Tullow Oil SK Limited

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Offshore Decommissioning Unit
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F.A.O. Alex Mateo, Decommissioning Manager

22 October 2015

RE: ORWELL FIELD DECOMMISSIONING PROGRAMME

Dear Sir/Madam,

We acknowledge receipt of your letter dated 22 October 2015 with reference 12.04.06.08/56c.

We, Tullow Oil SK Limited, hereby submit the Final Decommissioning Programme for the Orwell Field dated 22 October 2015, as directed by the Secretary of State on 22 October 2015.

The Final Orwell Field Decommissioning Programme dated 22 October 2015, is submitted on behalf of Section 29 Notice Holders Tullow Oil SK Limited, Tullow Oil plc, and Texaco North Sea U.K. Limited as requirement under section 29 of the Petroleum Act 1998.

Yours faithfully,

For and on behalf of Tullow Oil SK Limited

Signed .....
Name: ALAN GRAHAM MURRAY
Title: Director

Registered in England: Number 5287330
Registered Office as above

TULLOW OIL SK LTD - ORWELL FIELD DECOMMISSIONING PROGRAMMES

PROJECT CODE: 02029

Rev	Date	Reason for Issue	Prepared	Checked	Approved
F	22/10/15	Final Issue for Secretary of State Approval	DS	IM	IM
E	02/09/15	Re- Issued to incorporate comments and for formal review	DS	IM	IM
D	02/09/14	Re- Issued to incorporate comments and for formal review	DS	IM	AE
C	14/08/14	Re- Issued to incorporate comments and for formal review	DS	IM	AE
B	15/07/14	Issued to incorporate comments and for formal review	DS	IM	AE
A	19/3/14	Issued for DECC Informal Review	IM	DS	AE

DOCUMENT NUMBER :

02029-TLW-PM-PRG-0003

Contract Number	Area Code	System Code	Responsible Party
			Tullow Oil SK Ltd

REVISION CONTROL

Revision:	Para /Sect	Change Description

This sheet must be completed in detail, at each revision once this document has been approved. Details must include revision number, description and indication of which pages and paragraphs have been revised, date of revision approval and approval indication.

CONTENTS

A. TABLE OF TERMS AND ABBREVIATIONS

Abbreviation	Explanation
CoP	Cessation of Production
DECC	Department of Energy and Climate Change
DPs	Decommissioning Programmes
DSV	Diving Support Vessel
ES	Environmental Statement
ESDV	Emergency Shut Down Valve
HLV	Heavy Lift Vessel
LAT	Lowest Astronomical Tide
m	Meters
MEG	Monoethylene Glycol
NUI	Normally Unattended Installation
OGUK	Oil & Gas UK
OPEP	Oil Pollution Emergency Plans
ORSL	Oil Spill Response Ltd
OSPAR	Oslo and Paris Convention
Perenco	Perenco (UK) Ltd
P & A	Plug and Abandonment
PL	Pipe Line
QRA	Quantitative Risk Assessment
SLV	Sheer Leg Vessels
SNS	Southern North Sea
SWAT	Suspended Well Abandonment Tool
UKCS	UK Continental Shelf

B. TABLE OF FIGURES AND TABLES

C. TABLE OF APPENDICES

1.0 EXECUTIVE SUMMARY

1.1 Combined Decommissioning Programmes

This document contains two Decommissioning Programmes (DPs). (1) A single Orwell subsea installation and (2) Orwell pipelines (as described in Para 1.2). A separate programme for each set of associated notices under Section 29 of the Petroleum Act 1998 is incorporated within this document.

1.2 Requirement for Decommissioning Programme(s)

Installation: In accordance with the Petroleum Act 1998, the Section 29 notice holder of Orwell field in 50/26a (see Table 1.2) are applying to the Department of Energy and Climate Change to obtain approval for decommissioning the installations detailed in Section 2 of this programme. (See also Section 8 - Partner(s) Letter(s) of Support).

Pipeline(s): In accordance with the Petroleum Act 1998, Tullow Oil SK Ltd (hereinafter referred to as Tullow Oil) as operator of the Orwell pipelines PL931, PL932, PL933 (see Table 1.4) and on behalf of the Section 29 notice holders are applying to DECC to obtain approval for decommissioning the pipelines detailed in Section 2 of this document. (See also Section 8 – Partner(s) Letter(s) of Support).

In conjunction with public, stakeholder and regulatory consultation, the decommissioning programmes are submitted in compliance with national and international regulations and DECC guidelines. The schedule outlined in this document is for a 48 month decommissioning project plan due to begin in Quarter 4 2014.

1.3 Introduction

The Orwell field is located in block 50/26a in the Southern North Sea approximately 100km off the coast of Norfolk, northeast of Bacton and 35km west of the Thames AW platform to which the Orwell pipeline delivers untreated wet gas. Following development plan approval in 1992, the field was developed and first gas was delivered in August 1993. Operatorship of the field passed to Tullow in August 2001.

The Orwell development consists of a subsea template including three production wells, D1, D2 and D3, tied back via a 16" flow line to the Perenco operated Thames Facility. Orwell last produced gas in January 2009, when a fault was identified with the remaining production well's (D2) SSSV; the valve was inoperable from surface as hydraulic pressure could not be sustained to open the valve, indicating the requirement for subsea intervention for remediation. At this time 309BCF wet gas had been produced from Orwell which is estimated to be 85% recovery.

During the 6 month period prior to the SSSV fault on well D2, high liquid loading had been observed in the well such that production had become cyclic, at rates significantly below 1mmscf/d..

As part of the COP (Approved by DECC 14/05/14) considerations, TOSK have explored all options for continuing production of Orwell but concluded none are viable, therefore the Orwell field is ready for decommissioning.

To optimise efficiency and realise synergies, the Orwell Decommissioning Programme activities will be integrated with the Thames Area that comprise the Arthur, Thames Complex (including Thurne), Horne and Wren, Wissey and Gawain fields. The operator for the Thames Complex, Arthur and Gawain is Perenco UK (PUK)..

Similarly, each of the Thames Area fields have reached their end of economic production and due to the interdependencies of the subsea wells on the Thames platform it was agreed with DECC to submit joint single COP and EIA documents to capture all fields and further promote integration into a single project where practicable. However, it should be noted that each operator will submit individual DPs for each field that can be undertaken independently.

1.4 Overview of Installation(s)/Pipeline(s) Being Decommissioned

1.4.1 Installation(s)

Table 1.1: Installation(s) Being Decommissioned					
Field Name	Orwell	Quad/Block	50/26a	Number of Platforms	None
Distance from nearest UK coastline (km)	99.5	Distance to median (km)	4	Platform type	N/A
Number of Subsea Installation(s)	1	Number of Drill Cuttings Pile(s):	None	Topsides Weight (Te): Jacket Weight (Te):	N/A
Number of Wells: Platform: Subsea:	3 Subsea wells	Production Type (Oil / Gas /Conde)	Gas	Water Depth (m)	N/A

Table 1.2 Installation(s) Section 29 Notice Holders Details		
Section 29 Notice Holder(s)	**Registration Number**	**Equity Interest (%)**
Tullow Oil SK Ltd.	05287330	100
Tullow Oil Plc.	03919249	0
Texaco North Sea U.K. Limited	00807340	0

1.4.2 Pipeline(s)

Table 1.3: Pipeline(s) Being Decommissioned		
Number of Pipeline(s)/ Umbilical(s)	2/1	(See Table 2.3)

Table 1.4: Pipeline(s) Section 29 Notice Holders Details		
Section 29 Notice Holder(s)	**Registration Number**	**Equity Interest (%)**
Tullow Oil SK Ltd.	05287330	100
Tullow Oil Plc.	03919249	0
Texaco North Sea U.K. Limited	00807340	0

1.5 Summary of Proposed Decommissioning Programme(s)

Table 1.5: Summary of Decommissioning Programmes

Selected Option	Reason for Selection	Proposed Decommissioning Solution
1. Topsides		
N/A		
2. Jackets		
N/A		
3. Subsea Installation		
Wellhead protection frame will be removed by HLV or crane vessel	To remove all seabed structures and leave a clean seabed. To comply with OSPAR requirements.	Wellhead protection frames will be removed along with the top sections of piles. Piles will be severed 3m below the seabed level to ensure that any remains are unlikely to become uncovered. A PETS DCA application will be prepared and a MCAA licence application submitted to cover to removal of the Wellhead Protection Frame.
4. Pipelines & Umbilical		
Flush and leave buried in situ	Minimal seabed disturbance, lower energy usage, reduced risk to personnel engaged in the activity, pipelines and umbilical are sufficiently buried and are stable.	The pipelines (PL931/932) and umbilical (PL933) will be left in situ, with the cut ends re-buried below the seabed level at such a depth to ensure that any remains are unlikely to become uncovered. Surveys indicate pipelines and umbilicals will remain buried once flooded. Degradation will occur over a long period within seabed sediment and not expected to represent a hazard to other users of the sea. A PETS PLA application will be prepared and a MCAA licence application submitted to cover the proposed pipeline cutting and burial works. Chemical SATS and Oil Discharge SATs will be submitted as required in relation to the pipeline flushing operations.
5. Well Abandonment Operations		
Abandoned in accordance with UKOG for the	Meets DECC regulatory requirements	A PETS WIA application will be prepared and a MCAA licence application submitted to cover well abandonment

suspension and abandonment of wells		and removal of the wellhead infrastructure.
6. Drill Cuttings		
There are no drill cuttings associated with Orwell	Cuttings were widely dispersed and fall below OSPAR 2006/5 thresholds.	Not applicable
7. Interdependences		
None		

1.6 Field Location/Layout and Adjacent Facilities

Figure 1.1: Field Location in UKCS

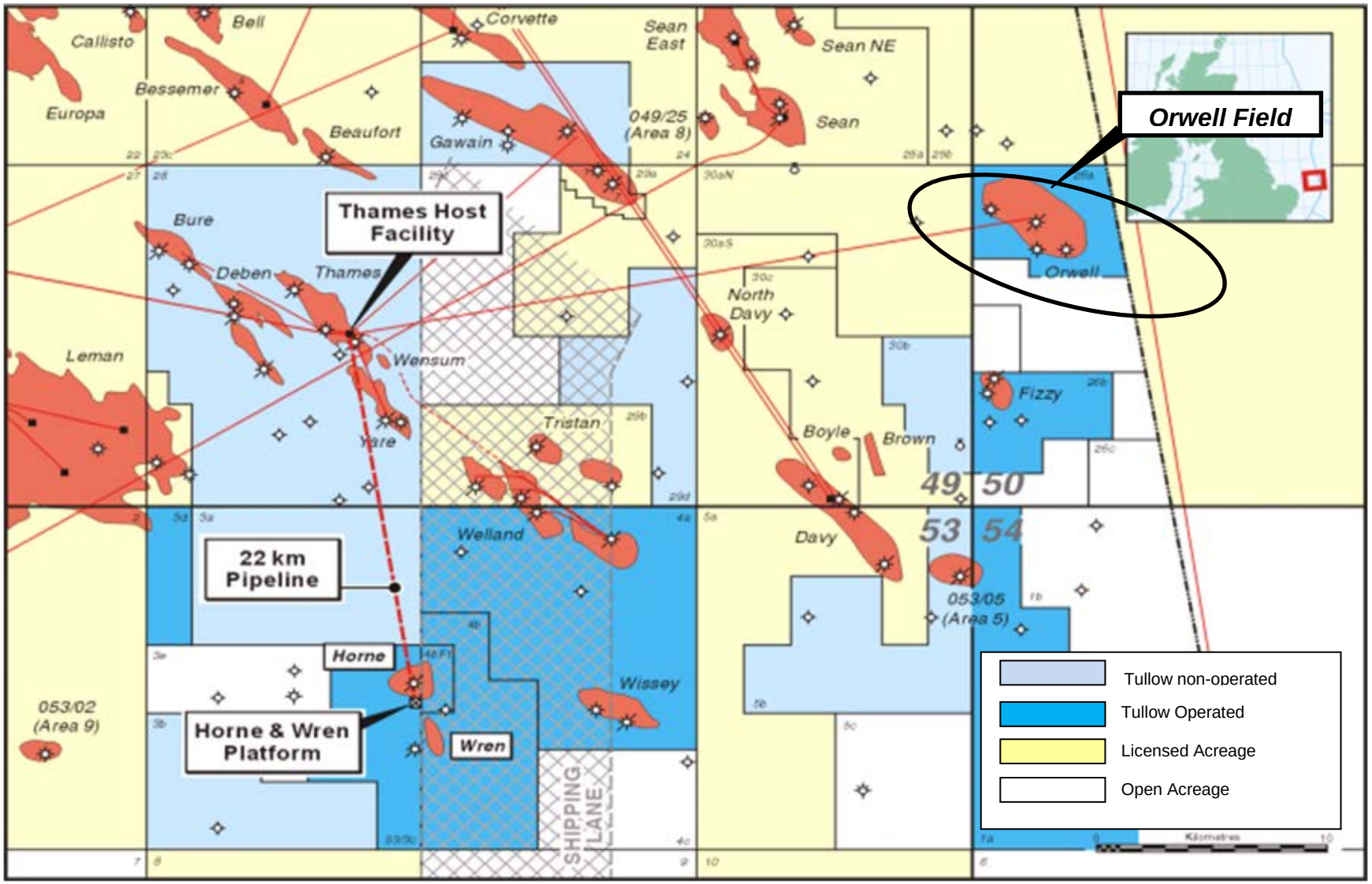


Figure 1.2: Field Layout.

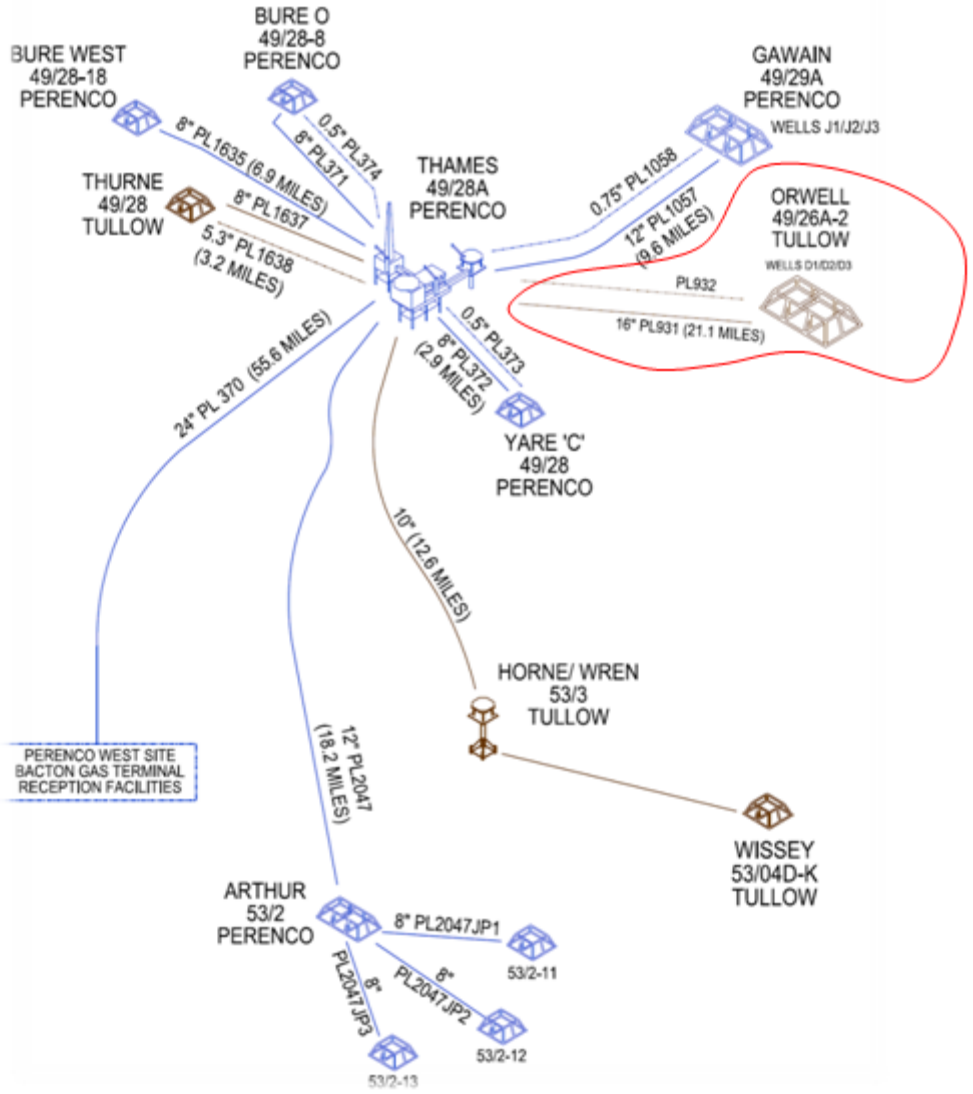
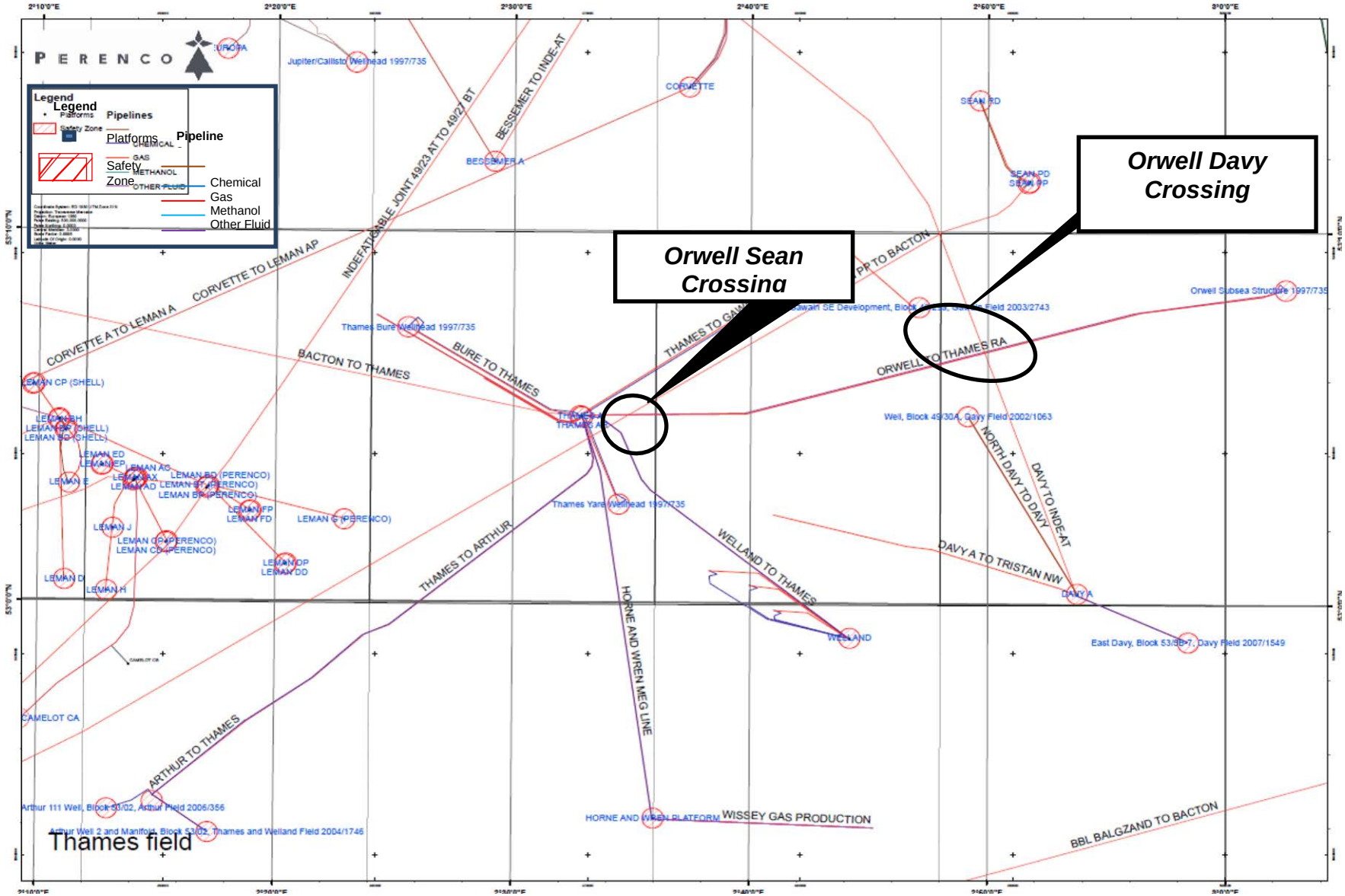


Table 1.6 List of Adjacent Facilities

Owner	Name	Type	Distance/Direction	Information	Status
Perenco	Thames	Platforms	From Orwell well to Thames is 35.0km South West.	Gas production from Orwell subsea wells flows into Thames AW platform	Operational
Perenco	PL1053/PL 1054	Pipeline	Approx. 17km to PL1053/PL1054 from Orwell wells	Gas production from Davy flows into Inde 23A platform through P1749 which crosses Orwell pipeline	Operational
Shell UK	PL 311	Pipeline	Approx. 3km East of Thames Platform	Orwell pipeline crosses 30" Sean P export pipeline to Bacton	Operational
Unknown	Unknown	Cable		Telecom cable, UK - Denmark	Believed to be operational
Unknown	Unknown	Cable	UK to Germany	Winterton to Romo	Redundant
Unknown	Unknown	Cable	UK to Germany	Winterton to Spiekroog	Redundant

NOTE: All Adjacent facilities will have no impact on the Decommissioning proposals.

Figure 1.3: Adjacent Facilities and crossings



1.7 INDUSTRIAL IMPLICATIONS

The intent of this Decommissioning Program is to integrate the Orwell scope of work into the wider "Thames Area decommissioning project" which encompasses all fields that tie back to the Thames complex, into discrete manageable phases.

The phases are as follows

- Surveys
- Pipeline cleaning (base case is to flush and clean from Thames complex back to individual fields. If this is not possible, the uncompleted scopes will be included in the DSV phase).
- DSV (pipeline severance and burial, removal of stabilisation materials).
- Well Plugging & Abandonment.
- Removal of subsea well heads and weld head protection structures.

The above Phases will need to be planned carefully to recognise synergies and efficiencies, however the pre engineering will be completed to allow either individual projects to be completed or to fully integrate all work scopes.

Strategically, suppliers with working vessels and assets on the UKCS will be favoured. All contracts will be competitively tendered or novated to either party.
Current operational contracts for items such as environmental permitting, rig drilling management and logistic support will be implemented to support decommissioning activities

2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Surface Facilities (Topsides/Jacket(s)/FPSO etc.)

Table 2.1: Surface Facilities Information

Name	Facility Type*	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 and Stabilisation Features

Table 2.2: Subsea Installations and Stabilisation Features

Subsea installations and Stabilisation Features	Number	Size/Weight (Te)	Location(s)	Comments/ Status
Wellhead(s)	3	50 for all three	Orwell wells: D1, D2 and D3 (WGS84 - 53° 8' 25.0706 North. 3°2' 29.543 East.)	
Manifolds(s)	5	Inc. in frame	NA	Integral with frame
Template(s)	1	250	Below wellheads	
Protection Frame(s)	1	200	Around manifold and 3 wells	Piled
Concrete mattresses with fronds	60	600	Within 500m of manifold (same as coordinates)	From as built drawings
Grout bags	50	1.25	Within 500m of manifold (same as coordinates)	From as built drawings
Rock Dump	0	N/A	N/A	No known rock dump

2.3 Pipelines/Flowlines/Umbilicals

Table 2.3: Pipeline/Flowline/Umbilical Information									
Description	**Pipeline No. (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Composition[1]**	**Contents[2]**	**From – To End Points**	**Condition**	**Status[3]**	**Contents[4]**
Orwell pipeline	PL931	16	33.9	Steel with concrete coating	Gas	Orwell well to Thames AW	Trenched and buried, some exposures covered by mattresses.	Ceased production	Hydrocarbon and Sea Water
Orwell Chemical Line	PL932	3	33.9	Steel	Chemicals	Thames AW to Orwell well	Trenched and buried, some exposures covered by mattresses. Piggybacked to PL931	Ceased production	Chemicals
Orwell Umbilical	PL933	4	34.5	Bundle	Chemicals/ Hydraulic Fluids	Thames AW to Orwell well	Trenched	Ceased production	Hydraulic fluids/copper

[1] e.g. Concrete; Steel; umbilical; Flexible; Bundle
[2] e.g. Oil; Gas; Water; Chemicals
[3] e.g. Operational; Out-of-use; Interim pipeline Regime
[4] e.g. Cleaned; Flushed; Hydrocarbons and/or Chemicals in line

Table 2.4: Subsea Pipeline Stabilisation Features				
Stabilisation Feature	**Number**	**Weight (Te)**	**Location(s)**	**Comments/ Status**
Concrete mattresses	0	N/A	Outside 500m zone of manifold	
Grout bags	50	1.25	Umbilical protection at Thames	From as built drawings
Frond Mats	60	600	Approaches to Thames and Orwell pipeline ends (within 100 m of each end)	From as built drawings. Assumed buried, however further surveys will determine.
Rock Dump	0	N/A		No known rock dump

2.4 Wells

Table 2.5 Well Information			
Platform Wells	**Designation 1**	**Status**	**Category of Well**
N/A			
Subsea Wells			
50/26a-2 (D1)	Production	Shut in	3/3/1
50/26a-2 (D2)	Production	Shut in	3/3/1
50/26a-2 D3	Production	Shut in	4/3/1

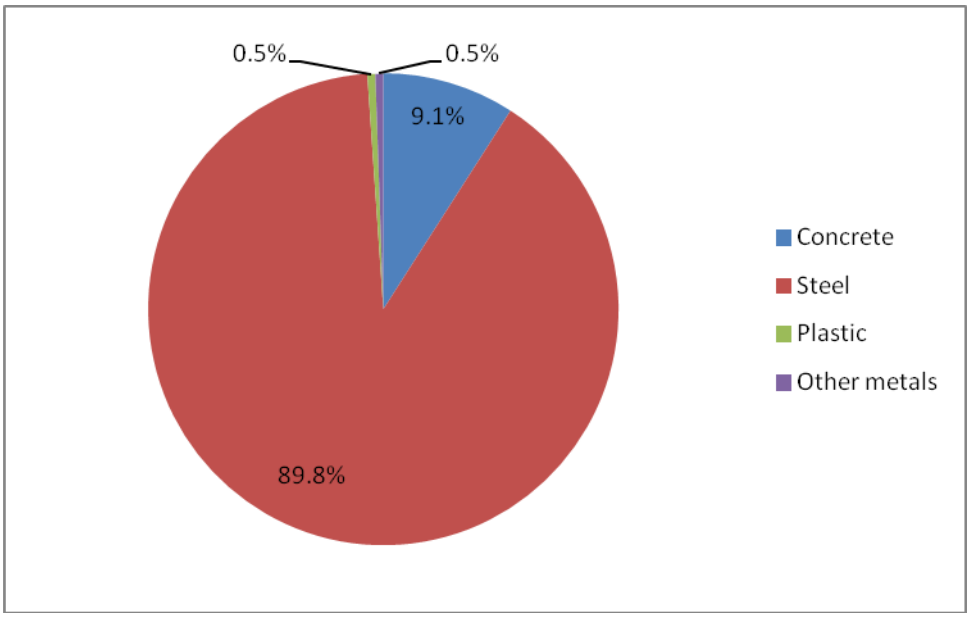
Category of well as per OGUK Guidelines for the suspension and abandonment of wells, Issue 4, July 2012.

2.5 Drill Cuttings

There are no drill cuttings associated with the Orwell subsea wells in the area. Drill cuttings that were generated during drilling activity are considered to have been distributed widely during drilling due to the local currents. There was no evidence of drill cuttings in the immediate vicinity of the wells when surveys were conducted in Q3 2013.

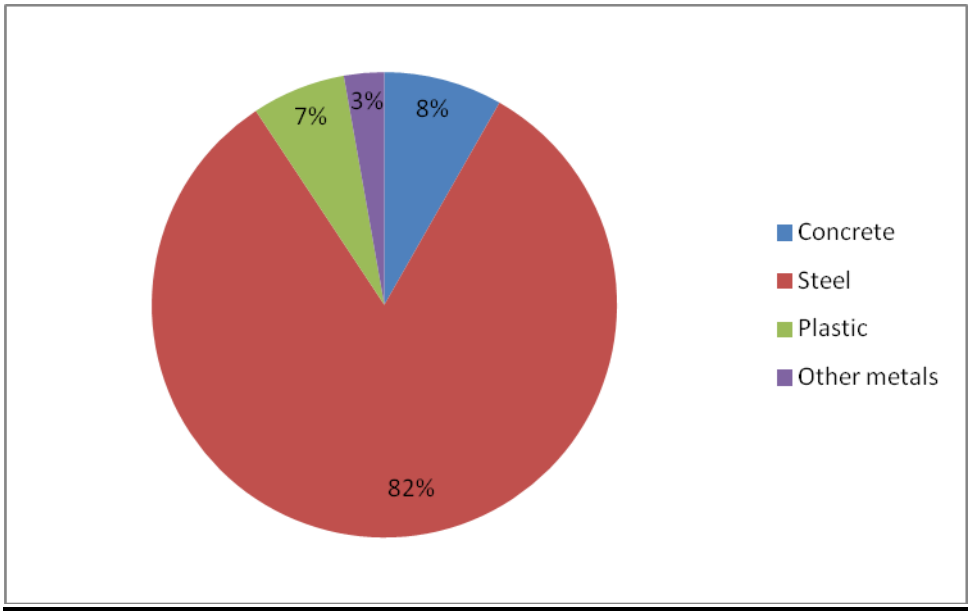
2.6 Inventory Estimates

Figure 2.1: Pie Chart of Estimated Inventories (Installations)



Total tonnes: 551

Figure 2.2: Pie Chart of Estimated Inventory (Pipelines)



Total tonnes: 7278

3. REMOVAL AND DISPOSAL METHODS

Wastes generated during decommissioning will be segregated and recorded by type and periodically transported to shore in an auditable manner through licensed waste contractors. Steel and other scrap metal are estimated to account for the greatest proportion of the materials inventory. The hierarchy for disposal will be:

1. Reuse
2. Reconditioning
3. Reconditioning of component parts
4. Recycling (partial or whole) components/materials
5. Disposal to landfill or other approved methods

The disposal routes for the subsea installations and pipeline infrastructure are shown in Tables 3.1 and 3.2.

Once the infrastructure is recovered to the vessels, it will be examined for the presence of NORM. If any contamination is found, the items will be sealed and delivered to specialist contractors for decontamination treatment and disposal. NORM contamination in Orwell infrastructure would require specialised waste transport and handling processes and is regulated under the Radioactive Substances Act 1993, however, the Orwell infrastructure is not expected to contain any NORM.

3.1 Topsides

N/A

3.2 Jacket(s)

N/A

3.3 Subsea Installations and Stabilisation Features

All subsea installations will be removed to shore for disposal. The pile cuts will be made below the seabed level (minimum 3m). The means of cutting could be diamond wire, high pressure water jet abrasive cutting or by explosives.

Table 3.1: Subsea Installation and Stabilisation Features Decommissioning		
Subsea installations and stabilisation features	**Option**	**Disposal Route (if applicable)**
Wellheads	Remove	Transport ashore for disposal
Manifold	Remove	Transport ashore for disposal
Template	Remove	Transport ashore for disposal
Protection Frame	Remove	Transport ashore for disposal
Concrete mattresses	It is intended that the mattresses should be recovered to shore, however in the event of practical difficulties DECC will be consulted and a Comparative Assessment submitted	Transport ashore for disposal
Grout bags	Remove	Transport ashore for disposal
Formwork	Not applicable	Not applicable
Frond Mats	It is intended that the mattresses should be recovered to shore, however in the event of practical difficulties DECC will be consulted and a Comparative Assessment submitted	Transport ashore for disposal
Rock Dump	Leave in situ	Leave in situ

3.4 Pipelines/Flowlines/Umbilicals

Decommissioning Options:

Table 3.2: Pipeline or Pipeline Groups/Decommissioning Options			
Pipeline or Group (as per PWA)	**Status of the line or characteristics of the pipeline group**	**Decommissioning Options considered**	**Whole or part of pipeline/group being decommissioned**
PL931	Trenched, buried	1,2,3,4,5	Whole pipeline
PL932	Trenched, buried	1,2,3,4,5	Whole pipeline
PL933	Trenched, buried	1,2,3,4,5	Whole pipeline

*Key to Options

1) Completely remove the line(s);
2) Trench and bury the exposed / uncovered areas of the line(s);
3) Rock dump the line in specific areas where the line is uncovered;
4) Partial removal of uncovered sections of the line;
5) Leave in situ with periodic monitoring (frequency to be agreed with DECC)

Comparative Assessment Method:

The Comparative Assessment process involved a multi-disciplinary team participating in a Comparative Assessment workshop and a preliminary Quantitative Risk Assessment (QRA) of the available decommissioning options. At the Comparative Assessment workshop, each decommissioning option has been scored against a set of assessment criteria using categories derived from DECC guidance: 1. Safety; 2. Environmental; 3. Technical; 4. Societal; 5. Commercial. The Comparative Assessment can be found in Section 7, Supporting Documents, Document 2.

The Comparative Assessment concluded the pipelines and umbilicals will be left in situ due to difficulty and cost to remove. They are predominantly trenched and buried; the free spans are within acceptable parameters to leave. The pipelines will be periodically monitored (frequency to be agreed with DECC) and buried as required.

Outcome of Comparative Assessment:

Table 3.3: Outcomes of Comparative Assessment		
Pipeline or Group	**Recommended Option***	**Justification**
PL931	Option 5	Line is buried and will be safe to leave in situ (5). End sections will be removed & exposures/spans will be buried or removed. Monitoring will be performed to confirm pipeline remains buried. The frequency of monitoring will be agreed with DECC
PL932	Option 5	Line is buried and will be safe to leave in situ (5). End sections will be removed & exposures/spans will be buried or removed. . Monitoring will be performed to confirm pipeline remains buried. The frequency of monitoring will be agreed with DECC
PL933	Option 5	Line is buried and will be safe to leave in situ (5). End sections will be removed & exposures/spans will be buried or removed. Monitoring will be performed to confirm pipeline remains buried. The frequency of monitoring will be agreed with DECC

*Key to Options

1) Completely remove the line(s);
2) Trench and bury the exposed / uncovered areas of the line(s);
3) Rock dump the line in specific areas where the line is uncovered;
4) Partial removal of uncovered sections of the line;
5) Leave in situ with continuous monitoring (frequency to be agreed with DECC).

3.5 Wells

Table 3.4: Well Plug and Abandonment
The wells which remain to be abandoned, as listed in Section 2.4 (Table 2.5) will be plugged and abandoned in accordance with Oil and Gas UK Guidelines for the suspension and abandonment of wells. A PETS WIA application will be prepared and a MCAA licence application submitted to cover well abandonment and removal of the wellhead infrastructure.

3.6 Drill Cuttings

Drill Cuttings Decommissioning Options: N/A
(Please refer to Section 2.5)
Comparative Assessment Method: N/A
Outcome of Comparative Assessment: N/A

3.7 Waste Streams

Table 3.5: Waste Stream Management Methods	
Waste Stream	**Removal and Disposal method**
Bulk liquids	Removed and discharged to disposal wells or sent to Bacton via the export line for disposal.
Marine growth	Removed offshore / onshore. Disposed of according to the Tullow Thames Field Decommissioning Waste Management Plan, and in line with relevant legislation relating to the decommissioning of offshore structures, and the management of controlled waste.
NORM/LSA Scale	Tests for NORM/LSA will occur offshore and will be dealt/disposed with according to guidelines and company policies.
Asbestos	N/A
Other hazardous wastes	Non identified
Onshore Dismantling sites	Appropriate licensed sites will be selected. Chosen facility must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver innovative recycling options.

Table 3.6 Inventory Disposition			
	Total Inventory Tonnage	**Planned tonnage to shore**	**Planned left in situ**
Installations	495	395	100
Pipelines	6000	300	5700

4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Environmental Sensitivities

The main features in this section are extracts from the Thames Area decommissioning Environmental Impact Assessment that has been prepared for the entire Thames Area decommissioning and is submitted in support of this Decommissioning Programme approval.

Table 4.1: Environmental Sensitivities

Environmental Receptor	Main Features
Conservation interests	**Marine Protected Areas (MPAs):** The Orwell infrastructure lies 40 kilometres from the nearest marine protected area; North Norfolk Sandbanks and Saturn Reef cSAC/SCI. **Annex I Habitats:** Annex I shallow sandbanks and discrete populations of *S. spinulosa* were identified in the side scan sonar mosaic and using seabed imagery across the Thames Area. Overall the site survey identified some areas of 'low' to 'moderate reefiness' but no areas of high reefiness which has previously been found at the Saturn Reef to the west of the Orwell field (outside of the current working area). Given the distance of the Orwell infrastructure from the North Norfolk Sandbanks and Saturn Reef cSAC/SCI, it is unlikely that Annex I *S. spinulosa* reefs will be present. **Annex II Species:** The Annex II species that could be present in the vicinity of the Thames Decommissioning Area include: • Harbour porpoise (*Phocoena phocoena*); • Grey seal (*Halichoerus grypus*); • The harbour (or common) seal (*Phoca vitulina*).

Table 4.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Seabed	Seabed imagery found that much of the surveyed area comprised bare sand with some areas of gravel and shell fragments (*CMACS, 2013*). Side scan sonar data demonstrated that sand waves across large areas of the seabed. This indicates strong seabed and water column currents, and subsequently highly mobile sediments (*CMACS, 2013*) which is consistent with the southern North Sea in general. The results of the chemical testing indicate that the concentrations of the individual PAH compounds all fall below the laboratory detection limits. Similarly, the aliphatic and aromatic total petroleum hydrocarbon (TPH) compounds also fall beneath lab detection limits, along with the other organic compounds and phenols listed. The organic content of sediments was generally low, ranging from 0.47 per cent to 1.54 per cent, with no discernible trend across the survey area (*CMACS, 2013*). Of all the metal contaminants, only arsenic was present above Level 1 threshold (Cefas L1 threshold is 20 ppm) at the majority of stations. Elevated levels of arsenic can occur following geological inputs and/or industrial discharge (*CMACS, 2013*). Cadmium was the only other metal found at concentration above the Level 1 threshold with 0.4 ppm. Barium was detectable at all stations sampled with levels of between 6 and 36 ppm across the sites and no evidence of any 'hotspots' of barium concentration *(CMACS, 2013).*
Fish	There are potential fish spawning areas in Block 50/26 for plaice (*Pleuronectes platessa*), sandeel (*Ammodytes marinus*), cod (*Gadus morhua*), and whiting (*Merlangius merlangus*). In addition, the waters of Block 50/26 also act as nursery areas for mackerel (*Scomber scombrus*), sandeel, cod, whiting, herring (*Clupea harengus*), spurdog (Squalus sp.), tope shark (*Galeorhinus galeus*), and anglerfish (Lophiiformes sp.) (*Coull et al., 1998; Ellis et al., 2012*).
Fisheries	Specific fishing effort and landings data for ICES Rectangles 36F2 indicated that annual fish landings were greatest in 2011 (217.8 tonnes). Conversely, annual fishing catches by tonnage were lowest during 2012 in ICES Rectangles 36F2 (36.4 tonnes) (*Marine Scotland, 2014*). Generally, fishing activity is low throughout the year in ICES rectangle 36F2. When averaged, catches by weight (tonnes) between 2009 and 2013 were highest during January. Plaice was the most commonly caught species during 2013 in ICES Rectangle 36F2.

Table 4.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Marine Mammals	According to Reid et al. (2003) three species have previously been sighted in the area around Block 50/26. Harbour porpoise (Annex II species), White-beaked dolphins, and minke whale. In addition, there is the potential that harbour seals (Annex II species) and grey seals (Annex II species) may be present in the vicinity of the Orwell infrastructure.
Birds	Within Block 50/26, seabird vulnerability peaks to high (2 out of 4 on the JNCC scale) during February and March.
Onshore Communities	All waste produced during the Thames Area Decommissioning will be transferred to an onshore decommissioning and waste facility for processing. Tullow Oil will ensure the chosen facility is fully regulated and licensed with current legislation.
Other Users of the Sea	**Shipping:** Shipping movements within Block 50/26 are regarded as 'Moderate' throughout the year. **Oil & Gas:** There is no other oil & gas infrastructure in Block 50/26 aside from the Orwell development tree and associated pipelines/ control umbilical. A number of wells have been drilled by Tullow and partners within the block and in the adjacent areas. The surrounding area supports moderate to intensive oil and gas exploration and production, with a number of nearby fields including North and South Sean (Blocks 49/24 and 49/25), North Davy (Block 49/30) and Boyle (Block 49/30). **Military Activity:** Block 50/26 does not lie within any marine military exercise areas. **Dredging and Dumping Activity:** No commercial or capital dredging is undertaken, nor are there sites licensed for disposal of dredged material within Block 50/26 **Wind Farms:** Block 50/26 lies within the East Anglia Offshore Wind farm Area. The site was awarded during Round 3 (2010), and is currently progressing through first project approval. Offshore construction is not planned to commence until 2017 (Renewables UK, 2014). **Archaeology:** There are no charted wreck sites located within Block 50/26

Table 4.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Atmosphere	Atmospherics emissions will be generated during the Orwell Field Decommissioning operations. However, it is expected that the emissions will be localised to the area of release.

4.2 Potential Environmental Impacts and their Management

Environmental Impact Assessment Summary:

Decommissioning project activities with the potential to cause environmental impacts were identified from discussions with the Tullow project team, an informal scoping exercise with key stakeholders and from the EIA team's previous oil and gas EIA project experience.

Impacts associated with the Orwell which is included in the Thames Area Decommissioning project have been grouped within the EIA under the following headings:

- Physical Presence;
- Seabed Impacts;
- Noise;
- Atmospheric Emissions;
- Marine Discharges;
- Unplanned Releases;
- Solid Wastes;
- Trans boundary Impacts;
- Cumulative Impacts.

Any relevant social-economic issues have been assessed within these sections.

In summary, all residual impacts are considered to be of minor significance, provided the proposed mitigation and management measures, as identified within the ES, are implemented during the Thames Area Decommissioning.

The exception to this is in the event of an accidental spill, where there would be a release of condensate from the pipeline or diesel fuel loss from the drilling rig / SLV; here the residual impact has been assessed as moderate. In addition, the assessment of potential cumulative impacts indicated that there would be no significant impacts and no significant transboundary impacts are expected to occur as a result of the decommissioning operations.'

Overview:

Table 4.2 Environmental Impact Assessment Summary		
Activity	**Main Impacts**	**Management**
Topsides Removal	Not applicable	Not applicable
Jackets Removal	Not applicable	Not applicable

Table 4.2 Environmental Impact Assessment Summary		
Activity	**Main Impacts**	**Management**
Subsea Installations Removal	Energy use and atmospheric emissions Underwater noise Dropped object Accidental hydrocarbon release Production of Waste Damage or loss of fishing gear Disturbance to the Seabed	Vessels will be audited as part of selection and pre-mobilisation. Work programmes will be planned to optimise vessel time in the field. A post decommissioning debris survey will be conducted and any debris recovered. Materials are reused and recycled where possible. Compliance with UK waste legislation and duty of care. Underwater cutting could be a potential source of sound, the operation of well-maintained equipment during decommissioning will ensure noise of operating machinery is kept as low as possible. Use of explosives underwater is expected to cause a significant source of sound. Use of explosives underwater is expected to cause a significant source of sound. Consultation with JNCC and DECC will occur before agreement on any operation. Tullow Oil will also conform to 'JNCC guidelines for minimising the risk of injury to marine mammals from using explosives.' If applicable a MMO will be onboard the vessel during cutting and/or explosive operation. UK Hydrographical Office and Kingfisher will be informed of all activities. Tullow Oil will establish lines of communication to inform other sea users, including fishermen, of vessel operations during decommissioning. Tullow Oil will prepare an MCAA licence application to cover the removal of the Wellhead Protection Frame. Any dropped objects will be reported to DECC OGED using the PON2 reporting form.

Table 4.2 Environmental Impact Assessment Summary		
Activity	**Main Impacts**	**Management**
Decommissioning Pipelines (left in situ)	Energy use and atmospheric Emissions Underwater noise Damage or loss of fishing gear Disturbance to Seabed Dropped object Accidental hydrocarbon release	Pipelines have been pre-flushed with seawater and risk assessments will indicate the potential for any environmental impact. Pipeline ends and exposed areas will be buried in situ preventing the release of pipeline contents into the marine environment Rock placement will be deposited from a dedicated rock placement vessel. This will be applied for under a DEPCON application. Tullow Oil will prepare an MCAA licence application to cover the proposed deposits, removal works, and potential disturbance of the seabed. Tullow Oil will ensure that disturbance is kept to a minimum during the operations. A post decommissioning debris survey will be conducted and any debris recovered. Underwater cutting could be a potential source of sound, the operation of well-maintained equipment during decommissioning will ensure noise of operating machinery is kept as low as possible. If applicable MMO will be onboard the vessel during cutting and/or explosive operation. UK Hydrographical Office and Kingfisher will be informed of all activities. Tullow Oil will establish lines of communication to inform other sea users, including fishermen, of vessel operations during decommissioning. Any dropped objects will be reported to DECC OGED using the PON2 reporting form.

Table 4.2 Environmental Impact Assessment Summary		
Activity	**Main Impacts**	**Management**
Decommissioning Stabilisation Features	Energy use and atmospheric Emissions Underwater noise Damage or loss of fishing gear Disturbance to Seabed Dropped object Accidental hydrocarbon release	It is intended that the mattresses and grout bags should be recovered to shore, however in the event of practical difficulties DECC will be consulted and a Comparative Assessment submitted. (as per Para 3.3 Table 3.4). Tullow Oil will prepare an MCAA licence application to cover the removal of mattresses and grout bags from the seabed. Any dropped objects will be reported to DECC OGED using the PON2 reporting form.
Decommissioning Drill Cuttings	Long-term presence of hydrocarbons in sediments Leaching of hydrocarbons into the surrounding sediments and water column	There are no drill cuttings associated with the Orwell installation in the area. Should any evidence of drill cuttings be discovered, Tullow Oil will contact DECC to review findings and extent and agree any necessary remedial actions. Any dropped objects will be reported to DECC OGED using the PON2 reporting form.

5 INTERESTED PARTY CONSULTATIONS

Consultations Summary:

Table 5.1 Summary of Consultee Comments		
Who	**Comment**	**Response**
INFORMAL CONSULTATIONS		
TBA	None	
TBA	None	
TBA	None	
STATUTORY CONSULTATIONS		
NFFO	None received	
SFF	None received	
NIFPO	None received	
Global Marine Systems	None received	

6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

A Tullow Oil Project Management team assisted by external specialist consultants will be appointed to manage suitable sub-contractors for the removal of the Orwell installation and execution of the Decommissioning Programme work scopes. Tullow Oil standard procedures for operational control and hazard identification and management will be used. Where possible the work will be coordinated with other decommissioning operations in the SNS. Tullow 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 around 500m radius of the Orwell installation, and a 200m corridor along each existing pipeline route. 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 installation and pipeline areas. This will be followed by a statement of clearance to all relevant governmental departments and non-governmental organisations.

6.3 Schedule

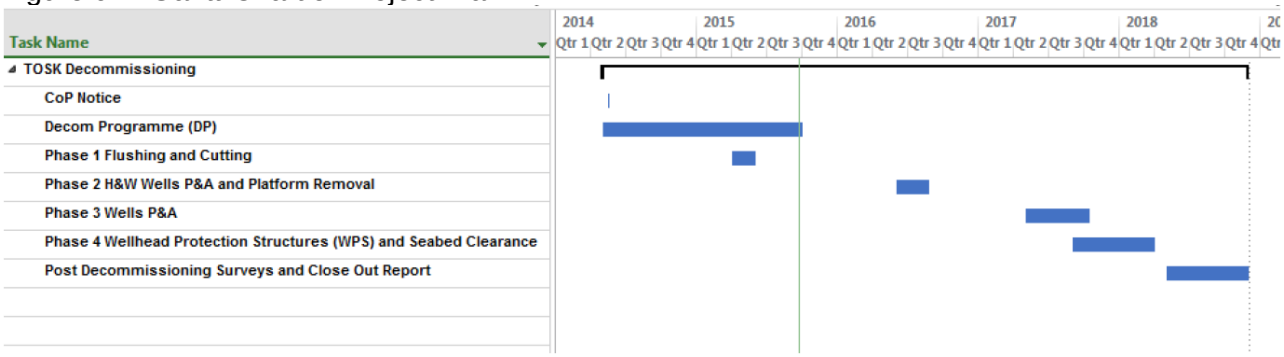
Project Plan:

The Tullow Oil plan for decommissioning Orwell and its other two operated installations in the Thames area Horne and Wren and Orwell is expected to be 48 months duration.

The plan below takes into account regulatory approvals and time to procure long lead items and equipment. Economic and operational benefits identified in detailed engineering through integration with the Perenco UK Ltd decommissioning of the Thames Area installations may require some future adjustment to the Tullow Oil planning. The market availability of key vessels including a heavy lift vessel for removing structures and rigs for wells plugging and abandonment will ultimately drive the dates for completion.

Note that Horne and Wren will require remedial works in order to facilitate the programme. This activity is shown as H&W Enabling in the plan.

Figure 6.1: Gantt Chart of Project Plan



6.4 Costs

Table 6.1 – Provisional Decommissioning Programme(s) costs	
Item	**Estimated Cost (£m)**
Platform(s) /Jacket(s) - Preparation / Removal and Disposal	NA
Pipeline(s) and Umbilical(s) Infrastructure Decommissioning	Inc. in subsea
Subsea Installation(s) and Stabilisation Feature(s)	5.0
Well Abandonment	14.0
Continuing Liability – Future Pipeline and Environmental Survey Requirements	0.5
TOTAL	**19.5**

6.5 Close Out

In accordance with the DECC Guidelines, a close out report will be submitted to DECC explaining any variations, from the Decommissioning Programme (normally within 4 months of the completion of the offshore decommissioning scope) including debris removal and independent verification of seabed clearance and the first post-decommissioning environmental survey.

6.6 Post-Decommissioning Monitoring and Evaluation

A post decommissioning environmental seabed survey, centred around sites of the Orwell subsea installation, will be carried out. The survey will focus on chemical and physical disturbances of the decommissioning and compared with the pre-decommissioning survey, conducted by OSIRIS Ltd in Q3 2013 (Osiris 02029-OSI-PL-RPT-001). Results of this survey will be available once the work is complete, with a copy forward to DECC. All pipeline routes and structure sites will be the subject of surveys when decommissioning activity has concluded. The survey will include the 200 metres corridor along the pipeline routes and 500 metres radius around the installation. After the surveys have been sent to DECC and reviewed, the post-decommissioning monitoring regime to be discussed and agreed with DECC.

7 SUPPORTING DOCUMENTS

Table 7.1: Supporting Documents	
Document Number	**Title**
PER-SNS-DECOM-THA-005	Environmental Impact Assessment
PER-SNS-DECOM-THA-001	Comparative Assessment
02029-OSI-PL-RPT-001	Environmental Survey
02029–XOD–SU-RPT-RPT001	Xodus report – Facilities and pipeline removal conceptual report
02029–INR–EG-RPT-0001	Interact report – Wells plug and abandonment conceptual report

8. PARTNERS LETTERS OF SUPPORT

Tullow Oil plc

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Offshore Decommissioning Unit
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Atholl House
86 -88 Guild Street
Aberdeen
AB11 6AR

F.A.O. Alex Mateo, Decommissioning Manager

22 October 2015

RE: ORWELL FIELD DECOMMISSIONING PROGRAMME

Dear Sir/Madam,

We acknowledge receipt of your letter dated 22 October 2015 with reference 12.04.06.08/56c.

We, Tullow Oil plc, confirm that we authorise Tullow Oil SK Limited to submit on our behalf the Final Decommissioning Programme for the Orwell Field dated 22 October 2015, as directed by the Secretary of State on 22 October 2015.

We confirm that we support the proposals detailed in the Final Orwell Field Decommissioning Programme dated 22 October 2015, which will be submitted by Tullow Oil SK Limited as required by section 29 of the Petroleum Act 1998.

Yours faithfully,

For and on behalf of Tullow Oil plc

Signed.....
Name: ALAN GRAHAM MARTIN
Title: Director

Chevron

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E14 4HA
020 7719 - 3415

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86 -88 Guild Street
Aberdeen
AB11 6AR

F.A.O. Alex Mateo, Decommissioning Manager

10 November 2015

RE: ORWELL FIELD DECOMMISSIONING PROGRAMME

Dear Sir/Madam,

We acknowledge receipt of your letter dated 9 November 2015 with reference 12.04.06.08/56c.

We, Texaco North Sea U.K. Limited, confirm that we authorise Tullow Oil SK Limited to submit on our behalf the Final Decommissioning Programme for the Orwell Field dated 22 October 2015, as directed by the Secretary of State on 22 October 2015.

We confirm that we support the proposals detailed in the Final Orwell Field Decommissioning Programme dated 22 October 2015, which will be submitted by Tullow Oil SK Limited as required by section 29 of the Petroleum Act 1998.

Yours faithfully,

For and on behalf of Texaco North Sea U.K. Limited

Signed.....
Name:
Title:

Director
Edward M Callaghan