

Goldeneye Decommissioning Programmes



Submitted to the U.K. Department for Business, Energy and Industrial Strategy

Shell Report Number GDP-S-AA-8203-00001

October 2019

Final Decommissioning Programmes

Document Control

Approvals

	Name	Signature	Date
Prepared by:	F. Whyte		01-10-2019
Reviewed by:	P.Ward		01-10-2019
Approved by:	R. Jansen		1/10/2019

Revision Control

Revision No.	Reference	Changes/Comments	Issue Date
R01	Issued for Internal Review		25/01/2018
R02	Issued for Internal Approval	Comments incorporated.	09/02/2018
A01	Pre-consultation draft sent to BEIS for comment	Internal approval comments incorporated.	05/03/2018
A02	Updated Pre-Consultation Draft incorporating ODU comments to re-issued to BEIS for comment	Updated incorporating comments from BEIS ODU	30/05/18
A03	Consultation draft		29/10/18
A04	Post-consultation draft – Issued for Partner and Internal Review	Updated with consultation comments Split Decommissioning Programme per NOTE TO READER	16/04/19
A05	Updated post-consultation draft – Issued for OPRED review	Updated with internal comments	05/06/19
A06	Focused consultation draft		02/08/19
A07	Final decommissioning programme		26/08/19
A08	Final decommissioning programme including partner letters of support	Added partners' letters	01/10/19

Distribution List (for Statutory and Public Consultation)

Name	Company/Organisation	No of Hard Copies
Luke Mathews	Exxon Mobil	1
Derek Neilson	Endeavour	1
Nigel MacLean	Spirit Energy (formerly Centrica)	1
Tracey Mackie	Department of Business, Energy and Industrial Strategy	1
Steven Alexander	Scottish Fishermen's Federation	1
Ian Rowe	The National Federation of Fishermen's Organisations	1
Richard James	Northern Irish Fish Producers Organisation	1
John Wrottesley	Global Marine Group	1

<u>Contents</u>		INST	P/L
1 Executive Summary	9	✓	✓
1.1 Combined Decommissioning Programmes	9	✓	✓
1.2 Requirement for Decommissioning Programmes	9	✓	✓
1.3 Introduction	10	✓	✓
1.3.1 Asset Overview.....	10	✓	✓
1.3.2 Summary of Recommendations.....	11	✓	✓
1.4 Goldeneye – Decommissioning Overview	11	✓	✓
1.5 Summary of Proposed Decommissioning Programmes	12	✓	✓
1.6 Field Location Including Field Layout and Adjacent Facilities	14	✓	✓
1.7 Industrial Implications	18	✓	✓
2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED	19	✓	✓
2.1 Goldeneye Fields	19	✓	✓
2.1.1 Goldeneye Field Installations: Surface Facilities (platform).....	19	✓	
2.1.2 Goldeneye Field Installations: Subsea including Stabilisation Features	19	✓	
2.1.3 Goldeneye Field: Pipelines Including Stabilisation Features.....	20		✓
2.1.4 Goldeneye Field Wells.....	23	✓	
2.1.5 Goldeneye Field Drill Cuttings.....	23		
2.1.6 Goldeneye Field Inventory Estimates	23	✓	✓
3 Removal and Disposal Methods	25	✓	✓
3.1 Topsides	25	✓	
3.2 Jacket	27	✓	
3.3 Subsea Installations and Stabilisation Features	30	✓	
3.4 Pipelines	30		✓
3.5 Pipeline Stabilisation Feature(s)	31		✓
3.6 Wells	31		
3.7 Drill Cuttings	31		
3.8 Waste Streams	32	✓	✓
4 Environmental Impact Assessment	34	✓	✓
4.1 Environmental Sensitivities	34	✓	✓
4.2 Potential Environmental Impacts and their Management	35	✓	✓
5 Interested Party Consultations	41	✓	✓
6 Programme Management	44	✓	✓
6.1 Project Management and Verification	44	✓	✓
6.2 Post-Decommissioning Debris Clearance and Verification	44	✓	✓
6.3 Schedule	45	✓	✓
6.4 Costs	46	✓	✓
6.5 Close Out	46	✓	✓
6.6 Post-Decommissioning Liabilities, Monitoring and Evaluation	46	✓	✓
7 Supporting Documents	47	✓	✓
8 Partner Letters of Support	48	✓	✓



Terms and Abbreviations

Term	Explanation
3LPP	3 Layer Polypropylene
A&C	Atlantic and Cromarty
BEIS	Department for Business, Energy and Industrial Strategy (formerly DECC)
CA	Comparative Assessment
CCS	Carbon Capture and Storage
CMID	Common Marine Inspection Documents
CNS	Central North Sea
CoP	Cessation of Production
DECC	Department of Energy and Climate Change (now Department of Business, Energy and Industrial Strategy)
DP	Dynamic Positioning
EIA	Environmental Impact Assessment
EHC	Electro-Hydraulic control and Chemical injection
ESDV	Emergency Shut Down Valve
FBE	Fusion Bonded Epoxy – pipeline polymer coating
FLAGS	Far (north) Liquids and Associated Gas - pipeline system
FPAL	First Point Assessment Ltd., the Achilles scheme which identifies, evaluates and pre-qualifies suppliers for major buyers in oil and gas
HLV	Heavy Lift Vessel
HSSE	Health, Safety, Security and Environment
JNCC	Joint Nature Conservation Committee
IA	Impact Assessment
LAT	Lowest Astronomical Tide
LSA	Low Specific Activity
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (Marine Pollution)
MCAA	Marine and Coastal Access Act
MCV	Monohulled Crane vessel
MEG	Mono Ethylene Glycol
MMO	Marine Management Organisation



MPA	Marine Protected Area
MSL	Mean Seabed Level
MLWS	Mean Low Water Spring (water mark for Landfall of pipeline)
NCS	Norwegian Continental Shelf
NFFO	National Federation of Fishermen's Organisations
NORM	Naturally Occurring Radioactive Material
NOSWA	North Of Scotland Water Authority
NUI	Normally Unattended Installation
OGA	Oil and Gas Authority
OGUK	Oil & Gas UK
OPEP	Oil Pollution Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo and Paris Convention (for the Protection of the Marine Environment of the North-East Atlantic)
P&A	Plug and Abandonment
PFP	Passive Fire Protection
PL	Pipeline
PLU	Pipeline Umbilical
PFOS	PerFluoro-Octane Sulfonic acid (part of pipework insulation)
PON	Petroleum Operations Notice
PMF	Priority Marine Feature
pMPA	proposed Marine Protection Area
PP	Polypropylene
PUI	Permanently Unattended Installation
PWA	Pipeline Works Authorisation
ROV	Remotely Operated Vessel
SAGE	Scottish Area Gas Evacuation - pipeline system
SEPA	Scottish Environmental Protection Agency
SFF	Scottish Fishermen's Federation
SIMOPS	Simultaneous Operations
SLV	Single Lift Vessel
SPA	Special Protection Area



SSIV	Sub-Sea Isolation Valve
Te	Metric Tonne
UKCS	United Kingdom Continental Shelf
WGS84	World Geodetic System 1984
WMP	Waste Management Plan

Figures and Tables

List of Figures	Description	Page
0.1	Scope Split of Separate Decommissioning Programmes	8
1.1	Field Location in UKCS	14
1.2	Field Layout	15
1.3	Adjacent Facilities	17
2.1	Pie Chart of Estimated Inventories (Installations)	24
2.2	Pie Chart of Estimated Inventory (Pipelines)	24
3.1	Goldeneye Topsides	26
3.2	Goldeneye Topsides Installation	26
3.3	Goldeneye Jacket	28
3.4	Goldeneye Jacket Installation	29
6.1	Gantt Chart of Project Plan	45

List of Tables	Description	Page
1.1	Installations Section 29 Notice Holders Details	9
1.2	Installations Being Decommissioned	11
1.3	Pipelines Being Decommissioned	12
1.4	Summary of Decommissioning Programmes	12
1.5	Adjacent Facilities	16
2.1	Surface Facilities Information	19
2.2	Subsea Installations and Stabilisation Features	19
2.3	Pipeline / Flowline / Umbilical Information	20
2.4	Subsea Pipeline Stabilisation Features	21
2.5	Subsea Pipelines Structures	22
2.6	Well Information	23



2.7	Material Inventory	24
3.1	Cleaning of Topsides for Removal	27
3.2	Topsides Removal Methods	27
3.3	Jacket Decommissioning Methods	31
3.4	Subsea Installations and Stabilisation Features	30
3.5	Pipeline or Pipeline Groups Decommissioning Options	30
3.6	Outcome of Comparative Assessment	31
3.7	Pipeline Stabilisation Features	31
3.8	Well Plug and Abandonment	31
3.9	Drill Cuttings Decommissioning Options	32
3.10	Waste Stream Management Methods	32
3.11	Inventory Disposition	33
4.1	Environmental Sensitivities	34
4.2	Environmental Impact Management	37
5.1	Summary of Stakeholder Comments	41
6.1	Provisional Decommissioning Programmes – Costs	46
7.1	Supporting Documents	47

Appendices

List of Appendices	Description	Page
1	Public Notice	53



NOTE TO READER:

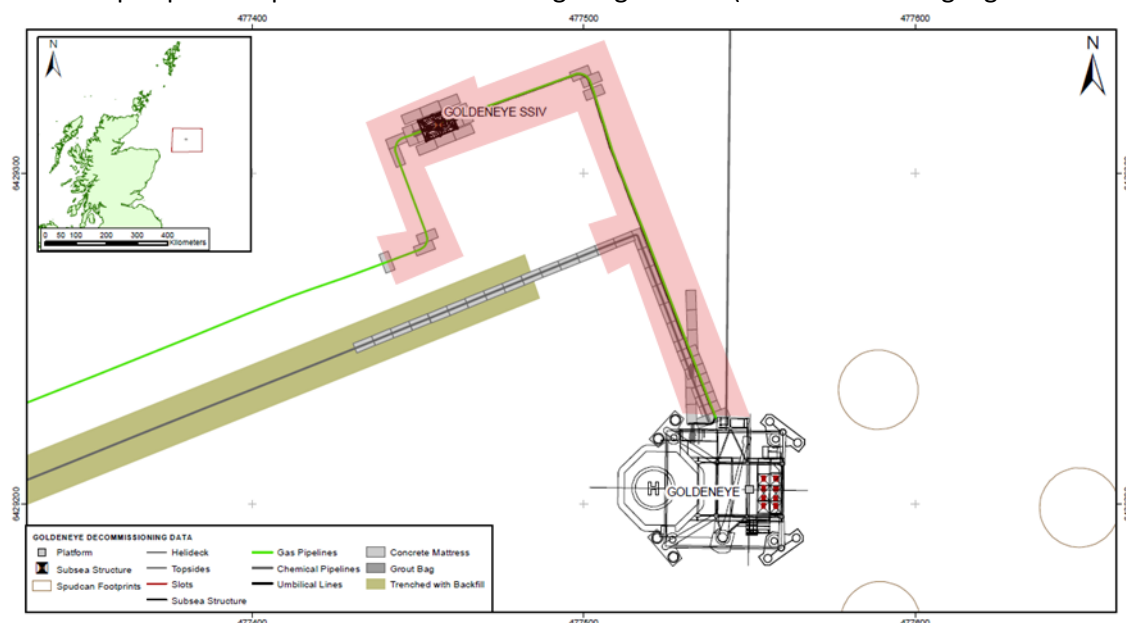
The Goldeneye Decommissioning Programmes were issued for public consultation in November 2018. At that time, the combined Decommissioning Programmes for the associated installations and pipelines included the full length of each pipeline from the Goldeneye Platform to landfall adjacent to the St Fergus Gas Terminal.

Following public consultation, Shell U.K. has been in discussions with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) and Carbon Capture, Utilisation and Storage (CCUS) stakeholders regarding the potential future re-use of both pipelines. The development of UK policy on the re-use of oil and gas infrastructure for CCUS, including identification of infrastructure with recognised potential for re-use, is ongoing. It will be appropriate for the decision on decommissioning of the pipelines to be taken in line with the policy when that policy has been finalised.

With the agreement of OPRED and the CCUS stakeholders, and to allow timely contracting for the removal of the Goldeneye topsides and jacket, Shell U.K. have therefore separated the previously submitted Decommissioning Programmes into two documents:

1. This document seeking approval for the decommissioning solutions proposed for the Goldeneye topsides, jacket, wells and subsea infrastructure up to but excluding the main pipeline tie-in flanges;
2. A second document describing the decommissioning solutions for each pipeline from and including the tie-in flanges adjacent to the Goldeneye Platform to landfall adjacent to the St Fergus Gas Terminal, to be submitted for approval at a later date.

Figure 0.1: Scope Split of Separate Decommissioning Programmes (this document highlighted in red)





1 EXECUTIVE SUMMARY

1.1 Combined Decommissioning Programmes

This document contains two Decommissioning Programmes (DP), one for Goldeneye offshore installations and one covering selected sections of the Goldeneye pipelines on the U.K. Continental Shelf (UKCS). A combined programme for each set of the associated notices served under Section 29 of the Petroleum Act 1998 [1] is provided herein. A summary of the Section 29 notices is shown in table 1.1

Table 1.1 Installations Section 29 Notice Holder Details		
	Type	Notice Holders
1	Goldeneye - Offshore installations <i>Platform and all associated subsea equipment</i>	Shell U.K. Limited (49.1%) Esso Exploration and Production UK Limited (40.4%) Endeavour Energy UK Ltd (7.0%) Spirit Energy Resources Limited (3.5%)
2	Goldeneye – Subsea Pipelines <i>Submarine pipelines and associated apparatus</i>	Shell U.K. Limited (49.1%) Esso Exploration and Production UK Limited (40.4%) Endeavour Energy UK Ltd (7.0%) Spirit Energy Resources Limited (3.5%)

These combined DPs are submitted by the co-venturers Shell U.K. Limited, registered company number: 00140141 (Shell, operator,), Esso Exploration and Production UK Limited, registered company number: 00207426 (Esso), Endeavour Energy UK Ltd, registered company number: 05030838 (Endeavour) and Spirit Energy Resources Limited (formerly Centrica Resources Ltd), registered company number: 02855151 (Spirit Energy) all being the recipients of the Section 29 Notices, and throughout this document the terms ‘owners’, ‘we’, and ‘our’ refer to all the co-venturers.

1.2 Requirement for Decommissioning Programmes

These draft DPs are submitted for statutory consultation in compliance with relevant legislation and the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) department within the Department for Business, Energy and Industrial Strategy, (BEIS), formerly Department of Energy and Climate Change (DECC) guidelines [2]. It describes the principles of the removal activities in compliance with national and international regulations, whilst also presenting an assessment of the environmental impacts of the proposed programme.

Installations:

In accordance with the Petroleum Act 1998 [1] and the OPRED Guidance Notes [2], the Section 29 notice holders of the Goldeneye installations are applying to OPRED to obtain approval for decommissioning the Goldeneye installation and associated subsea elements returning them to shore for recycling and disposal.

Installations are detailed in Section 2.1.1 and 2.1.2. (See also Section 8 - Partner Letters of Support). No derogation from the general rule of OSPAR Decision 98/3 [3] is required or sought.



OPRED is responsible for consideration of the Goldeneye decommissioning programmes, pending recommendation of final programmes to the Secretary of State for approval.

Pipelines:

In accordance with the Petroleum Act 1998 [1] and the OPRED Guidance Notes [2], the Section 29 notice holders of the Goldeneye pipelines are applying to OPRED to obtain approval for decommissioning selected sections of the pipelines detailed in Section 2.1.3 of this programme. (See also Section 8 – Partner Letters of Support).

It should be noted that the Goldeneye platform also supported the Atlantic & Cromarty (A&C) field until 2012, at which stage the A&C systems were made safe, ready for decommissioning. The A&C field decommissioning proposals are not covered by this submission, however are publicly available.

1.3 Introduction

Goldeneye has been operational as a gas producing field since 2004, and the last well in the Goldeneye field watered out on the 8th December 2010. The field was finally shut-in on the 16th February 2011. In March 2011, Shell assessment, supported by the JV Partners for the cessation of production was submitted to DECC. Cessation of Production was approved by DECC in March 2011.

The non-producing Normally Unattended Installation (NUI) and associated infrastructure was preserved and maintained as a NUI, managed under a revised Safety Case which ensured that all the critical safety systems were maintained and integrity of the platform was preserved, for the potential Peterhead CCS (Carbon Capture and Storage) project that is no longer progressing. In 2018, the NUI was converted to a Permanently Unattended Installation (PUI) in preparation for decommissioning.

The programmes contained in this document set out the decommissioning proposals.

The phasing of the decommissioning activities is as follows:

- Phase 1 – Removal of bulk hydrocarbons and Pipeline cleanout (pigging towards shore and leaving in an IPR (Interim Pipeline Regime) filled with inhibited water completed in 2012);
- Phase 2 - Platform Wells Plug & Abandonment (P&A), convert NUI to Permanently Unattended Installation (PUI) platform (completed in 2018);
- Phase 3 – Disconnection and removal of platform in accordance with the approved DP:
 - Topsides/Deck removal;
 - Jacket/Substructure removal.
- Phase 4 – Subsea infrastructure removal and/or remediation within Goldeneye areas in accordance with this approved DP.

A guard vessel will be used for any period between Phase 3 and phase 4, if the status of the seabed could cause harm to other users of the sea. In the event there is a significant period between these phases OPRED will be kept informed and made aware of the anticipated timing of the 4th phase. These offshore phases will be finalised with trawler sweeps and as-left surveys, as required.

1.3.1 Asset Overview

The Goldeneye field is a normal temperature, normal pressure gas condensate field located in blocks 14/28b, 14/29a, 20/3b and 20/4b of the United Kingdom Continental Shelf (UKCS) in the central North Sea, approximately 100km North-East of St. Fergus. The NUI is a 4-leg steel jacket substructure supporting an integrated topsides deck structure. The topsides consist of separation, export metering with chemical



injection (Mono-Ethylene Glycol - MEG) and basic supporting utilities (e.g. power, venting etc). The design life of the platform was 20 years although the anticipated operating life was only 7-10 years. There are 5 platform wells for the Goldeneye Platform, though provision had been made for up to 8. The full well stream was transferred to the dedicated Goldeneye onshore facility co-located at the Shell St. Fergus gas terminal. The MEG was imported from St. Fergus for injection into the gas export pipeline. Goldeneye was fully controlled from Shell St. Fergus control room.

Atlantic and Cromarty, originally a third-party field during time of production, was controlled via the Goldeneye platform by means of an umbilical and associated equipment, also located on Goldeneye. Though this is now within Shell's decommissioning portfolio (following the integration of BG in 2016), it is outside the scope of this document.

1.3.2 Summary of Recommendations

All installations/structures will be fully removed during decommissioning, in line with the requirements of OSPAR Decision 98/3. The proposals for decommissioning pipelines and umbilicals, meanwhile, have been prepared in line with the OPRED Guidance Notes following comparative assessment of feasible options and are as follows:

- The surface-laid pipelines' end spools will be removed and returned to shore for recycling or disposal.
- The Goldeneye umbilical PLU4858 between the platform and SSIV, surface laid and covered next to PL1978, will be removed.

1.4 Goldeneye – Decommissioning Overview

1.4.1 Installations

Table 1.2: Installations Being Decommissioned			
Fields:	Goldeneye	Production Type:	Gas and condensate
Water Depth (m)	119m	UKCS Block:	14/29a
Surface Installations			
Number	Type	Topside Weight (Te)	Jacket Weight (Te)
1	Wellhead structure type platform	1,245	2,779
Subsea Installations		Number of Wells	
Number	Type	Platform	Subsea
0	N/A	5	0
Drill Cuttings pile(s)		Distance to meridian	Distance from nearest UK coastline
Number of Piles	Total Estimated volume (m ³)	km	km
0	N/A	N/A	N/A



1.4.2 Pipelines

Table 1.3 Pipelines being Decommissioned	
Number of Pipelines (see Table 2.3 for full details)	3
Pipelines (partial)	2
Umbilicals	1

1.5 Summary of Proposed Decommissioning Programmes

Table 1.4: Summary of Decommissioning Programmes		
Selected Option	Reason for Selection	Proposed Decommissioning Solution
1. Topsides		
Complete removal and re-use/recycling/disposal	Allows jacket to be removed and will allow for re-use or maximise recycling of materials	Topsides will be removed and recovered to shore. Topsides process equipment has been drained, flushed, purged and vented offshore prior to preparation for removal; Where required, further cleaning will be carried out at the dismantling/ disposal site for re-use or recycling, as appropriate.
2. Jacket/Floating Facility (FPSO etc.)		
Complete removal and recycling/disposal	To comply with OPSAR requirement to leave a clear seabed, removes a potential obstruction to fishing operations and maximises recycling of materials	The leg piles will be cut to a target depth of 3m below the natural seabed and the jacket removed and recovered to shore; Cutting of the piles is anticipated to be by way of internal cutting equipment. However, if this proves unfeasible it would be necessary to excavate the seabed around the piles to enable external cutting Where required, cleaning will be carried out at the dismantling/ disposal site for recycling, as appropriate. Conductors will have been removed during P&A activities.
3. Subsea Installations		
N/A	N/A	N/A
4. Pipelines, Flowlines & Umbilicals		
Gas Export SSIV complete removal and recycling/disposal	To be aligned with OPSAR requirement to leave a clear seabed.	The piles will be cut to a target depth of 3m below the seabed and the structure will be removed and recovered to shore, complete with any piping that they contain. Cutting of the piles is anticipated to be by way of internal cutting equipment. However, if this proves unfeasible it would be necessary to excavate the seabed around the piles to enable external cutting
Full removal of spools (PL1978-7, PL1978-9, PL1979-2). Full removal of umbilical hoses (PLU4858)	To remove and leave a clear seabed	To be removed.



Table 1.4: Summary of Decommissioning Programmes

5. Wells		
Well decommissioning in accordance with Oil & Gas UK Guidelines for the Suspension and Abandonment of Wells (issue 5, July 2015)	Meets HSE and OGA regulatory requirements	The wells have been abandoned from the installation with support from a Jack Up Drilling Rig; PON5/PETS/Marine Licence applications under the relevant regulations were submitted in support of works carried out.
6. Drill Cuttings		
N/A	N/A	N/A
7. Interdependencies		
The jacket, topsides and subsea infrastructure above the seabed near to the platform base can be disconnected/removed with no impacts/interdependencies. The Atlantic umbilical is non-operational and available to be decommissioned.		



1.6 Field Location Including Field Layout and Adjacent Facilities

Figure 1.1: Field Location in UKCS

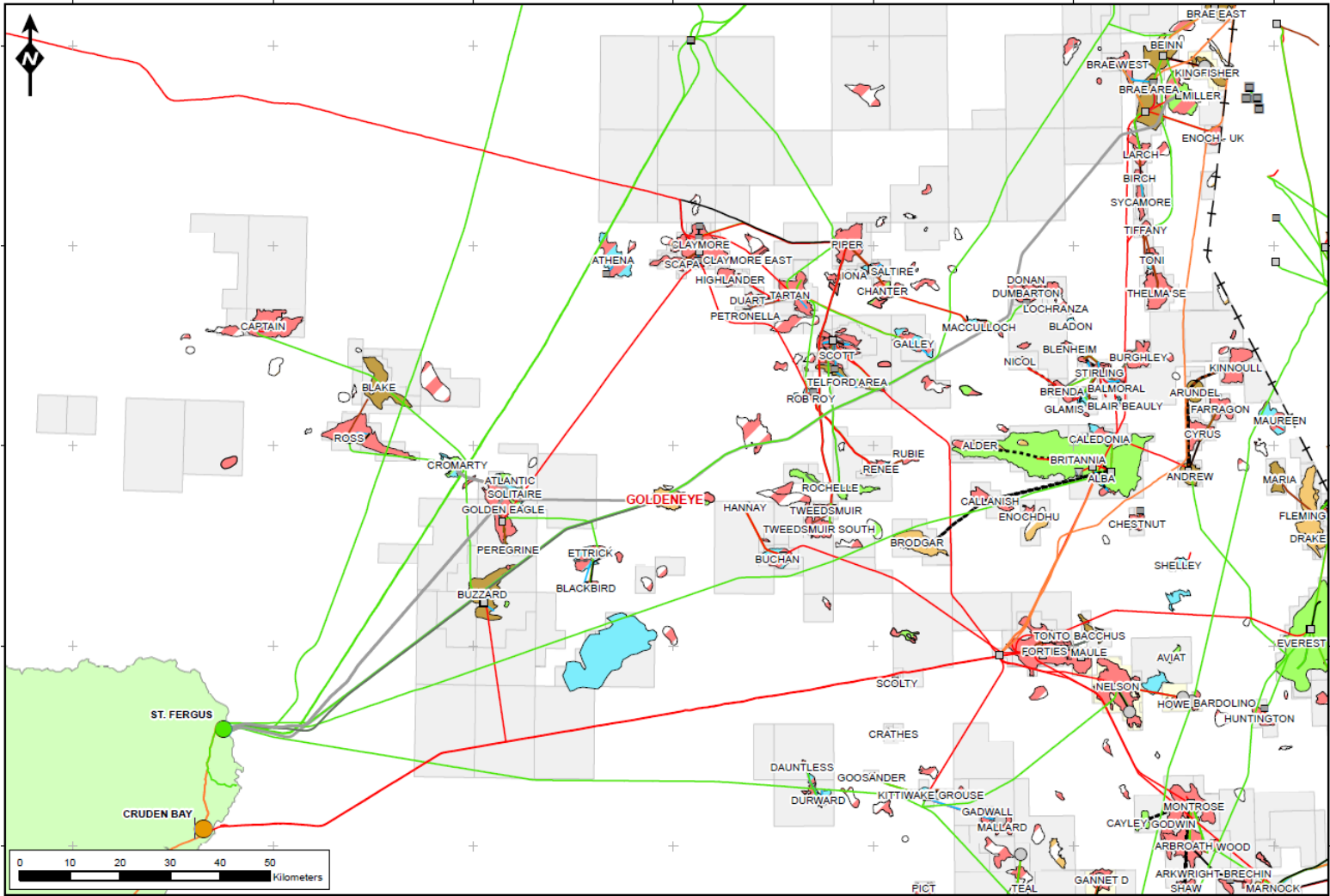




Figure 1.2: Field Layout

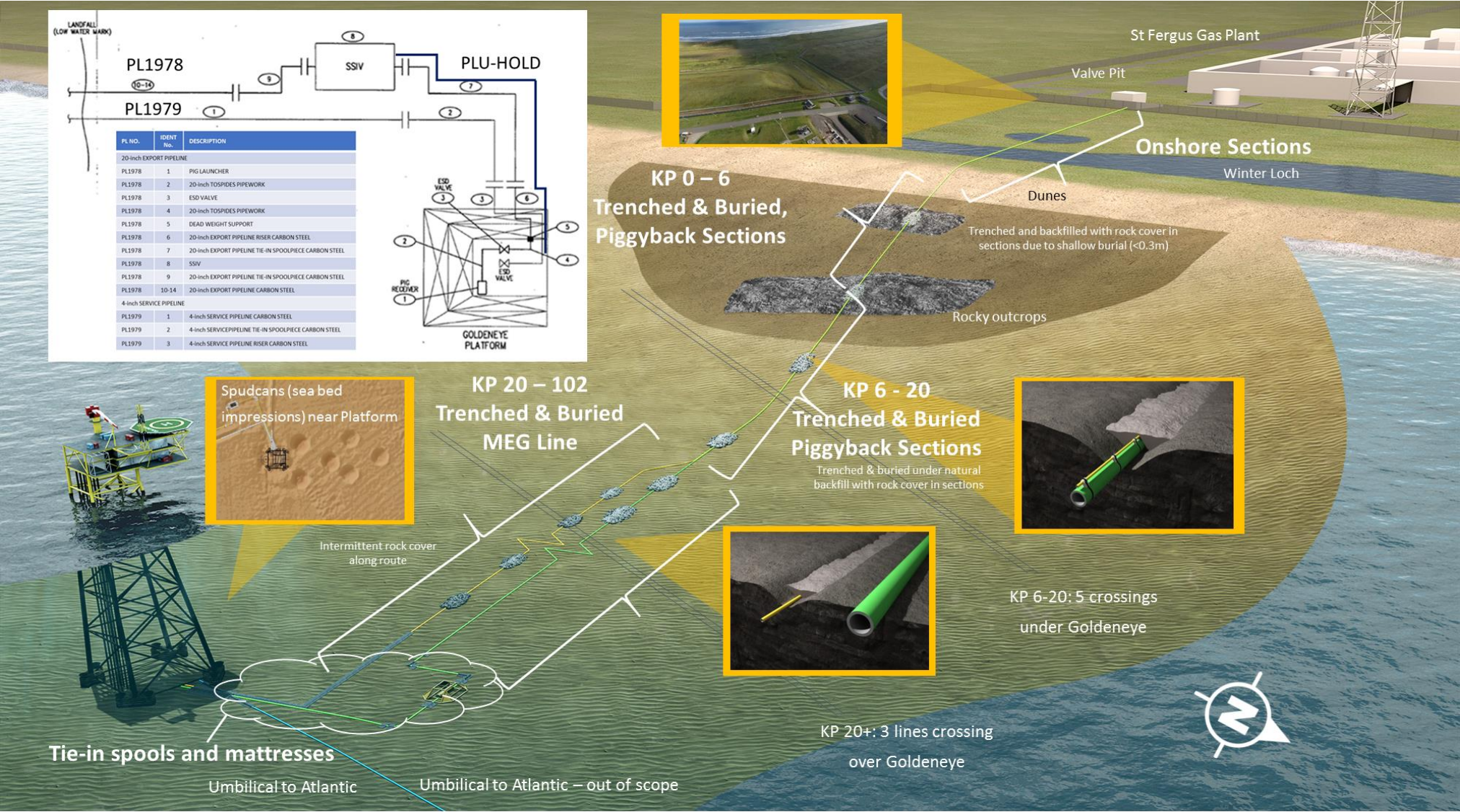


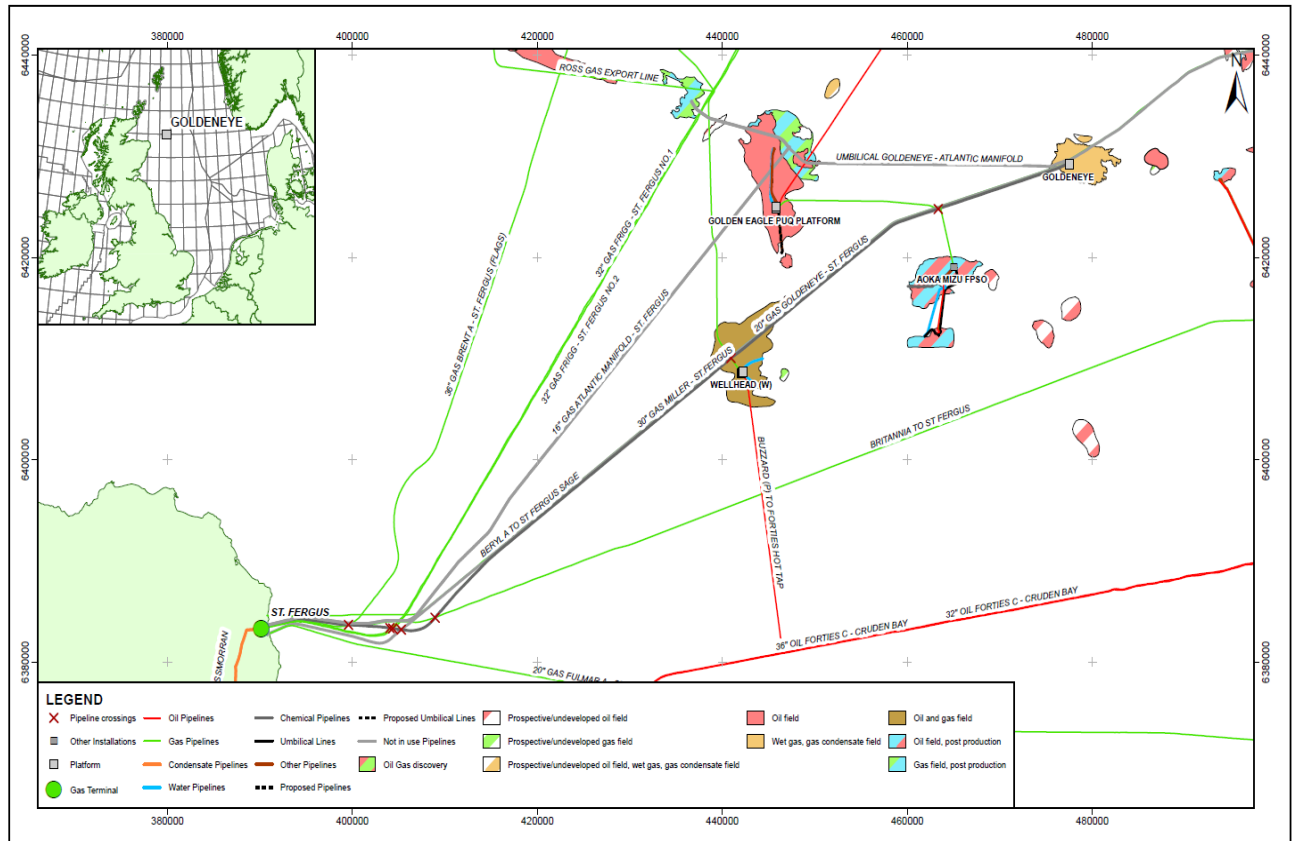


Table 1.5 Adjacent Facilities					
Owner	Name	Type	Distance/ Direction	Information	Status
Shell U.K. Ltd	PLU2033	Electro-Hydraulic Control Umbilical	0km	Goldeneye to A&C Atlantic Umbilical. Crosses Goldeneye Gas Export Pipeline PL1978 and chemical (MEG) line PL1979 at Goldeneye platform (approx. 20m)	Inactive
BP	PL720	Gas condensate transmission system	0.1km NW	Miller Pipeline 30". Runs near Gas Export Pipeline PL1978 and MEG Import line PL1979 (nearest approx. 105m). Crossed by Goldeneye Gas Export Pipeline PL1978 and chemical (MEG) line PL1979 at 57°34.761' N, 01°35.125' W	Inactive
Apache	PL762	Gas transmission system	0.2km N/NW	SAGE Beryl A to St Fergus 30". Runs near Gas Export Pipeline PL1978 and chemical (MEG) line PL1979 (nearest approx. 160m)	Active
Impacts of Decommissioning Proposals					
The Atlantic umbilical is redundant (abandoned) hence no impacts where spools, umbilical, SSIV and jacket removal are planned.					

See figure 1.3 for adjacent facilities. With the exceptions of PL720 and PL762 listed in Table 1.5 above, all other installations/pipelines are greater than 15km away (nearest infrastructure is associated with the Ettrick field, which is in the process of being decommissioned).



Figure 1.3: Adjacent Facilities





1.7 Industrial Implications

We have looked to identify safe, efficient and cost-effective methods and procedures for various aspects of decommissioning facilities in the Goldeneye Fields. Many contractors and consultancies have contributed to the numerous studies and assessments that have been prepared since 2015 to inform our plans and support our decision-making processes.

Contact was initiated, in late 2016, with the supply chain to explore decommissioning execution solutions, including:

- Inviting supply chain companies to present to the decommissioning team on their capabilities;
- Decommissioning & Remediation supply chain/market engagements including:
 - Portfolio presentation at kick-off event held in March 2017;
 - Follow up engagement questionnaires and selective follow up “deep dives”;
- Participation in industry workgroups, events, seminars and conferences;
- Inclusion of trade organisations and enterprise bodies in supply chain consultations;
- Exploring multi-field and potentially multi-operator combined work scopes.

All procurement will be carried out in accordance with the company standards for contract and procurement. This includes the required utilisation of FPAL/Achilles for the identification of potential tenderers, where suitable.



2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Goldeneye Fields

2.1.1 Goldeneye Field Installations: Surface Facilities (platform)

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)
Goldeneye	Small, fixed steel well-head platform	WGS84 Decimal	58..0019°N 00.3815°E	1,245	1	2,779 (excl marine growth)	4	12	1,580
		WGS84 Degree Minute	58°00.115'N 00°22.887'E						

2.1.2 Goldeneye Field Installations: Subsea including Stabilisation Features

Table 2.2: Subsea Installations and Stabilisation Features

Subsea installations including Stabilisation Features	No.	Size/ Weight (Te)	Location	Comments/Status
Concrete mattresses	n/a	n/a	n/a	n/a
Grout bags	n/a	n/a	n/a	n/a
Formwork	n/a	n/a	n/a	n/a
Froned Mats	n/a	n/a	n/a	n/a
Rock Dump	n/a	n/a	n/a	n/a

See Section 2.1.3, Table 2.4 for structures associated with the subsea pipelines.



2.1.3 Goldeneye Field: Pipelines Including Stabilisation Features

Table 2.3: Pipeline/Flowline/Umbilical Information									
Description	Pipeline Number (as per PWA)	Diameter (inches)	Approx. Length (km)	Description of Component Parts	Product Conveyed	From - To End Points	Burial Status	Pipeline Status	Current Content
Pipelines									
Gas export pipeline	PL1978 (7 to 9)	20	0.2	Carbon Steel (asphalt enamel and concrete coating)	Gas	From Gas Export Pipeline Riser PL1978 (6) to 20" pipeline tie-in flange	Pipeline spools between platform and SSIV and SSIV to main pipeline section, surface laid, some sections covered by concrete mattresses.	Non-operational	Inhibited Water
Gas Export Pipeline Riser and Topsides	PL1978 (1 to 6)	20	0.2	Carbon Steel (epoxy paint, PFP coating, Polychloroprene 6)	Gas	Goldeneye Topsides to Gas Export Pipeline Spool-piece PL1978 (7)	N/A	Non-operational	Inhibited Water
Chemical (MEG) pipeline	PL1979 (2)	4	0.1	Carbon Steel (FBE - Fusion Bonded Epoxy)	Chemical (MEG)	From pipeline tie-in flange to Chemical (MEG) Riser PL1979 (3)	Pipeline spools between platform and main pipeline section, surface laid, covered by concrete mattresses.	Non-operational	Inhibited Water
Chemical (MEG) Riser and Topsides	PL1979 (3)	20	0.2	Carbon Steel (Polychloroprene 6 & 12)	Chemical (MEG)	Chemical (MEG) Pipeline PL1979	N/A	Non-operational	Inhibited Water



						Goldeneye Topsides			
Umbilicals									
SSIV Umbilical (2 off hydraulic hoses)	PLU4858	½" each	0.2	Hydraulic umbilical hoses	Mineral Hydraulic Oil	Goldeneye platform riser to SSIV	Surface laid, covered by grout bags.	Non- operational	Mineral Hydraulic Oil

Table 2.4: Subsea Pipeline Stabilisation Features				
Stabilisation Feature	Total Number	Weight (Te)	Location(s)	Exposed/Buried/Condition
Concrete mattresses	Approx. 53	5 Te each	At Goldeneye platform approach including protection from the Atlantic umbilical crossing	At the platform approach the mattresses are mainly exposed on seabed surface with some potentially partially or lightly covered due to sea bed mobility. Generally good condition.
Grout bags	Approx. 600	0.025 Te each	At Goldeneye platform approach including the Atlantic umbilical crossing	At the platform approach the grout bags are mainly exposed on seabed surface with some potentially partially or lightly covered due to sea bed mobility. Generally good condition.
Formwork	n/a	n/a	n/a	n/a
Froned Mats	n/a	n/a	n/a	n/a
Rock Cover	n/a	n/a	n/a	n/a



Table 2.5: Subsea Pipeline Structures					
Pipeline Installations/structures	No.	Size/ Weight (Te)	Location		Comments/Status
Gas Export Sub-Sea Isolation Valve (SSIV)	1	10.3m x 6.5m x 3.2m 53	WGS84 Decimal	58.000364°N 00.890554°W	4 tubular driven piles (0.76m dia, approx. 27m long; 22m depth) @ 12.3Te each
			WGS84 Decimal Minute	58°00.022'N 00°53.433'W	



2.1.4 Goldeneye Field Wells

Table 2.6 Well Information			
Platform Wells	Designation	Status	Category of Well
GYA01 (14/29a-A3)	Gas/Condensate Production	Permanently plugged and made safe	PL 4-3-3
GYA02 (14/29a-AGY4Z)	Gas/Condensate Production	Permanently plugged and made safe	PL 4-3-3
GYA03 (14/29a-A5)	Gas/Condensate Production	Permanently plugged and made safe	PL 4-3-3
GYA04 (14/29a-A1)	Gas/Condensate Production	Permanently plugged and made safe	PL 4-3-3
GYA05 (14/29a-A2)	Gas/Condensate Production	Permanently plugged and made safe	PL 4-3-3

NB All Exploration/Appraisal wells have all been previously abandoned

2.1.5 Goldeneye Field Drill Cuttings

(See Section 3.7 for further information)

Any oil-based muds (OBM) used in drilling the wells were contained and shipped back to shore. Hence nothing is present that would constitute an oil-based mud cuttings piles within the definition in OSPAR Recommendation 2006/5.

2.1.6 Goldeneye Field Inventory Estimates

The total inventory of materials associated with these Decommissioning Programmes at the Goldeneye fields is 10,303 tonnes.

9,762 tonnes of this total relates to installations, including the Goldeneye topsides and jacket.

541 tonnes of this total relates to pipelines, umbilicals, spool pieces and structures on the seabed.

The tables and pie charts which follow present estimates for the Goldeneye inventory.



Table 2.7 Goldeneye Material Inventory		
Material	Weight (Te)	% of total
Installations		
Carbon Steel	8,745	89.6
Stainless Steel	141	1.4
Non-Ferrous Metal	113	1.2
Concrete	123	1.3
Plastics	30	0.3
Haz Mat/NORM	2	0.0
Other Non-Hazardous	608	6.2
Installations Total	9,762	100
Pipelines		
Carbon Steel	160	29.6
Non-Ferrous Metal	1	0.2
Concrete	368	68
Plastics	5	0.9
Haz Mat/NORM	0	0.0
Other Non-Hazardous	7	1.3
Pipelines Total	541	100

Details of wastes are given in Section 3.8 of this Decommissioning Programme.

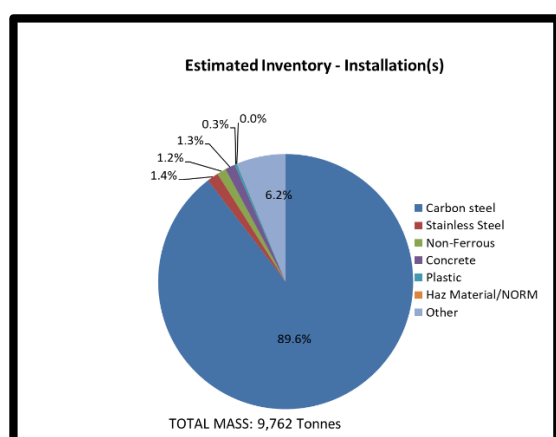


Figure 2.1: Pie Chart of Estimated Inventories (Installations)

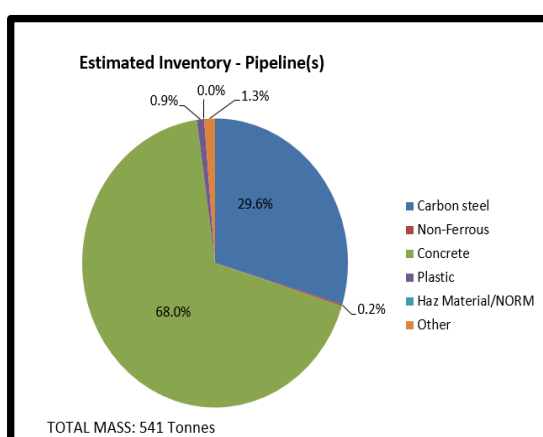


Figure 2.2: Pie Chart of Estimated Inventories (Pipelines)



3 REMOVAL AND DISPOSAL METHODS

The Goldeneye decommissioning project will implement Shell's HSSE & SP Control Framework, supporting a waste management hierarchy that optimises the re-use and recycling of waste and aims to minimise waste disposal in accordance with the EU Waste Framework Directive. The risks associated with waste will be assessed before removal to shore and opportunities to re-use the waste for the same or other purposes or, failing that, to recycle or recover materials will be identified. Waste will be characterised, classified, segregated, stored and transported according to appropriate regulatory requirements.

When removed from the seabed, the equipment will be transported to a decommissioning contractor's onshore yard, where different types of material will be segregated with a view to optimising re-use and recycling.

The decommissioning contractor for topsides, subsea and/or the jacket may look for opportunities to re-use equipment, machinery or component parts, either as spares or for them to be refurbished through their normal channels. It is anticipated there may be limited commercial interest given the age of the asset.

The decommissioning contractor's established arrangements with recycling companies will facilitate optimisation of the quantity of materials that can be sent for recycling. An active project Waste Management Plan (WMP) will be implemented that tracks waste materials through to the recycling endpoint. It is expected that more than 97% of recovered materials from the Goldeneye development will be re-used or recycled.

Materials for which no re-use or recycling options are available will be tracked through to disposal in landfill.

3.1 Topsides

Following preparatory work on the topsides, the risers and umbilicals will be disconnected, allowing the release of the topsides. The Goldeneye topsides are likely to be cut underneath the topsides and then it could be removed and transported as a single lift from the field to the selected yard.

Topsides Description: Goldeneye is a PUI which, when operating, was fully controlled from the Shell St. Fergus control room. Offshore topsides process equipment was limited to gas-condensate-water separation, metering and re-combination, MEG injection and a vent drum and stack for emergency blowdown. Power generation was limited to 3 x 80kW (electrical) diesel driven units.

The topside was installed by HLV, using temporary cantilevered counter weights. The topside was stabbed into the top of the jacket legs and welded in place.

The top of jacket dimensions are 16m x 19.7m with a weather deck size of 16m x 31.1m. Access is via helicopter. It had short stay accommodation provided for 12 people.

Atlantic and Cromarty has containerised control equipment and a Topsides Umbilical Termination Unit, now also mothballed, that were secured in position after the topsides installation.

ELEVATION ON SOUTH FACE (VIEWED LOOKING NORTH)

ELEVATION ON WEST FACE (VIEWED LOOKING EAST)



Table 3.1: Cleaning of Topsides for Removal

Waste Type	Composition of Waste	Disposal Route
On-board hydrocarbons	Process fluids, fuels and lubricants	Drained and transported ashore for re-use/disposal (complete in 2018)
Other hazardous materials	Batteries	Transported ashore for re-use/disposal by appropriate methods. See Inventory of Hazardous Materials [7] (complete in 2018)
Original paint coating	Paint may contain Lead or Chromium	May give off dust if flame-cutting or grinding/blasting is used so appropriate safety measures will be taken. (Refers to potential topsides disconnection (leg cutting) only).
Asbestos and Ceramic Fibre	None Identified	N/A

Table 3.2: Topsides Removal Methods

1) HLV (semi-submersible crane vessel) <input checked="" type="checkbox"/> 2) Monohull crane vessel <input checked="" type="checkbox"/> 3) SLV <input checked="" type="checkbox"/> 4) Piece small <input type="checkbox"/> 5) Other <input checked="" type="checkbox"/>	
Method	Description
Proposed removal method and disposal route	<p>The topsides are likely be cut and lifted (e.g. as a single lift), then transported to a yard onshore for further cleaning, re-use, recycling and/or disposal, as appropriate.</p> <p>An SLV or other construction vessel is the minimum required, though an HLV or Monohull Crane vessel (MCV) may be used if selected for jacket removal, depending on market availability and commercial suitability.</p> <p>The method will be determined during the commercial tendering process.</p> <p>All necessary transfrontier shipments for waste, if required, shall be in place.</p> <p>If the topside is lifted at a different time from jacket, a NAVAID would be affixed to the jacket or a guard vessel deployed as required. OPRED will be advised of any prolonged duration of the jacket being left in place without a topsides.</p>

3.2 Jacket

The four- legged substructure is 19.7m x 16m at the top, 35x35 m at the seabed, standing 141m tall, with four support points for the topside integrated deck. In the temporary, on-bottom condition, the substructure was located on four docking piles. The permanent foundation system consists of a further eight support piles, two in each corner. The substructure has one vertical side to enable drilling access from a Jack-Up rig.

The topside was installed by HLV from a barge, using temporary cantilevered counter weights.

Figure 3.3: Goldeneye Jacket

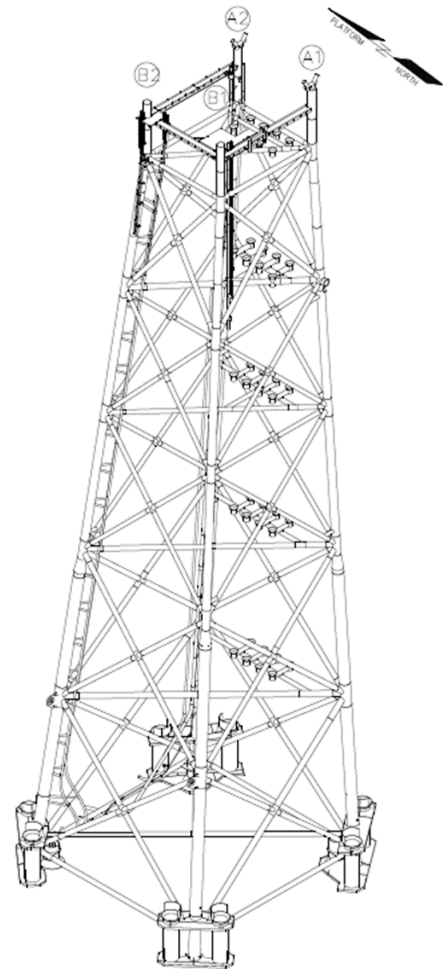
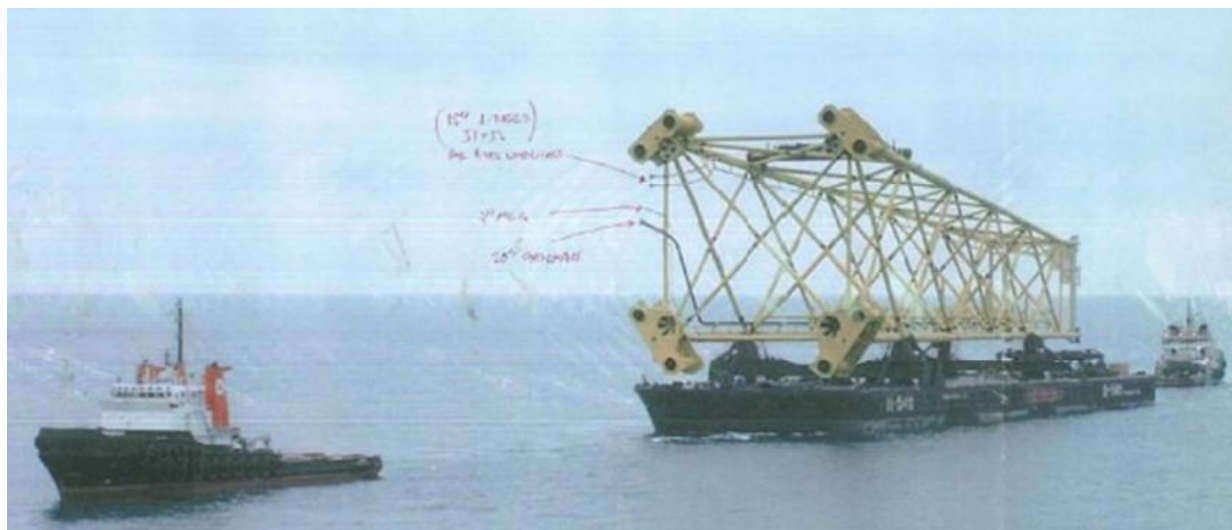


Table 3.3: Jacket Decommissioning Methods	
1) HLV (semi-submersible crane vessel) <input checked="" type="checkbox"/> 2) Monohull crane vessel <input checked="" type="checkbox"/> 3) SLV <input checked="" type="checkbox"/> 4) Piece small <input type="checkbox"/> 5) Other <input checked="" type="checkbox"/>	
Method	Description
Proposed removal method and disposal route	<p>The jacket foundation and docking piles will be cut to a target depth of 3m below the seabed and the jacket lifted, then transported to a recycling yard onshore for further cleaning and recycling and/or disposal, as appropriate. Cutting of the piles is anticipated to be by way of internal cutting equipment. However, if this proves unfeasible it would be necessary to excavate the seabed around the piles to enable external cutting</p> <p>HLV (multiple crane) vessel and barge is needed for single lift excluding the conductors (removed during Wells P&A). Removal could also be by an MCV or SLV, if the jacket were to be cut in sections and vertical lifted (single crane), depending on market availability and commercial suitability</p> <p>If the jacket were to be lifted in sections at different times a guard vessel would be required. OPRED would be advised if a multiple jacket lift approach necessitated a guard vessel to be deployed.</p> <p>The method will be determined during the commercial tendering process.</p> <p>All necessary transfrontier shipments for waste, if required, shall be in place.</p>

Figure 3.4: Goldeneye Jacket Installation





3.3 Subsea Installations and Stabilisation Features

Table 3.4: Subsea Installations and Stabilisation Features			
Subsea installations and stabilisation features	Number	Option	Disposal Route (if applicable)
Concrete mattresses	n/a		
Grout bags	n/a		
Formwork	n/a		
Froned Mats	n/a		
Rock Dump	n/a		

3.4 Pipelines

Riser and topsides sections of pipelines, and any associated pipelines structures or equipment, are to be fully removed and returned to shore for recycling to leave a clear seabed in-line with OSPAR, so were not part of the comparative assessment review. Any associated support piles will be cut to a target depth of 3m below the seabed.

A comparative assessment review of the pipeline decommissioning options was performed in accordance with the Shell U.K. Guidance. At this review, the following options for decommissioning were considered (see also Table 2.3 for more information on current status):

*Key to Options:

- | | | |
|-----------------------------|---------------------------|-----------------------------------|
| 1) Remove - reverse reeling | 2) Remove - Reverse S lay | 3) Trench and bury |
| 4) Remedial removal | 5) Remedial trenching | 6) Partial Removal – cut and lift |
| 7) Leave in place | 8) Remove - cut & lift | 9) Remedial rock-dump |
| 10) Blanket rock cover | | |

Table 3.5: Pipeline or Pipeline Groups Decommissioning Options			
Pipeline/ group	Condition of line/group	Whole or part of pipeline/group	Decommissioning options considered
Spools: (PL1978-7, PL1978-9, PL1979-2) Umbilical (PLU4858)	Surface laid, mattress cover	Whole	8

Comparative Assessment Method:

Decommissioning options were assessed in line with the requirements of the OPRED Guidance Notes [2] and largely adopted the guidance provided in Appendix A of the Oil & Gas UK Guidelines for Comparative Assessment in Decommissioning Programmes, Issue 1, as required. In line with the project Comparative Assessment Procedure [6], a narrative recommendation was presented to recover the surface-laid spools. This recommendation was presented to relevant external stakeholders and consultants for review and endorsement, to ensure a robust assessment was completed.



Outcome of Comparative Assessment:

The results of the CA workshop have been issued to stakeholders, with feedback being sought prior to the final recommendations being issued as the Comparative Assessment Report [5] in support of this document. Note that the CA Report [5] includes sections of PL1978 and PL1979 which are not within the scope of this DP and will be presented for approval at a later date.

Table 3.6: Outcomes of Comparative Assessment

Pipeline or Group	Recommended Option*	Justification
Spools: (PL1978-7, PL1978-9, PL1979-2) Umbilical (PLU4858)	Total removal of spools, umbilical and associated mattresses	Per OPRED Guidance Notes, total removal is base case.

3.5 Pipeline Stabilisation Feature(s)

Table 3.7: Pipeline Stabilisation Features

Stabilisation feature(s)	Number	Option	Disposal Route (if applicable)
Exposed concrete mattresses	Approx. 53	Full recovery	To shore for recycling ^[1]
Exposed grout bags	Approx. 600 ^[2]	Full recovery	To shore for recycling

Notes

1. It is intended that all surface laid mattresses will be removed to shore; however, in the event of practical difficulties (e.g. poor integrity), OPRED will be consulted.
2. The exact distribution of surface laid grout bags (rock covered or exposed) is not known, however it is intended that all exposed surface laid bags will be recovered to shore.

3.6 Wells

Table 3.8: Well Plug and Abandonment

The wells which have been abandoned, as listed in Section 2.1.4 (Table 2.6) have been decommissioned in accordance with Oil and Gas UK (OGUK) Guidelines for the suspension and abandonment of wells.

PON5/PON15/MCAA Application were submitted in support of the work carried out.

3.7 Drill Cuttings

For all Goldeneye wells, drill cuttings with OBM were shipped back onshore for treatment and disposal when they were drilled in 2004 onwards. The regulations concerning offshore drilling permitted the discharge of OBM cuttings to sea only until the start of 2001 for OBM and Synthetic / low toxicity OBM cuttings.

Surveys taken in 2009 also confirmed there were not any drill OBM cuttings piles.



Table 3.9 Drill Cuttings Decommissioning Options	
How many drill cuttings piles are present?	0
Tick options examined: <input type="checkbox"/> Remove and re-inject <input type="checkbox"/> Leave in place <input type="checkbox"/> Cover <input type="checkbox"/> Relocate on seabed <input type="checkbox"/> Remove and treat onshore <input type="checkbox"/> Remove and treat offshore <input type="checkbox"/> Other	
Review of Pile characteristics	Pile
How has the cuttings pile been screened? Actual samples taken?	N/A
Dates of sampling	N/A
Sampling included in pre-decommissioning survey?	N/A
Does it fall below both OSPAR thresholds?	N/A
Will the drill cuttings pile have to be displaced in order to remove the jacket?	N/A
What quantity (m ³) would have to be displaced/removed?	N/A
Will the drill cuttings pile have to be displaced in order to remove any pipelines?	N/A
What quantity (m ³) would have to be displaced/removed?	N/A
Have you carried out a Comparative Assessment of options for the Cuttings Pile?	N/A

3.8 Waste Streams

Table 3.10: Waste Stream Management Methods	
Waste Stream	Removal and Disposal Method
Bulk liquids	Removed from vessels and transported to shore. Vessels, pipework and sumps will be drained prior to removal to shore and shipped in accordance with maritime transportation guidelines (completed in 2018). Further cleaning and decontamination will take place onshore prior to recycling / re-use, as required.
Marine growth	Some marine growth is likely to dry out and detach itself from the jacket and subsea equipment while it is in transit. Marine growth that remains attached to the subsea equipment and/or jacket after load-in to the onshore dismantling site will be removed. It will be disposed of in accordance with the regulations in force at the site following the site operator's licences and procedures (e.g. decommissioning yard's Waste Management Plan)
Radioactive Materials	There is no historical evidence of NORM at the Goldeneye field in risers or topsides process vessels, nor identified during the hazardous material inspections [7]. There are low level radioactive materials in smoke detectors, that will be recovered to shore and disposed of under appropriate permits.



Table 3.10: Waste Stream Management Methods	
Asbestos	The Goldeneye Platform was built in 2003, when the use of asbestos was being phased out. There is no record of asbestos being used for the Goldeneye Platform. No asbestos has been identified during recent hazardous material inspections [7].
Other hazardous wastes	Shell has completed a Hazardous Material Inventory survey [7]. Hazardous wastes will be recovered to shore and disposed of under appropriate permits.
Onshore Dismantling sites	<p>Selection of an onshore dismantling site will be made on the basis of a commercial tender, taking account of HSE criteria.</p> <p>Screening, followed by site audits, will have been performed and Shell U.K. will only consider sites that are licenced to receive the types and quantities of materials identified in the Materials Inventory. Candidate sites must demonstrate the capability to manage waste streams and disposal throughout the deconstruction process. The dismantling site operator will have established arrangements with facilities that recycle steel, copper, aluminium and other materials.</p>

The Waste Management Strategy for the Goldeneye decommissioning project is based on the waste hierarchy (avoid, re-use, recycle, recover energy, dispose) underpinned by the commitment to comply with legal requirements.

The material to be removed during decommissioning activities is shown in Tables 3.11.

Table 3.11 Inventory Disposition			
	Total Inventory Tonnage	Planned tonnage to shore	Planned left <i>in situ</i>
Installations			
Goldeneye	9,762	5,759	4,003
Pipelines			
Goldeneye	541	541	0

Table 3.11 above details the split of materials that are planned to be decommissioned *in-situ* and those planned to be recovered to shore. Of the total of materials in the Goldeneye development, it can be seen that approximately 61% of the inventory tonnage is planned to be recovered. The remaining 39% of the inventory tonnage is proposed to be decommissioned in situ. For the inventory that is to be left in situ, it actually accounts only for structure piles and well casing below the cut-line. Wellhead conductors have been cut approx. 1.5m below the Mean Seabed Level (MSL).

533Te (wet) of marine growth is listed as 'Other Non-Hazardous' material. Most of this weight represents water. Some marine growth will dry out in transit and onshore, so a much smaller dry weight of biological waste will require disposal. It is likely that the marine growth will be disposed of by land-farming or to landfill.

Excluding the marine growth, the Waste Management Plan suggests that more than 97% of the wastes and materials arising from the decommissioning works and recovered to shore are reusable and/or recyclable.



4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Environmental Sensitivities

Table 4.1: Environmental Sensitivities	
Environmental Receptor	Main Features
Conservation interests	<p>There are no designated areas of conservation interest in close proximity to Block 14/29.</p> <p>The Goldeneye platform is located on the edge of an area of Annex 1 habitat of submarine structures made by leaking gases, although active bubble streams were not evident in the numerous pockmarks in the area, nor was Methane-Derived Authigenic Carbonate identified near the platform.</p>
Seabed	<p>The seabed sediment around the Goldeneye platform area is largely homogeneous comprising poorly sorted silty fines, with the underlying layers of sediment expected to comprise very soft sandy clay and soft to firm clay. The sediment is assigned to the EUNIS biotope 'Circalittoral fine sand' and is considered to support the habitat 'Seapen and burrowing megafauna communities', that has been classed as a threatened and / or declining habitat by OSPAR.</p> <p>Juveniles of Ocean Quahog are also present at the platform location.</p>
Fish	<p>The Goldeneye platform lies within spawning grounds for cod (January to April), lemon sole (April to September), <i>nephrops</i> spp (year-round), sand eels (November to January), Norway pout (January to April), sprat and Whiting (February to June). The area is also used as nursery grounds for anglerfish, blue whiting, cod, European hake, herring, ling, mackerel, sand eels, Spotted ray, sprats, spurdog and whiting.</p>
Fisheries	<p>The Goldeneye platform is situated in ICES rectangle 45E9. Based on available data for 2012-2016, the average effort in ICES rectangle 45E9 is 903 days per year (0.5% of U.K. total), while fish landing is estimated at an annual average of 4,231 tonnes. VMS data between 2009 and 2013 indicate high activity of larger (>15m) vessels with <i>Nephrops</i> mobile gear in the vicinity of Goldeneye.</p>
Marine Mammals	<p>JNCC Cetacean Atlas suggests that moderate densities of harbour porpoise, white-beaked dolphin, Atlantic white-sided dolphin and minke whale may occur in the vicinity of the Goldeneye platform. Harbour porpoises are protected under Annex II of the Habitats Directive and all four species are listed as PMFs.</p> <p>Both grey and harbour seals are Annex II species and also listed on the U.K.'s PMF list. Telemetry data collected between 1991 – 2012 and count data 1988 – 2012 indicate that grey seals are likely to occur within the Goldeneye area. Harbour seals are unlikely to occur in these areas.</p>



Table 4.1: Environmental Sensitivities

Birds	<p>Fulmar, gannets, guillemots, kittiwake, puffin, great skua and great black-backed gulls may be present all year round in the vicinity of Goldeneye. In addition, species protected by the EC Birds Directive are expected in low densities during summer (arctic tern) and late summer (storm petrel).</p> <p>Seabird vulnerability to surface pollution in Block 14/29 is classified as moderate or low, although adjacent blocks are classified as extremely high sensitivity in January.</p>
Onshore Communities	<p>The platform and subsea installations will be taken to licenced recycling yards, which might be located in the vicinity of onshore communities. The potential effects could include noise, odour, light pollution, inflow of additional workers, etc. Shell has yet to start the process of selection for recycling yards and therefore potential environmental and social receptors are not yet identified. The evaluation and selection process of licensed dismantling yards will take into account potential sensitivities and Shell will ensure that recycling activities will not have a detrimental effect.</p> <p>Only licensed yards with sufficient management system for waste, safety and environment (including communities) will be selected.</p> <p>Only licenced waste management contractors will be contracted to handle, store, recycle and dispose of all waste generated by the decommissioning activities.</p>
Other Users of the Sea	<p>Shipping traffic is moderate in the vicinity of Block 14/29 (OGA, 2017. Fishing and cargo vessels identified as the most abundant in these areas (Anatec, 2013).</p> <p>There are several oil and gas developments close to the Goldeneye platform, the closest being the Golden Eagle, located approximately 32km to the southwest.</p> <p>There are currently no renewable energy developments or extraction activities in the vicinity of the Goldeneye platform.</p> <p>There are no recorded military training or disposal sites located within Block 14/29.</p>
Atmosphere	<p>Goldeneye is a PUI with minimal processing facilities, now mothballed, and all sources of direct or indirect atmospheric emissions mothballed in 2018</p>

4.2 Potential Environmental Impacts and their Management

Environmental Impact Assessment Summary

An understanding of the environmental baseline and measures available for its protection have informed the development of the Goldeneye decommissioning project.

Overview:



Shell has carried out an environmental impact assessment of the proposed decommissioning activities, and the full results of the assessment are documented in the Environmental Appraisal report that supports these Decommissioning Programmes. Note that the Environmental Appraisal includes sections of PL1978 and PL1979 which are not within the scope of this DP and will be presented for approval at a later date.

Potential impacts arising from the proposed decommissioning activities have been identified and assessed. Mitigations and controls have been agreed to be applied during the execution phase of the project to reduce these impacts.

In summary, based on the results of the assessment and agreed mitigations, it can be concluded that the proposed activities are not expected to result in significant environmental or societal impacts. Table 4.2 provides a high-level overview of key environmental aspects associated with the main activities required for the decommissioning of the Goldeneye installation and how they will be managed.



Table 4.2: Environmental Impact Management		
Activity	Main Impacts	Management of the Impacts
Jacket and Topsides Removal and Decommissioning	Atmospheric Emissions: Emissions of CO ₂ , NO _x , CO and SO ₂ associated with vessel operations will contribute to reduction in air quality.	Vessel requirements and operations will be coordinated and optimised. All vessels will comply with MARPOL 73/78 Annex VI on air pollution. Assurance of vessel maintenance standards and control of emissions will be in line with the Oil Companies International Marine Forum processes.
	Discharges to Sea: There are no planned discharges to sea other than those of grey and black water from vessels undertaking decommissioning activities. These discharges will result in some organic enrichment and chemical contamination of the water column.	Vessel use will be minimised through efficient journey and activity planning. All vessels will comply with MARPOL and IMO standards for sewage discharge. Assurance of vessel maintenance standards and control of discharges will be in line with the Oil Companies International Marine Forum processes. The topsides systems were flushed and cleaned in 2012. All remaining fluids on the platform were back loaded and shipped to shore during preparation activities to achieve permanently unattended mode with the exception of hydraulic fluid in the SSIV control lines. These control lines may be removed intact but if this proves not to be possible, release of the fluid may be required subject to Permit approval by OPRED.
	Underwater Noise: Cutting and disconnection of the jacket piles, and potentially of the jacket into sections, will result in elevated underwater noise arising from use of cutting tools and additional vessels operating in the field simultaneously (some with dynamic positioning system). This will add to baseline noise levels with potential disturbance to marine mammals.	The level and frequencies of noises generated are not expected to cause injury to marine mammals or fish. Some minor temporary disturbance to marine mammals may occur for short durations. Use of explosives is not anticipated.
	Waste Generation: The platform and subsea infrastructure will be taken to a cleaning and/or dismantling yard, where they will be cleaned and recycled resulting in non-hazardous, hazardous and radioactive waste streams being generated.	A waste inventory has been compiled and will form the basis of the active decommissioning Waste Management Plan (WMP). Candidate dismantling yards will be assessed on past waste management performance; Only licensed yards capable of handling expected waste streams, with appropriate permits in place will be selected.



Table 4.2: Environmental Impact Management

	Impacts to Onshore Communities: Dismantling activities at a recycling yard may result in societal impacts such as noise and vibration, light and visual disturbance, odour/ nuisance, dynamics of an influx migrant workers, heavy traffic and dust, and air/water/soil pollution/quality issues (particularly from management of hazardous substances and accidental events).	Audit and assessment of candidate dismantling yards will include the evaluation of societal and community health issues that may arise during recycling activities, and their management by the yard.
	Invasive Species: The Goldeneye jacket is overgrown by marine growth estimated to be up to 528Te in weight. The transit of the jacket to a dismantling location may result in potential introduction of the invasive species, depending on the location of the yard. Additionally, the ballast water of the towing vessels may be exchanged in transit also resulting in the potential introduction of non-native species, depending on the location of the yard.	Transportation of the jacket will be in accordance with a Transit Plan which will include measures for the management of marine growth as applicable. Management of ballast water of the towing vessels will be carried out in accordance to IMO Ballast Water Treatment Convention.
	Accidental Events: There is a risk of dropped objects during lifting and removal of the jacket (also applies to subsea structures and including concrete mattresses) with resultant potential to damage the pipeline ends and compromise their integrity for subsequent reuse.	Each lifting operation will be managed in accordance with a bespoke Lift Plan.
	During the transit of the jacket and topsides, there is a potential for losing either the barge or one or more of the towing vessels. Although the likelihood of such events is low, the consequences may include beaching of a vessel, collision with other sea users, and an uncontrolled release of vessel's fuel to water.	The Transit Plan will include consideration of weather and its seasonal variation, optimal speed, traffic, etc., identification of safe shelter locations from storms and detailing emergency response procedures. Loss of a vessel's fuel under any circumstances will be managed in accordance with the vessel's Shipboard Oil Pollution Emergency Plan.
	Removal of topsides prior to jacket and subsea installation removal has the potential to result in snagging of fish trawl gear on subsea structures or in collision of a vessel with the jacket.	A NAVAID will be affixed to the jacket or a guard vessel will remain on station.



Table 4.2: Environmental Impact Management

Decommissioning of Subsea Structures	Atmospheric Emissions: Emissions of CO ₂ , NO _x , CO and SO ₂ associated with vessel operations will contribute to reduction in air quality.	Vessel requirements and operations will be coordinated and optimised. All vessels will comply with MARPOL 73/78 Annex VI on air pollution. Assurance of vessel maintenance standards and control of emissions will be in line with the Oil Companies International Marine Forum processes.
	Discharge to sea: Subsea infrastructure (SSIV, Gas Export pipeline, chemical (MEG) pipeline, all spools) has been flushed to <5 ppm oil in water and currently contains inhibited freshwater. Control lines containing hydraulic fluid are equipped with self-sealing connections. Should these connections fail to close completely on disconnection, or if there is a requirement to cut the lines, there will be a release of hydraulic fluid and consequent contamination of the water column.	No discharges are planned. Should control lines need to be cut, the planned release of hydraulic fluid will be assessed and will be subject to Permit approval by OPRED.
	Underwater Noise: Cutting and disconnection of the subsea infrastructure will result in elevated underwater noise arising from use of cutting tool and additional vessels operating in the field simultaneously (some with DP system). This will add to baseline noise levels with potential disturbance to marine mammals.	The level and frequencies of noises generated are not expected to cause injury to marine mammals or fish. Some minor temporary disturbance to marine mammals may occur for short durations. Use of explosives is not anticipated.
	Seabed Disturbance: Some localised disturbance of sediments will occur as a result of the extraction of the Goldeneye jacket, SSIV, spool pieces and associated mattresses and grout bags. Following removal activities, the 500 m zone will be over-trawled to confirm a clear and safe seabed. This will cause disturbance of the sediments, leading to potential habitat alteration and causing suspension of fine material into the water column. Infrastructure removal will re-expose the natural substrate beneath them which will be quickly recolonised by the surrounding	Disturbed sediments will be left to recover naturally. Where rock placement is required, materials will be sized to mitigate the risk of snagging while minimising the loss of natural seabed habitat.



Table 4.2: Environmental Impact Management		
	<p>benthic communities, therefore impacts are considered to be small scale, localised and of small effect.</p> <p>Rock cover may be required to remediate the spud can depressions should the post-decommissioning over-trawl trials indicate they are not currently safe for other users of the sea.</p>	
Decommissioning Pipelines	<p>Discharges to Sea:</p> <p>The spool pieces have been flushed to <5 ppm oil in water and filled with inhibited fresh water.</p>	No Further management measures are required.
	<p>Seabed Disturbance: Removal of grout bags and mattresses, and subsequent overtrawl trials, will disturb the sediment, resulting in resuspension of sediment in the water column, which may affect certain species.</p>	The activity will be temporary and short in time; sediment is expected to resettle relatively quickly after disturbance.
Decommissioning Stabilisation Features	<p>Waste Generation: Recovered material will be classed as waste.</p>	A suitable company for management of mattresses will be contracted, with aim of recycling / reusing this type of the material. The disposal site will be compliant with relevant legislations.



5 INTERESTED PARTY CONSULTATIONS

This section will be updated for the public consultation draft.

Pre-Engagement Summary

Pre-engagement with stakeholders commenced in early 2017 with discussions held with statutory advisor and regulatory bodies. These covered the emerging decommissioning plans and the scope of the pre-decommissioning environmental baseline surveys. Ongoing introductory engagements and meetings with statutory consultees were progressed. Other meetings have taken place, as required, with regulatory authorities and others (e.g. OGA Decom, SEPA, JNCC, Marine Scotland, OPRED Environmental Management Team, SFF, Pale Blue Dot, Scottish Natural Heritage, Scottish Crown Estates).

A comparative assessment workshop was held in December 2017 to consult and engage key stakeholders through the decisions to be made. From the workshop, the emerging recommendations report was updated and the notes of minutes detailing the outcomes was circulated to all stakeholders in attendance and comments, where received, were taken account of.

Consultations Summary

The responses contained in Table 5.1 below were provided to the public consultation of the Decommissioning Programmes covering the entirety of both s29 notices. Comments relating to the main pipeline lengths have been removed from this document and will be submitted for approval in a future Decommissioning Programme. See the Note to Readers at the start of this document.

Table 5.1 Summary of Stakeholder Comments		
Points raised during statutory and public consultations		
Stakeholder	Comment	Response
National Federation of Fishermen's Organisations	None	N/A
Scottish Fishermen's Federation	<p>The Scottish Fishermen's Federation (SFF) appreciates the clearly laid out and detailed explanation of Shell U.K. Limited's (Shell) proposals for the decommissioning of the Goldeneye offshore installations and pipelines and place on record our appreciation of the information provided and discussions held at the various Stakeholder Engagement sessions as well as the one to one sessions with the Federation to date.</p> <p>As highlighted previously, the concerns of fishermen remain primarily that of safety and the physical impact</p>	<p>Comments relating to the main pipeline lengths (from the pipeline tie-in flanges to landfall adjacent to the St Fergus Gas Terminal) have been removed from this document and, pending future discussions, will be submitted for approval in a future Decommissioning Programme. See the Note to Readers at the start of the document.</p>



Table 5.1 Summary of Stakeholder Comments

	<p>on the fishing grounds of the long term presence of oil industry infrastructure on the seabed. With this in mind, the SFF's Offshore Oil and Gas Decommissioning policy (August 2018) * explains that a return to clean seabed is the SFF's overarching principle in relation to oil and gas decommissioning in the United Kingdom Continental Shelf (UKCS), taking into account current legislation, related guidelines and the UK Fisheries Offshore Oil and Gas Legacy Trust Fund Limited (FLTC) Memorandum of Understanding.</p> <p>We are therefore pleased to note that it is Shell's intention to remove all non-pipeline related infrastructure during the course of the Goldeneye decommissioning works as well as the Goldeneye umbilical between the platform and SSIV, and that mitigation measures, should they be required, are also in place for dealing with the spud can depressions.</p> <p>...</p> <p>The Federation having stated the above position, would reaffirm its continued appreciation of the openness of the dialogue hitherto and its wish to continue to work closely and positively with the Goldeneye Decommissioning Project Team, as you work through the challenges before you</p>	
Northern Ireland Fish Producers Organisation (NIFPO)	None	N/A
Global Marine Systems Limited (GMS)	None	N/A
Pale Blue Dot Energy	Pale Blue Dot Energy welcome clarity on Shell's intentions for the Goldeneye Decommissioning Programme and in particular the mention of the potential re-use of pipeline infrastructure for CCS	Comments relating to the potential future re-use of the main pipeline lengths from the pipeline tie-in flanges to landfall adjacent to the St Fergus Gas



Table 5.1 Summary of Stakeholder Comments

	<p>noted in the Comparative Assessment. Shell have set an important example to other operators to consider CCS re-use in their decommissioning plans despite the current pre-commercial status of this sector.</p> <p>...</p> <p>Decommissioning programme comments:</p> <p>Pale Blue Dot Energy have no comments on the decommissioning of the Goldeneye Offshore Platform Installation. The Acorn CCS Project has no plans to re-use this facility or the wells hosted by it.</p> <p>We expect the wells to be abandoned in a manner which would not compromise the use of the subsurface for CCS.</p> <p>...</p> <p>In our opinion, amongst other matters, some issues which could impact the ability to re-use the Goldeneye pipeline for CCS are;</p> <p>Removing existing manifold and fitting blind flange: the process of removing manifold and fitting caps/blinds flanges are likely to give rise to problems for pipeline re-use including; issues associated with ingress of seawater; ability to safely remove the blind flange in the future.</p> <p>...</p>	<p>Terminal have been removed from this document and, pending future discussions, will be submitted for approval in a future Decommissioning Programme. Reference the Note to Readers at the start of the document.</p> <p>No comments on the decommissioning of the Goldeneye Offshore Platform Installation are noted.</p> <p>With regard to the final bullet point and the removal of the SSIV manifold, Shell have responded and engaged directly with Pale Blue Dot in preparation for issuing this Decommissioning Programme. Shell outlined the proposals contained herein, including the pipeline ends to remain in situ pending the submission of a future Decommissioning Programme - see the Note to Readers at the start of this document. Pale Blue Dot are supportive of the decision to split the Decommissioning Programmes and raised no concerns with the proposals contained in this document.</p>
Public	None	N/A



6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

Members of the Project Management team have been appointed to manage suitable sub-contractors for the disconnection and removal activities. Standard company 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 Central North Sea to secure schedule and cost efficiencies. The process of consents and the consultations required as part of this process have commenced and will be fully managed and monitored. In the event of any changes in the detail of the offshore removal programme being required, these would be discussed and agreed with OPRED in advance. The United Kingdom Hydrographic Office will be notified in accordance with the requirements Decommissioning of Offshore Oil and Gas Installations and Pipelines Nov. 18

6.2 Post-Decommissioning Debris Clearance and Verification

A post decommissioning debris survey will be carried out within all 500m safety zones.

Any significant oil and gas related seabed debris will be recovered for onshore disposal or recycling in line with existing disposal methods.

Verification of seabed clearance will be provided by an independent party and submitted to OPRED. A copy of the seabed clearance certificate will also be submitted to the Seabed Data Centre (Offshore Installations) at the United Kingdom Hydrographic Office.

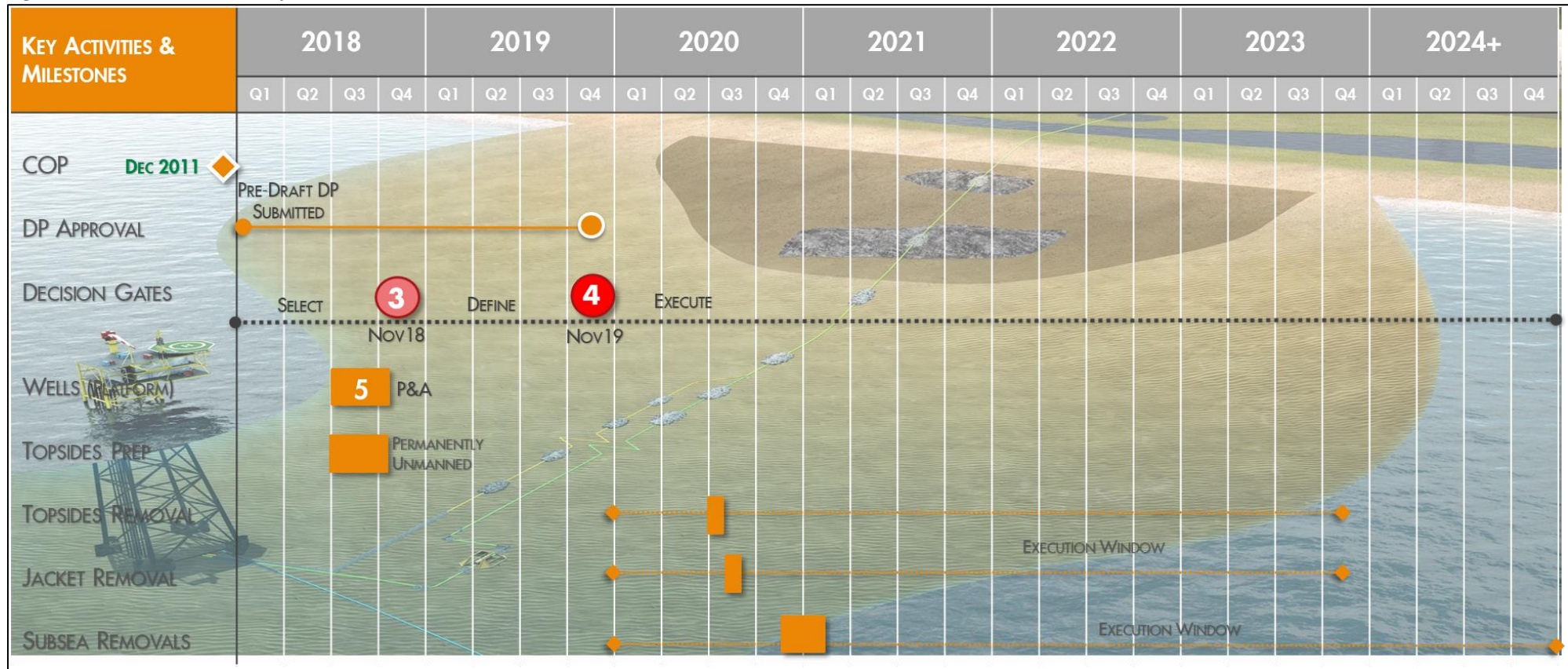
Verification of the safe seabed state for other users of the sea will be obtained by over-trawl trials in areas of decommissioning activities, including remediated spud can depressions.

Note, if overtrawl trials find that depressions within the 500 m safety zone (such as anchor scars or spud cans) present a risk to trawl gear, attempts will first be made to smooth out the profile of these features with the dragged chain matts used for the overtrawl trials. If this approach does not adequately reduce the risk of future snagging, rock cover will be applied to make the seabed safe. Where feasible, any such rock cover will infill the depressions to a level approximately 0.5 m below the surrounding seabed level. This will allow subsequent natural infill with fine sediments over time, thereby recreating a more natural habitat than if rock were filled to seabed level.



6.3 Schedule

Figure 6.1: Gantt Chart of Project Plan





6.4 Costs

Separate costs letter will be provided to OPRED ‘commercial – in confidence’ at public consultation submission

An overall cost estimate is being provided to OPRED in confidence, following Oil and Gas U.K. Guidelines on Decommissioning Cost Estimation in-line with OGUK Work Breakdown Structure (WBS) Guidelines.

Table 6.1 – Provisional Decommissioning Programmes - Costs	
Item	Estimated Cost (£m)
Platforms/Jacket- Preparation/Removal and Disposal	Provided to OPRED in confidence
Pipelines Decommissioning	
Subsea Installations and Stabilisation Features	
Well Abandonment	
Continuing Liability – Future Pipeline and Environmental Survey Requirements	

6.5 Close Out

In accordance with the OPRED guidelines, a close out report will be submitted to OPRED explaining any variations from the Decommissioning Programmes (normally within twelve 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 Liabilities, Monitoring and Evaluation

A post-decommissioning environmental seabed survey centred on the sites of the former installations and the adjacent spud can depressions will be carried out. The survey will focus on any chemical and physical disturbances of the decommissioning activities compared with the pre-decommissioning data. Results of this survey will be available once the work is complete, with a copy forwarded to OPRED. All tie-in spool routes and structure sites including the adjacent spud can depressions will be the subject of geo-physical surveys when decommissioning activity has concluded. After the summary of the surveys has been sent to OPRED and reviewed, a post-monitoring survey regime will be agreed.

The Goldeneye Section 29 Notice holders will be the contact points for any third-party claims arising from damage caused by any remaining infrastructure under the approved Goldeneye Decommissioning Programmes.



7 SUPPORTING DOCUMENTS

<i>Table 7.1: Supporting Documents</i>		
<i>Ref</i>	<i>Document Number</i>	<i>Title</i>
[1]	Chapter 17	The Petroleum Act 1998
[2]	URN 09D/734 Version 7 (Draft) Dec 2017	OPRED Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998 Superseded during document preparation by OPRED GUIDANCE NOTES Decommissioning of Offshore Oil and Gas Installations and Pipelines May 2018
[3]	OSPAR Decision 98/3	OSPAR Decision on the Disposal of Disused Offshore Installations
[4]	GDP-PT-S-HE-0702-00003	Environmental Appraisal
[5]	GDP-PT-S-AA-7180-00002	Goldeneye Comparative Assessment Report
[6]	EOFL-PT-INT-D-00004	Comparative Assessment Methodology
[7]	GDP-PT-S-HX-7180-00001	Inventory of Hazardous Material

These documents are available as follows:

1. At the Shell website at <https://www.shell.co.uk/sustainability/decommissioning.html>.
2. By email from: SUKEP-Shell-Decommissioning-Correspondence@shell.com
3. For inspection during the statutory and public consultation period (Tuesday 6th November 2018 - Wednesday 5th December 2018) at Shell U.K. Limited, 1 Altens Farm Road, Nigg, Aberdeen, AB12 3FY.



8 PARTNER LETTERS OF SUPPORT



ExxonMobil

Esso Exploration and Production UK Limited
Union Plaza
1 Union Wynd
Aberdeen
AB10 1SL
+44 (0)1224 651924

Department for Business, Energy and Industrial Strategy
Offshore Decommissioning Unit
AB1 Building, 3rd Floor
Crimon Place
Aberdeen
AB10 1BJ

24th September 2019

Dear Sir or Madam,

Section 29 Notice Petroleum Act 1998 – Goldeneye Field Decommissioning Programmes

Further to your letters dated 6th September 2019 regarding the decommissioning of the offshore installation and the offshore pipelines for the Goldeneye field, this letter confirms that Shell U.K. Limited as Goldeneye Field Operator is authorised to submit decommissioning programmes for approval as directed by the Secretary of State on behalf of the current equity holders.

Esso Exploration and Production UK Limited (as a Section 29 Notice Holder) confirms its support for the proposals detailed in the Goldeneye Decommissioning Programmes which the Goldeneye Field Operator, Shell U.K. Limited, will submit for approval by 3rd October 2019.

Yours sincerely,

Luke Mathews
Joint Interest Project Advisor

For and on behalf of Esso Exploration and Production UK Limited

Registered in England
Number: 00207426
Registered Office:
Ermyn House, Ermyn Way
Leatherhead, Surrey KT22 8UX



Offshore Petroleum Regulator for Environment & Decommissioning
Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

12 September 2019

Dear Sir / Madam

Petroleum Act 1998 – Goldeneye Decommissioning Programmes

We, Endeavour Energy UK Limited, confirm that we authorise Shell U.K. Limited to submit on our behalf abandonment programmes relating to the decommissioning of the Goldeneye installation and Goldeneye pipelines (from the Goldeneye installation up to but excluding the main pipeline tie-in flanges) as directed by the Secretary of State on 6 September 2019.

We confirm that we support the proposals detailed in the final Goldeneye Decommissioning Programmes dated 26 August 2019, which is to be submitted by Shell U.K. Limited in so far as they relate to those facilities in respect of which we are required to submit abandonment programmes under section 29 of the Petroleum Act 1998.

Yours Faithfully

Derek Neilson
For and on behalf of Endeavour Energy UK Limited



Spirit Energy Resources Limited

5th Floor
iQ Building
15 Justice Mill Lane
Aberdeen
AB11 6EQ

Telephone: 01224 415000
www.spirit-energy.com

**Offshore Petroleum Regulator for Environment and
Decommissioning**

Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

17 September 2019

Dear Sir or Madam,

**PETROLEUM ACT 1998
ABANDONMENT OF THE GOLDENEYE INSTALLATION**

We acknowledge receipt of your letter dated 6 August 2019.

We, Spirit Energy Resources Limited, confirm that we authorise Shell U.K. Limited, in their capacity as the Goldeneye Operator, to submit on our behalf a Decommissioning Programme relating to the Goldeneye field installation as directed by the Secretary of State on 6 August 2019.

We confirm that we support the proposals detailed in the Goldeneye Decommissioning Programme dated 26 August 2019, which is to be submitted by Shell U.K. Limited, in their capacity as the Goldeneye Operator, in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully,

Gerry Harrison
Director
For and on behalf of Spirit Energy Resources Limited

Spirit Energy Resources Limited
Registered in England and Wales No.02855151
Trading Address: 5th Floor, iQ Building, 15 Justice Mill Lane, Aberdeen AB11 6EQ
Registered Office: 1st Floor, 20 Kingston Road, Staines-upon-Thames, TW18 4LG



Spirit Energy Resources Limited

5th Floor
iQ Building
15 Justice Mill Lane
Aberdeen
AB11 6EQ

Telephone: 01224 415000
www.spirit-energy.com

**Offshore Petroleum Regulator for Environment and
Decommissioning**

Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

18 September 2019

Dear Sir or Madam,

**PETROLEUM ACT 1998
DECOMMISSIONING OF THE GOLDENEYE PIPELINES**

We acknowledge receipt of your letter dated 6 August 2019.

We, Spirit Energy Resources Limited, confirm that we authorise Shell U.K. Limited, in their capacity as the Goldeneye Operator, to submit on our behalf a Decommissioning Programme relating to the Goldeneye pipelines (from the Goldeneye installation up to but excluding the main pipeline tie-in flanges) as directed by the Secretary of State on 6 August 2019.

We confirm that we support the proposals detailed in the Goldeneye Decommissioning Programme dated 26 August 2019, which is to be submitted by Shell U.K. Limited, in their capacity as the Goldeneye Operator, in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully,

Gerry Harrison
Director
For and on behalf of Spirit Energy Resources Limited

Spirit Energy Resources Limited
Registered in England and Wales No.02855151
Trading Address: 5th Floor, iQ Building, 15 Justice Mill Lane, Aberdeen AB11 6EQ
Registered Office: 1st Floor, 20 Kingston Road, Staines-upon-Thames. TW18 4LG



APPENDIX 1 – PUBLIC NOTICE

PUBLIC NOTICE

The Petroleum Act 1998

Goldeneye Decommissioning Programmes

On Tuesday 6th November 2018, Shell U.K. Limited submitted, for the consideration of the Secretary of State for Business, Energy and Industrial Strategy, a draft Decommissioning Programmes for the Goldeneye Field facilities, and associated pipelines, in accordance with the provisions of the Petroleum Act 1998.

It is a requirement of that Act that interested parties be consulted on such decommissioning proposals.

The Goldeneye Field is situated in the Central North Sea, approximately 100kms north-east of St. Fergus, in blocks 14/28b;14/29a;20/3b;20/4b. The facilities covered by the Decommissioning Programmes are:

- 1.The Goldeneye Platform
2. Pipelines and the associated subsea infrastructure

Shell U.K. Limited hereby gives notice that the Goldeneye Decommissioning Programmes can be viewed online at website. <https://www.shell.co.uk/sustainability/decommissioning.html>

Alternatively, a digital copy of the programmes can be requested, or a hard copy inspected at the following location on Tuesday mornings or Thursday afternoons until Wednesday 5th December 2018

Shell U.K. Limited
1 Altens Farm Road
Nigg
Aberdeen
AB12 3FY

Contact: Rob Jansen, Head of Projects, Decommissioning Strategy
E-Mail: SUKEP-Shell-Decommissioning-Correspondence@shell.com

Representations regarding the Goldeneye Decommissioning Programmes should be submitted in writing to Shell U.K. Limited marked for the attention of Rob Jansen at the above address, where they should be received by the consultation closing date, Wednesday 5th December 2018 and should state the grounds upon which any representations are being made.

Tuesday 6th November 2018

Rob Jansen
Head of Projects, Decommissioning Strategy
Shell U.K. Limited
1 Altens Farm Road
Nigg
Aberdeen
AB12 3FY