison 2006 - 2009
LEA-LEA108-SU-TN-0003	Conditioning Philosophy: Requirements prior to Decommissioning
LEA-LEA108-SA-HD-0001	Maersk HAZID Report
LEA-LEA108-SU-RE-0013	Independent Review of Process to Evaluate Leadon Decommissioning Options.
LEA-CR5318-LEA108-SU-RE-5000	Other Users of the Sea PLL Study
UK-P952-0405-RP	2013 Subsea Inspection Programme
OTC 18962	Constructing the World's Longest Subsea Pipeline, Langeled Gas Export, Leif Solberg and Erling Gjertveit, Statoil, 2007
JIP07 R11A Summary Report	Overtrawling of Large Diameter Pipelines JIP, Jee

PARTNER LETTERS OF SUPPORT

Maersk Oil UK Limited
Maersk House
Crawpeel Road
Altens
Aberdeen
AB12 3LG

Phone: +44 1224 242000
Fax: +44 1224 242116

Registered office:
Maersk House
Braham Street
London
E1 8EP

www.maerskoil.com
Reg. No.: 00946986

Date: 04 February 2016
Page: 1/1

Department of Energy and Climate Change
Offshore Decommissioning Unit
3rd Floor, Atholl House
86-88 Guild Street
Aberdeen
AB11 6AR

F.A.O. Alex Mateo, Decommissioning Manager

Dear Sir/Madam

LEADON DECOMMISSIONING PROGRAMMES

We acknowledge receipt of your letter dated 20 January 2016 with reference 12.04.06.08/2c.

We, Maersk Oil UK Limited, confirm that we authorise Maersk Oil North Sea UK Limited to submit on our behalf the Leadon Decommissioning Programmes dated 24 November 2015 as directed by the Secretary of State on 20 January 2016.

We confirm that we support the proposals detailed in the Leadon Final Decommissioning Programmes dated 24 November 2015 which is to be submitted by Maersk Oil North Sea UK Limited in so far as it relates to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully

Director
For and on behalf of Maersk Oil UK Limited