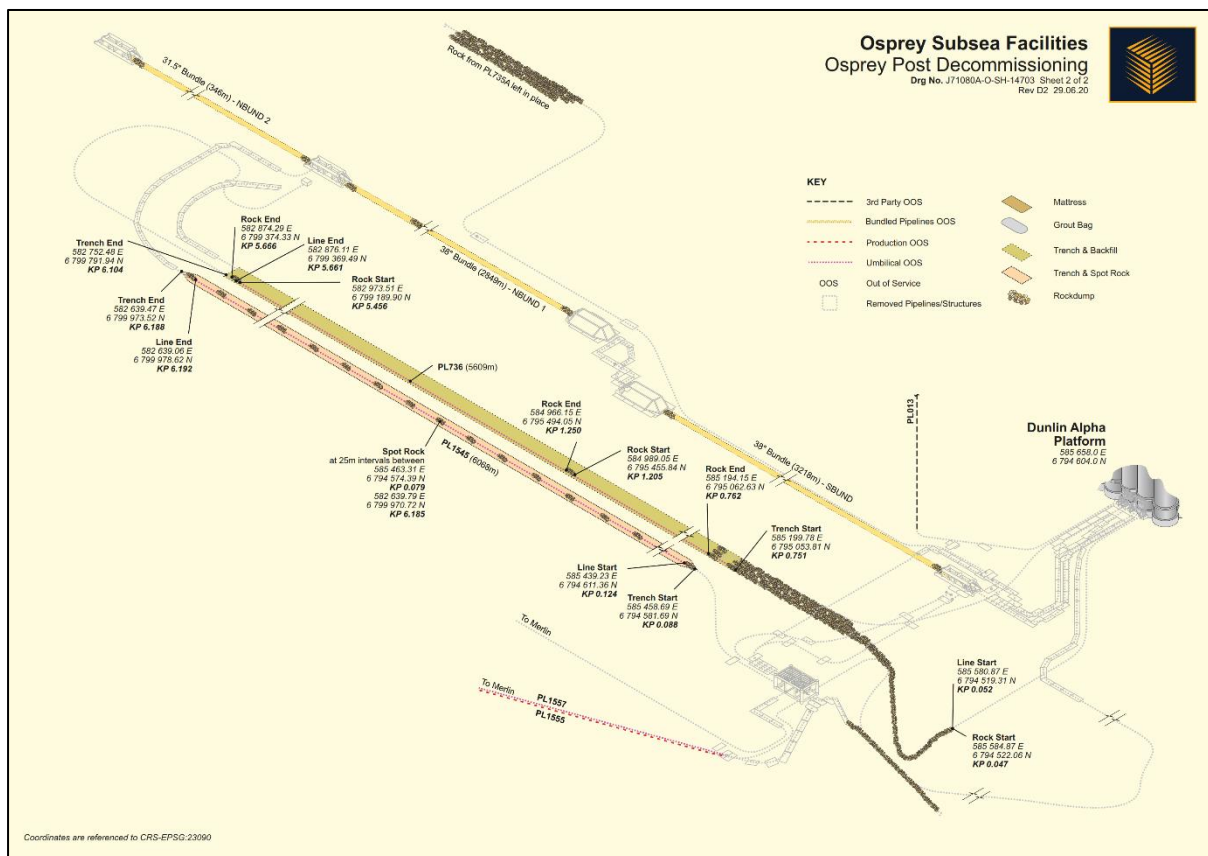




Fairfield Fagus Limited

Osprey Pipelines and Structures Decommissioning Programme Regulatory Close Out Report



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APPROVALS

	Name	Signature	Date
Prepared by	Jonathan Bird	<i>J. Bird</i>	18/01/2021
Reviewed by	James Clarkson	<i>J. Clarkson</i>	18/01/2021
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CONTENTS

1	Summary	5
	Summary of Decommissioning Programme	5
1.1	Schematic of Field Layout.....	9
1.1.1	Operational	9
1.1.2	Post Decommissioning	10
1.2	Project Delivery against Approved Schedule	12
1.3	Associated Decommissioning Approvals.....	13
2	Decommissioning Activities	14
2.1	Contracts Awarded	14
2.2	Platform Operations.....	14
2.3	Subsea P&A	15
2.4	Subsea Installations	16
2.5	Pipelines / Umbilicals & Jumpers	16
2.6	Pipeline Stabilisation Features	19
2.7	Drill Cuttings	19
2.8	Results of Post Decommissioning & Environmental Surveys	20
2.9	Key Milestones	22
2.10	Stakeholder Engagement	23
3	Impact on the Environment	23
3.1	Activities	23
3.2	Future Monitoring	24
4	Impact on HS&E	26
4.1	Details of any Incidents / Accidents during Project Execution.....	26
5	Waste	27
6	Lessons Learned	27
7	Cost Summary	28
8	Photographs.....	29
9	Appendices	32



Terms and Abbreviations

Term	Meaning
BEIS	Department of Business, Energy and Industrial Strategy
CCME	Canadian Council of Ministers of the Environment
CGBS	Concrete Gravity Base Substructure
COP	Cessation of Production
DP	Decommissioning Programme
DSV	Diving Support Vessel
EPRD	Engineering, Preparation, Removal, Disposal
ERM	Effects Range Median
FBL	Fairfield Betula Limited
FEL	Fairfield Energy Limited
FFL	Fairfield Fagus Limited
HS&E	Health, Safety and Environment
MER	Maximising Economic Recovery
MODU	Mobile Offshore Drilling Unit
N/A	Non Applicable within OPRED regulatory close out report template
NOAA	National Oceanic and Atmospheric Administration
ODU	Offshore Decommissioning Unit (OPRED)
OGA	Oil and Gas Authority
OGUK	Oil and Gas UK
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo Paris Convention
P&A	Plug and Abandonment
PL	Pipeline
PON	Petroleum Operations Notice
ppm	Parts per Million
PWA	Pipeline Works Authorisation
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SID	Subsea Infrastructure Decommissioning
THC	Total Hydrocarbon Content
WILBM	Water Injection Linear Block Manifold



1 Summary

Summary of Decommissioning Programme

The Osprey field Decommissioning Programme (FFL-DUN-OSP-HSE-01-PLN-00001) was approved on the 14th December 2017. A summary of the infrastructure which has been decommissioned and the approved decommissioning options is outlined below.

The Greater Dunlin Area consists of the Dunlin, Dunlin South West, Osprey and Merlin Fields, located in the Shetland Basin of the northern North Sea. The Dunlin Alpha platform served as the production facility for the Greater Dunlin Area and is located in block 211/23a, approximately 137 km north east of Scotland and 11 km from the UK / Norwegian median line, in a water depth of 151 m.

The Dunlin Alpha platform was installed in 1977 and two subsea tiebacks, Osprey and Merlin, were developed in 1991 and 1997 respectively. During its lifetime, over 522 million barrels of oil were produced from the Greater Dunlin Area.

The Osprey subsea field is located 6 km north west of Dunlin Alpha in blocks 211/23a and 211/18a in a water depth of 159 m, and originally consisted of two subsea templates, complete with eight production wells and four water injection wells respectively. Oil was produced via a subsea production manifold, and transported through two 8" production lines contained within a 38" bundle carrier pipe to Dunlin Alpha platform.

The original 10" water injection pipeline contained within the 38" carrier pipe suffered a loss of integrity in July 2002, after which water injection was supplied by a 10" flexible pipeline via a central Water Injection Linear Block Manifold (WILBM) to the four satellite injection wells.

Termination of Production from the Greater Dunlin Area was announced in May 2015, having Maximised Economic Recovery (MER) from these oilfields. Termination of Production was agreed with the Oil & Gas Authority (OGA) on 9th July 2015, with Cessation of Production (COP) on 15th June 2015, confirmed by letter dated 15th January 2016.

Table 1-1: Overview of the Decommissioned Installation(s)		
Subsea Installation Type	Wells	
Wells	12	
Associated Cuttings Pile(s)	2	
Dummy Wellheads	2	
Manifolds	3	
Protection Structures	4	
Stabilisation Features ¹	Estimated Quantity	Actual Removed
Concrete Mattresses	266	343 ²
Grout Bags	280	8,537 ³
Sand Bags	5,295	

¹ It was agreed with OPRED-ODU and OPRED-EMT that under the Marine Licence sand/grout bags that are wholly buried could remain *in situ* if technical difficulties were experienced in exposing them for recovery. All visible sand/grout bags have been removed.

² 77 off additional mattresses from original records were found and recovered.

³ Summary reports combined grout/sand bags as it was not possible to distinguish them apart during removals. Quantities were derived from weight of 25kg/bag however many bags were split upon retrieval.



Table 1-2: Decommissioned Production/Water Injection Pipelines, Bundle Carrier Pipes & Controls Umbilicals				
Item being Decommissioned	Components	Total length (km)	Total length removed (km)	Total length left <i>in situ</i> (km)
Production/Water Injection Pipelines/Spools/Jumpers	21	7.965	7.425	0.540 (this is contained within the CGBS)
Bundle Carrier Pipes	3	6.476	0.063	6.413
Control Umbilicals/Jumpers	32	16.634	4.253	12.381 (0.360 is within the CGBS)
Total	56	31.075	11.741	19.334

Table 1-3: Summary of the Approved Decommissioning Options		
Selected Option	Reason for Selection	Approved Decommissioning Solution
Subsea Installations		
Xmas trees (12 off) will be removed using a MODU. The wellheads may be removed by the MODU or at a later stage using a DSV.	Removal of all seabed structures to leave a clear seabed.	There are no wellhead protection frames or over trawable structures in place on the wells. Wellheads and associated completion materials will be removed to (minus) -3 m.
Interim Manifold (IM)	Removal of all seabed structures to leave a clear seabed.	Full removal
WILBM	Removal of all seabed structures to leave a clear seabed.	Full removal
Protection Structures (4 off)	Removal of all seabed structures to leave a clear seabed.	Full removal
Pipelines, Flowlines and Umbilicals⁴		
Group 1: pipeline and umbilical components	Leaves clear seabed and meets regulations	Full removal
Group 2a: deposits	Leaves clear seabed and meets regulations	Full removal
Group 2b: structures	Leaves clear seabed and meets regulations	Full removal

⁴ FBL-DUN-OSP-SSP-01-RPT-00003 - Osprey Subsea Assets, Burial Status.



Table 1-3: Summary of the Approved Decommissioning Options		
Selected Option	Reason for Selection	Approved Decommissioning Solution
Group 3: bundles	Comparatively assessed as preferred option. The bundles are stable, posing no hazard to marine users. Minimal seabed disturbance, lower energy usage, reduced risk to personnel engaged in the activity.	Partial Removal
Group 4: surface laid flexible jumpers	Leaves clear seabed and meets regulations	Full removal
Group 5: flexible and umbilical risers	Comparatively assessed as preferred option. The risers are contained within the Dunlin Alpha concrete gravity based structure.	Partial Removal
Group 6: surface laid rigid spools	Leaves clear seabed and meets regulations	Full removal
Group 7: surface laid flexible pipelines	Leaves clear seabed and meets regulations	Full removal
Group 8: trenched and rock covered umbilicals	Comparatively assessed as preferred option. The pipelines and umbilicals are sufficiently buried and stable, posing no hazard to marine users. Minimal seabed disturbance, lower energy usage, reduced risk to personnel engaged in the activity.	Partial Removal
Group 9: surface laid umbilicals	Leaves clear seabed and meets regulations	Full removal
Group 10: surface laid, rock covered pipelines	Leaves clear seabed and meets regulations	Full removal
Wells		
Abandoned in accordance with OGUK guidelines for the Abandonment of Wells, issue 5 July 2015	Meets regulatory requirements	A PON5 will be submitted through the OGA Well Operations and Notification System (WONS) and Chemical Permit & Marine Licences will be submitted through the Portal Environmental to support the work carried out

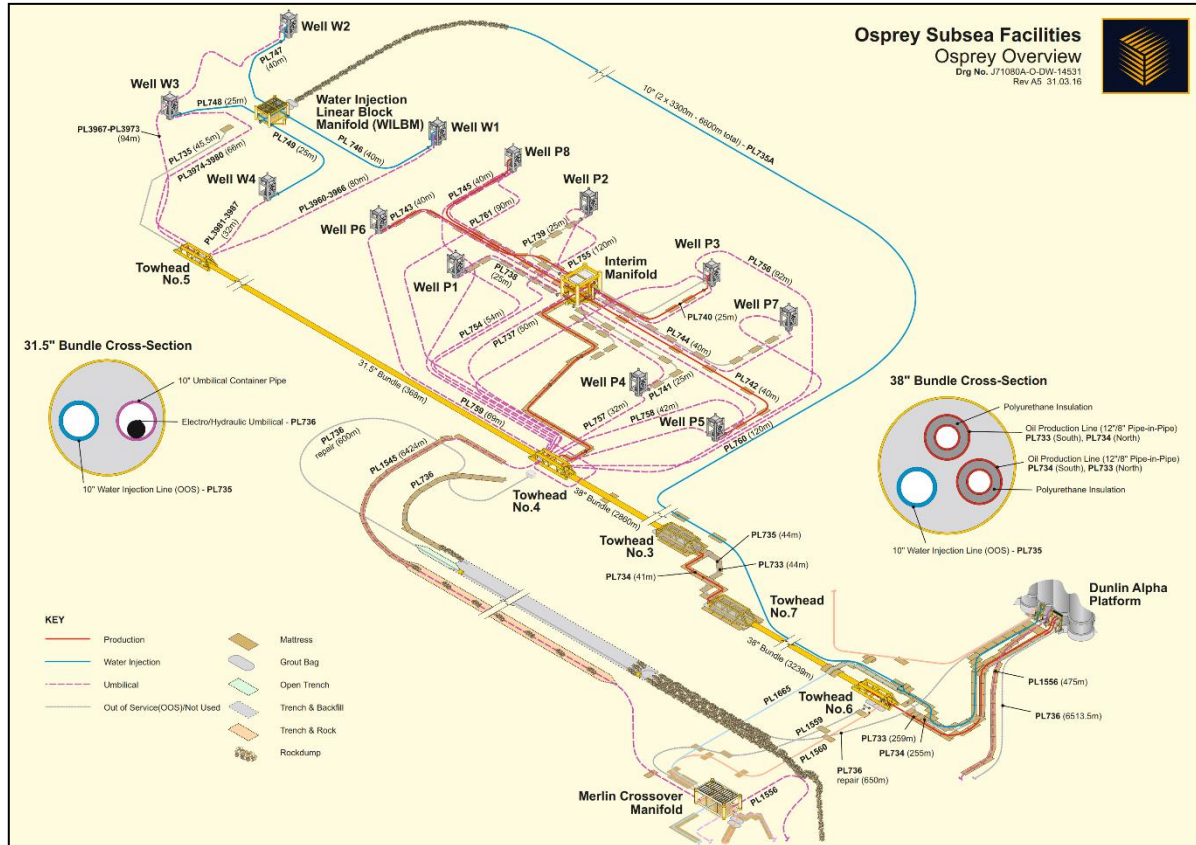


Table 1-3: Summary of the Approved Decommissioning Options		
Selected Option	Reason for Selection	Approved Decommissioning Solution
Drill Cuttings		
Leave in place to degrade naturally	Cuttings coverage is small, thin and widely dispersed and falls below both OSPAR 2006/5 thresholds	Left undisturbed on seabed
Criteria:	Osprey Production Wells Cuttings (Pile)	Osprey Water Injection Wells Cuttings (Pile)
Area (m ²)	5,834	3,092
Volume (m ³)	2,130	922
Average depth of cover (m)	0.60	0.59
Max depth of cover (m)	1.47	2.40
Interdependencies		
None		



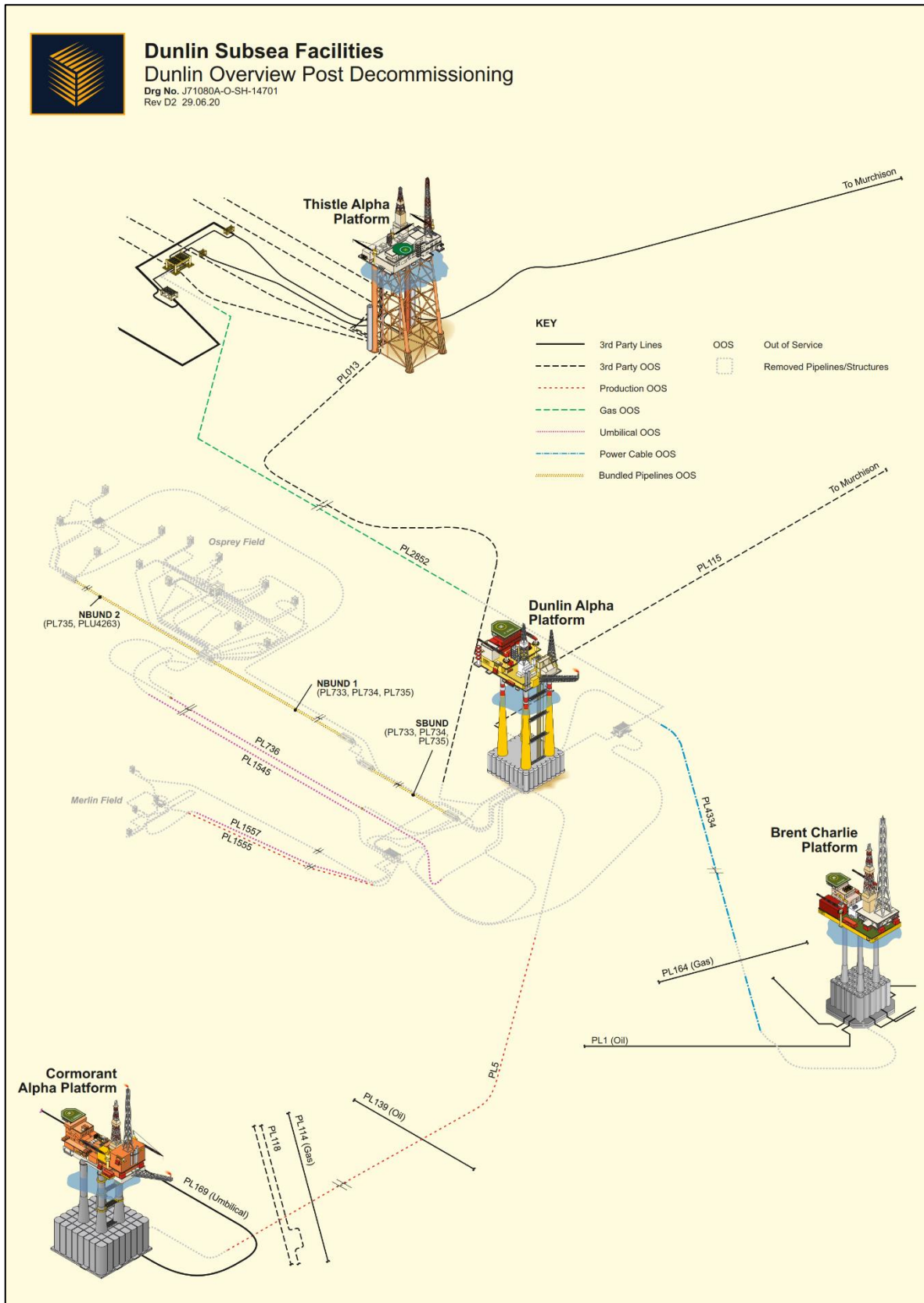
1.1 Schematic of Field Layout

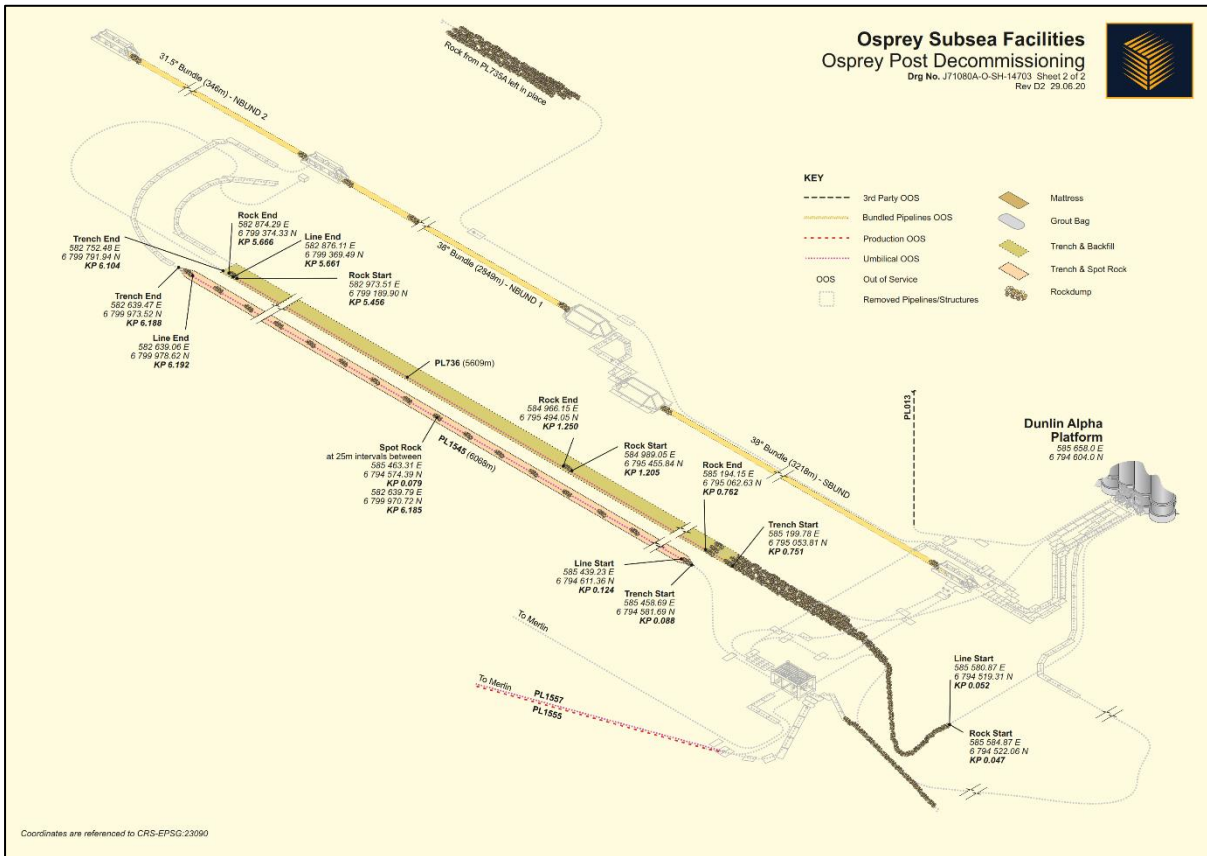
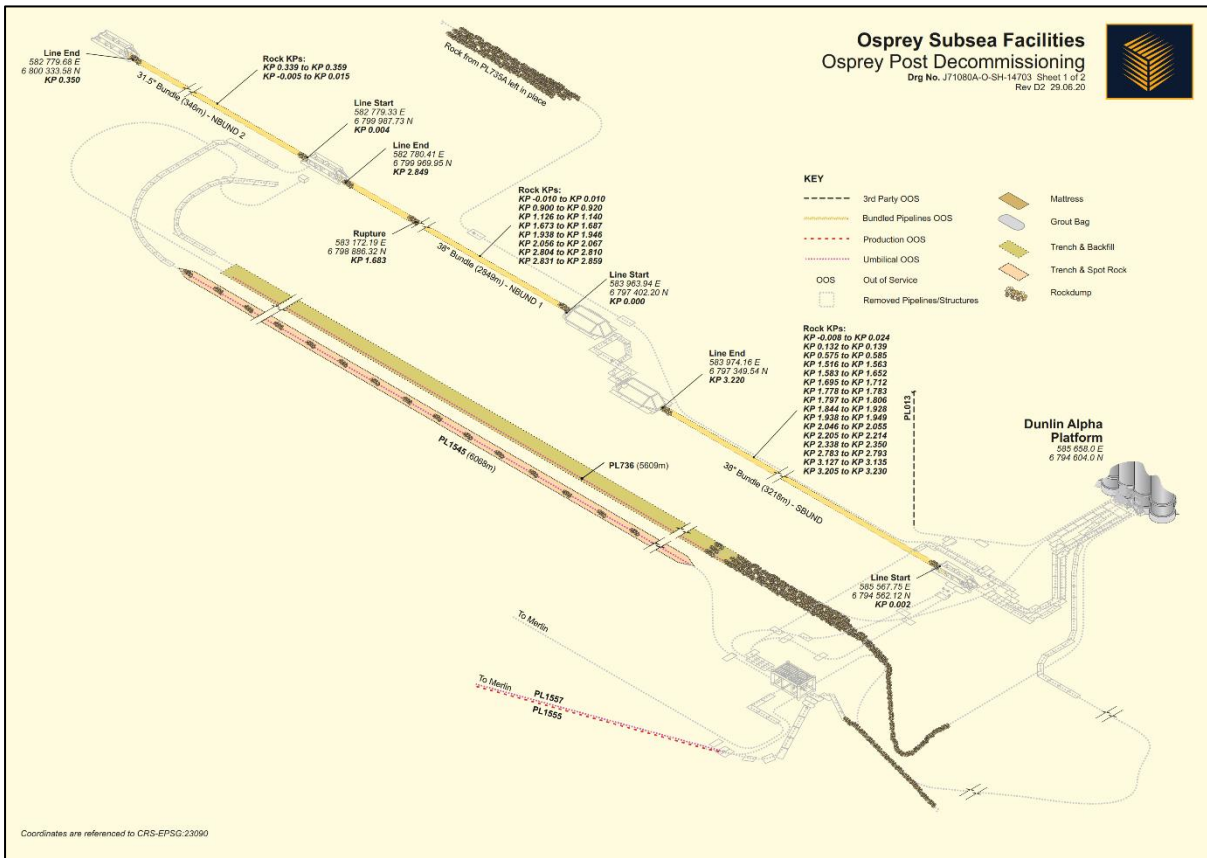
1.1.1 Operational





1.1.2 Post Decommissioning

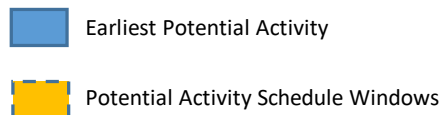
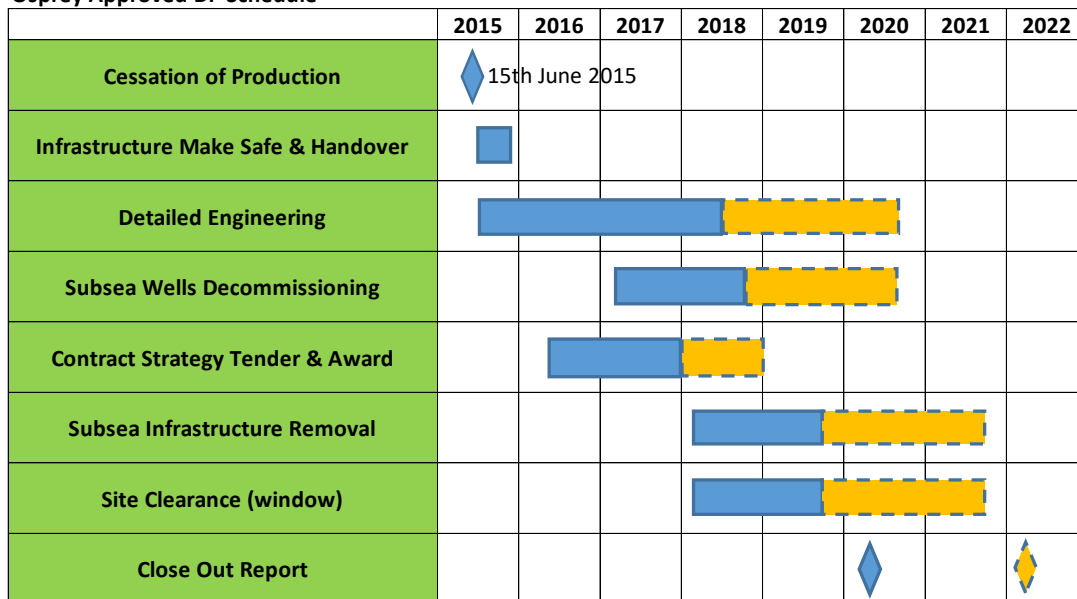




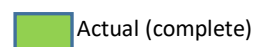
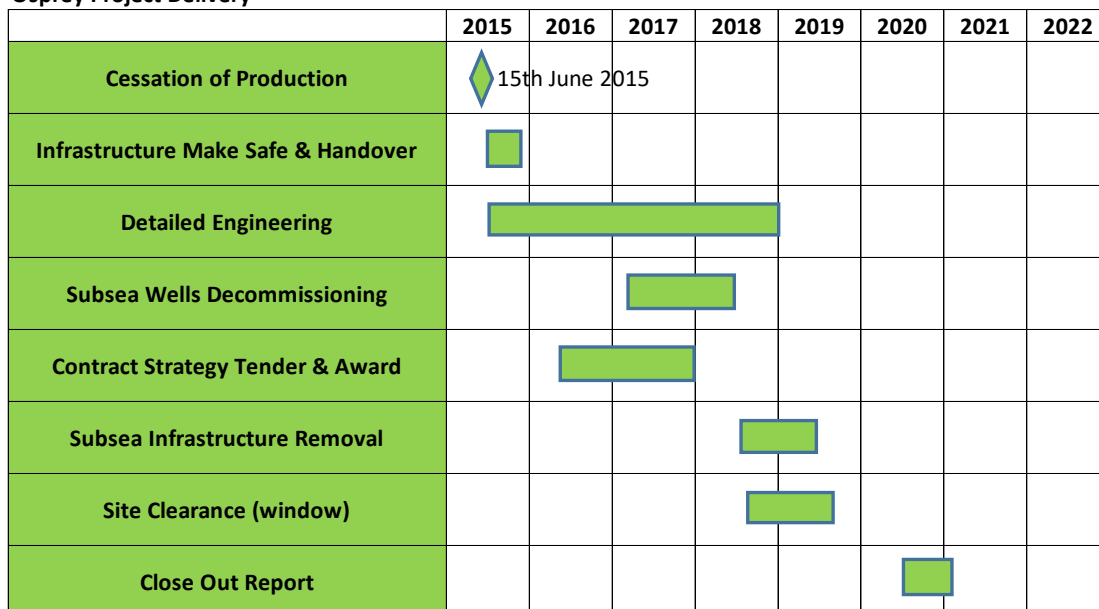


1.2 Project Delivery against Approved Schedule

Osprey Approved DP Schedule



Osprey Project Delivery





1.3 Associated Decommissioning Approvals

Table 1-4: Associated Decommissioning Approvals	
Cessation of Production (COP)	15/06/2015
Decommissioning Programme Approval	14/12/2017
Well P&A	P&A activities were approved via Consent to Locate permit CL/661/1 (Version 1). Campaign commenced April 2017 and completed July 2018.
Topside Removal	This will be completed as part of the Approved Dunlin Alpha Topsides Decommissioning Programme
Subsea Installation Removal	Pipeline Application (PLA) permit PLA/538 (Approved 01/08/2018) Required for marine licences and/or oil/chemical discharge Radioactive Substances Act permit RSA/B/70248
Pipeline Preparatory Works	Pipeline Application (PLA) permit PLA/231 (Approved 08/06/2015); Required for pipeline flushing operations Decommissioning Application (DCA) permit DCA/37 (Approved 04/07/2017) Required for subsea umbilical flushing operations
Pipeline Works Authorisation (PWA)	PWA 4/W/90 130/V/18, Approved 07/08/2018 Recovery of 61 off Pipelines and Umbilicals & Modification of 7 off Pipelines and Umbilicals to remain <i>in situ</i> Advised work Completed 01/11/2019 PWA 33/W/97 128/V/18, Approved 07/08/2018 Modification of 1 off Umbilical to remain <i>in situ</i> Advised work Completed 01/11/2019

Supporting documents are:

1. Osprey Pipelines and Structures Decommissioning Programmes (DP1)
(FFL-DUN-OSP-HSE-01-PLN-00001 rev A9)
2. Osprey Comparative Assessment Report (FFL-DUN-OSP-HSE-01-RPT-00001 rev A03)
3. Osprey Environmental Statement (XOD-DUN-HSE-RPT-00004 (Xodus) rev A04)
4. Osprey Cost Summary Report (confidential) (FFL-DUN-OSP-HSE-01-RPT-00002 rev A1)

No amendments have been made since approval.



2 Decommissioning Activities

The Osprey field Cessation of Production (COP) occurred on the 15th June 2015 followed by an approved decommissioning programme on the 14th December 2017.

Prior to this, pipeline preparation was completed in May 2015 and the drilling P&A campaign commenced in April 2017 and completed in July 2018.

The following sections detail the Osprey decommissioning activities that have taken place.

2.1 Contracts Awarded

Table 2-1: Contracts Awarded

Transocean Limited were awarded the Osprey subsea well P&A contract, which included removal of the wellheads, Xmas trees and flowbases.

Rever Offshore UK Limited were awarded the full Engineering, Procurement, Removal and Disposal (EPRD) contract for subsea decommissioning.

Rever's main subcontractors were:

Benthic Inc, an Acteon company, for Environmental Sampling and Analysis

Van Oord nv for Rock Installation

Veolia Environmental Services (UK) plc for Waste Management

2.2 Platform Operations

Table 2-2: Platform Decommissioning

Platform operations for subsea have been completed under the Make Safe and Handover operations for the Dunlin Alpha platform.



2.3 Subsea P&A

Table 2-3: Well Decommissioning			
Subsea Wells	Designation	Status	Category of Well
211/23-P12Z (OU-P1S4)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P8Y (OU-P2S4)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P4Z (OU-P3S1)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P5Z (OU-P4S1)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P13 (OU-P5S3)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P6 (OU-P6)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P7 (OU-P7)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-P11 (OU-P8)	Oil Producer	Fully Abandoned	SS 0-0-0
211/23-W1Z (OU-W1S1)	Water Injector	Fully Abandoned	SS 0-0-0
211/23-W2Y (OU-W2S2)	Water Injector	Fully Abandoned	SS 0-0-0
211/23-W3 (OU-W3)	Water Injector	Fully Abandoned	SS 0-0-0
211/23-W4Z (OU-W4S1)	Water Injector	Fully Abandoned	SS 0-0-0

The following End of Job Reports (EOJR) were produced for each well:

- Osprey OU-P1S4 (211/23-P12Z) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP1-DWO-EOJR-00001)
- Osprey OU-P2S4 (211/23-P8Y) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP2-DWO-EOJR-00001)
- Osprey OU-P3S1 (211/23-P4Z) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP3-DWO-EOJR-00001)
- Osprey OU-P4S1 (211/23-P5Z) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP4-DWO-EOJR-00001)
- Osprey OU-P5S3 (211/23-P13) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP5-DWO-EOJR-00001)
- Osprey OU-P6 (211/23-P6) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP6-DWO-EOJR-00001)
- Osprey OU-P8 (211/23-P11) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUP8-DWO-EOJR-00001)
- Osprey OU-W1S1 (211/23-W1Z) Abandonment Phases 1 to 3 (AB3)
(FBL-WAOUW1-DWO-EOJR-00001)
- Osprey OU-W3 (211/23-W3) Abandonment Phases 1-3
(FBL-WAOUW3-DWO-EOJR-00001)



- Osprey OU-W4S1 (211/23-WAZ) Abandonment Phases 1-3 (FBL-WAOUW4-DWO-EOJR-00001)
- Osprey OU-W2S2 (211/23-W2Y) Abandonment Phases 1 to 3 (AB3) (FBL-WAOUW2-DWO-EOJR-00001)
- Osprey OU-P7 (211/23-P7) Abandonment Phases 1 to 3 (AB3) (FBL-WAOUP7-DWO-EOJR-00001)

2.4 Subsea Installations

Table 2-4: Subsea Installations			
Description	Planned status (Estimated quantity)	Total removed (Actual)	Total left <i>in situ</i>
Osprey Production Interim Manifold	Removal (1 off)	1	0
Production Block Linear Manifold	Removal (1 off)	1 (in 2013)	0
Water Injection Linear Block Manifold	Removal (1 off)	1	0
Towhead 3 Protection Structure	Removal (1 off)	1 (Sept 2018)	0
Towhead 7 Protection Structure	Removal (1 off)	1 (Sept 2018)	0
Water Injection Protection Structure	Removal (1 off)	1	0
Production Protection Structure	Removal (1 off)	1	0
Dummy Wellheads	Removal (2 off)	2	0

2.5 Pipelines / Umbilicals & Jumpers

Table 2-5: Pipelines / Umbilicals & Jumpers			
PL number	Description	Agreed Decom Solution	Status
PL735A	Osprey water injection riser	Partial Removal	Partially Removed
PL735A	Osprey water injection pipeline	Removal	Removed
PL735A	Osprey water injection pipeline	Removal	Removed
PL746	W1 flexible jumper	Removal	Removed
PL747	W2 flexible jumper	Removal	Removed
PL748	W3 flexible jumper	Removal	Removed
PL749	W4 flexible jumper	Removal	Removed
PL735	Water Injection Line – South Bundle	Partial Removal	Partially Removed
PL735	Osprey water injection jumper	Removal	Removed
PL735	Water Injection Line – North Bundle	Partial Removal	Partially Removed
PL735	Osprey water injection jumper	Removal	Removed
PL738	P1 production jumper	Removal	Removed
PL739	P2 production jumper	Removal	Removed



Table 2-5: Pipelines / Umbilicals & Jumpers			
PL number	Description	Agreed Decom Solution	Status
PL740	P3 production jumper	Removal	Removed
PL741	P4 production jumper	Removal	Removed
PL742	P5 production jumper	Removal	Removed
PL743	P6 production jumper	Removal	Removed
PL744	P7 production jumper	Removal	Removed
PL745	P8 production jumper	Removal	Removed
PL734	Osprey production pipeline tie-in	Removal	Removed
PL733	Production Line – North Bundle	Partial Removal	Partially Removed
PL734	Production Line – North Bundle	Partial Removal	Partially Removed
PL734	Osprey production pipeline tie-in	Removal	Removed
PL733	Osprey production pipeline tie-in	Removal	Removed
PL733	Production Line – South Bundle	Partial Removal	Partially Removed
PL734	Production Line – South Bundle	Partial Removal	Partially Removed
PL734	Osprey production riser	Partial Removal	Partially Removed
PL734	Osprey production topside pipework	Partial Removal	Partially Removed
PL733	Osprey production riser	Partial Removal	Partially Removed
PL733	Osprey production topside pipework	Partial Removal	Partially Removed
PL736A	Osprey umbilical riser - repair	Partial Removal	Partially Removed
PL736	Osprey umbilical	Partial Removal	Partially Removed
PL736	Osprey umbilical - north repair	Removal	Removed
PLU4263	Osprey umbilical – North Bundle	Partial Removal	Partially Removed
PL1545	Osprey control umbilical	Partial Removal	Partially Removed
PL754	P1 TSCJ	Removal	Removed
PL755	P2 TSCJ	Removal	Removed
PL756	P3 TSCJ	Removal	Removed
(previously PL756) PWA 4/W/90	P3 TSCJ (hydraulic / chemical)	Removal	Removed
PL757	P4 TSCJ	Removal	Removed
PL758	P5 TSCJ	Removal	Removed
(previously PL758) PWA 4/W/90	P5 TSCJ (hydraulic / chemical)	Removal	Removed
PL759	P6 TSCJ	Removal	Removed
PL760	P7 TSCJ	Removal	Removed
PL761	P8 TSCJ/IVHJ	Removal	Removed
PL737	IM MVHJ	Removal	Removed



Table 2-5: Pipelines / Umbilicals & Jumpers			
PL number	Description	Agreed Decom Solution	Status
PL3001JWP1	P1 IVHJ	Removal	Removed
PL3001JWP2	P2 IVHJ	Removal	Removed
PL3001JWP3	P3 IVHJ	Removal	Removed
PLU4335	P3 IVHJ (out of service)	Removal	Removed
PL3001JWP4	P4 IVHJ	Removal	Removed
PL3001JWP4A	P4 IVHJ (out of service)	Removal	Removed
PL3001JWP5	P5 IVHJ	Removal	Removed
PLU4336	P5 IVHJ (out of service)	Removal	Removed
PL3001JWP6	P6 IVHJ	Removal	Removed
PL3001JWP7	P7 IVHJ	Removal	Removed
PL3960 - PL3966	W1 TSCJ	Removal	Removed
PL3967 - PL3973	W2 TSCJ	Removal	Removed
PL3974 - PL3980	W3 TSCJ	Removal	Removed
PL3981 - PL3987	W4 TSCJ	Removal	Removed
PL2837	P7 hose	Removal	Removed
PL4337	P8 hose	Removal	Removed
PL750 PL751 PL752 PL753	Not installed	N/A	N/A

There are no 3rd party crossings.



2.6 Pipeline Stabilisation Features

Deposit removal was conducted over the 2018 – 2019 period using diving and ROV techniques.

Table 2-6: Pipeline Stabilisation Features		
Description	Agreed Decom Solution	Status
Concrete Mattresses	Removal (estimated 266 off)	The amount removed by Fairfield was 343. All visible mats have been removed.
Grout Bags	Removal (estimated 280 off)	The amount of sand/grout bags removed by Fairfield was 8,537, noting that sand/grout bags are indistinguishable from one another upon retrieval. All visible sand/grout bags have been removed.
Sand Bags	Removal (estimated 5,295 off)	

All deposits removed during decommissioning were returned to shore for re-use or disposal.

Marine licence ML/378 was varied throughout the decommissioning campaigns to account for inventory changes discovered during the operations.

2.7 Drill Cuttings

Table 2-7: Drill Cuttings		
Pre-Decommissioning Description	Agreed Decom Solution	Status
The Osprey production well cuttings cover an area of 5,834 m ² and has a volume of 2,130 m ³ . The average depth of cover is 0.60 m and maximum depth of cover is 1.47 m. Cuttings coverage is small, thin and widely dispersed and falls below both of OSPAR 2006/5 thresholds.	Leave in place to degrade naturally	Left in place to degrade naturally
The Osprey water injection well cuttings cover an area of 3,092 m ² and has a volume of 922 m ³ . The average depth of cover is 0.59 m and maximum depth of cover is 2.40 m. Cuttings coverage is small, thin and widely dispersed and falls below both of OSPAR 2006/5 thresholds.		

See ROUK-SC-321-K12-0003_1926 for further Cuttings Information



2.8 Results of Post Decommissioning & Environmental Surveys

Table 2-8: Post Decommissioning & Environmental Surveys Summary

A Post-decommissioning environmental survey and geotechnical, habitat and Cuttings Pile (CP) assessments were conducted around the Dunlin cluster fields. Environmental operations were carried out by Benthic Solutions Limited (BSL) aboard the Diving Support Vessels Rever Sapphire and Normand Clipper from July to September 2019. The Osprey stations were sampled between the 9th September and 13th September 2019 aboard the Normand Clipper. A total of 24 stations were sampled around the Osprey Drill Centres and Osprey to Dunlin Alpha pipeline route. At each environmental station, four grab samples were acquired, one for physico-chemical and three for macrofaunal analysis.

Sediment was generally homogeneous within each section of the survey with cuttings piles dominated by fines; the 500 m zones having similar percentages of both sand and fines; and the pipeline corridor characterized as sandy in nature. Folk classifications ranged from 'mud' to 'slightly gravely muddy sand'. Samples within 100 m of the drill centres presented fines proportions suggesting an influence from drilling activities. Particle size analysis (PSA) revealed an increase in percentage of fines across the entire survey area since the pre-decommissioning survey, potentially caused by disturbance of the seabed during decommissioning activities.

Total hydrocarbon concentration (THC) levels were above the UKOOA 95th percentile for the Northern North Sea at most stations with gas chromatograms showing the presence of several signatures likely arising from historic drilling activities. Comparable hydrocarbon signatures were also seen in the 2016 pre-decommissioning survey data. Polyaromatic hydrocarbon (PAH) concentrations varied across the survey area with elevated levels at the cuttings piles, as observed during the previous 2016 survey, but with a lower peak concentration for the current survey. A majority of the cuttings pile stations showed concentrations above the background assessment concentration benchmark.

Concentrations of heavy metals were relatively low throughout the entire survey for all metals measured, with most concentrations falling below their corresponding background reference values. Exceptions were lead above the NOAA ERM threshold at four stations local to the drill centres and zinc above the CCME TEL threshold at one location near the WI drill centre and at the Dunlin Alpha end of the pipeline corridor which likely reflects contamination around Dunlin Alpha.

Both species richness and abundance showed the influence of drilling related activity with a reduced species diversity and an increase in the abundance of opportunistic species. Species sensitive to disturbance were found in high abundances along the pipeline route and those sample stations which reflected background North Sea conditions. Significant correlations between the macrofaunal data and physico-chemical parameters all further corroborated the impact of drilling related activity on the macrofaunal communities.

Both cuttings piles fall within the "small cuttings pile" classification of the OLF guidelines (<5,000 m³). The physical extent of the pile surrounding the water injection site (6,800 m² / 1,715 m³) indicated little modification had occurred since the pre-decommissioning survey. A larger pile (11,140 m² / 4,025 m³) was present at the production site. A smaller pile (5,834 m² / 2,130 m³) was recorded in the pre-decommissioning survey due to the exclusion of the elevated seabed at the eastern and northern peripheries. To more accurately quantify any disturbance to this pile, the estimated pre-decommissioning pile extent was utilised to calculate the post-decommissioning pile volume. Results revealed a slightly higher pile volume (2,358 m³) indicating some modifications had occurred, leading to an increase in THC across the production pile surface.



Table 2-8: Post Decommissioning & Environmental Surveys Summary

The footprint of the two piles (where THC was above the OSPAR 50 ppm threshold) exceeded the physical pile boundaries but was constrained to sediment within 200m, covering a surface area of approximately 0.36 km² with a persistence of 25.5 km².yr. Results indicated the footprint and persistence of the piles had reduced from the pre-decommissioning survey (area: 0.41 km²; persistence: 29.1 km².yr) with both sets of data falling well below the OSPAR threshold (500 km².yr).

On average, THC had increased across the comparable stations between the pre and post decommissioning surveys, indicating there may have been an input or movement of hydrocarbon material during decommissioning activities. Permeation of hydrocarbons from the pile surface to deeper core layers was also evident within both piles with all core sub-layers recording THC levels above 50 ppm.

Moderate levels of organic enrichment were evident at the surface of the Osprey piles with higher levels of TOC when compared to the natural sediment sampled within core sub-layers and at stations further afield. Gas chromatography indicated the presence of several types of drilling fluids having been utilised during the long development period of the Osprey site (1991-2009) and included low toxicity, olefin and polyalphaolefin constituents. Overall, the concentrations of PAHs had decreased by an average of 62% from the levels described in the pre-decommissioning survey but had remained above the NOAA ERL and US EPA TRV levels at five sample stations.

The concentrations of PCBs, organotins and APEs were found at most locations to be below laboratory Levels of Detection, reflecting the low levels of contamination within the piles. The Osprey piles displayed heavy and trace metal contamination typical of North Sea cuttings piles with most metals showing results above the background reference levels in both the pre and post decommissioning surveys. Overall, the environmental data was typical of North Sea cuttings piles and, while there was evidence of potential inputs or movement of hydrocarbons and certain heavy metals during decommissioning activity, the physical and chemical extent of both piles remained within the OSPAR and OLF guidelines.

The following reports were produced as part of the final subsea close out documentation:

- Osprey Subsea Assets Site Clearance Summary
(DUN-SSP-01-RPT-0003)
- Osprey In Situ Subsea Assets, Post Decommissioning Status
(FBL-DUN-OSP-SSP-01-RPT-00004)
- Subsea Inventory, Post Decommissioning - Pipelines, Umbilicals & Structures
(FBL-DUN-DAOM-SSP-01-RPT-00008)
- Merlin, Osprey and Dunlin Post Decommissioning Survey Report - Habitat Assessment Report
(ROUK-SC-321-K12-0001)
- Environmental Monitoring and Cuttings Pile Assessment Report – Osprey
(ROUK-SC-321-K12-0003)
- NBUND1 - (PL733, PL734 & PL735) Alignment Chart
(UK1077-SVY-DA-NBUND1-001)
- NBUND2 - (PL735 & PLU4263) Alignment Chart
(UK1077-SVY-DA-NBUND2-001)
- SBUND - (PL733, PL734 & PL735) Alignment Chart
(UK1077-SVY-DA-SBUND-001)



- PL736 (DA - OSP) Alignment Chart (UK1077-SVY-DA-PL736-001)
- PL1545 (DA - OSP) Alignment Chart (UK1077-SVY-DA-PL1545-001)

Deviations/Dispensations

One deviation to the decommissioning programme, in relation to overtrawling of the installation site, was sought and approved:

- Fairfield and its main clearance contractor, Rever Offshore, engaged with the Scottish Fisherman's Federation (SFF) on the 8th August 2019, to undertake overtrawl activities of the Osprey 500mZ and provide a 'Clear Seabed Certificate'.
- During the engagement the SFF was advised that the Osprey 500mZ contained a small volume of drill cuttings, located around the previous well positions. Under the decommissioning programme drill cuttings were to remain undisturbed and allowed to decay naturally.
- In an email on the 26th August 2019 from the SFF to Rever Offshore, the SFF advised that they would not be able to issue a 'Clear Seabed Certificate':

"With regard to issuing a clear (clean) seabed certificate, as things stand, we can only do this for an entire 500 metre Safety Zone (i.e. for a statutory 500 metre area of seabed that was a 'no go' area for fishermen when the oil field was in operation, and for which the fishing industry hopes is deemed safe for normal fishing activities to resume on completion of decommissioning). If there are localities within the aforementioned zone that remain a 'no go' area to fishermen, then unfortunately we cannot issue a clear/clean seabed certificate for that particular 500 metre Safety Zone."

Based on the response of the SFF, Fairfield engaged with OPRED to seek a deviation from the approved decommissioning programme. The requested deviation was to allow geophysical and ROV survey evidence in lieu of an overtrawl to demonstrate a clear seabed. The acceptance to deviate from the approved decommissioning programme was received on the 28th August 2019, in an email from OPRED to Fairfield's Regulatory Affairs & Stakeholder Engagement Manager.

2.9 Key Milestones

Jun 2015	COP from the Osprey Field and pipeline preparation for flushing undertaken
Apr 2017	Mobilisation of TRO 712 to undertake plug and abandon (P&A) operations
Jul 2017	Flushing of subsea umbilicals completed
Dec 2017	Osprey Infrastructure and Pipelines DP approved by OPRED
Jan 2018	Contract awarded to Bibby Offshore (now Rever Offshore) for the engineering, preparation, removal and disposal of subsea infrastructure from the Osprey, Merlin and Dunlin fields.
Jul 2018	Completion of Osprey field P&A activities
Aug 2018	Commencement of subsea decommissioning activities
May 2019	Completion of flowline and umbilical recovery operations
Jul 2019	Completion of structure & deposit recovery operations and completion of post decommissioning survey operations
Sep 2019	Completion of environmental surveys and debris recovery and completion of remedial rock cover operations



2.10 Stakeholder Engagement

Table 2-10: Stakeholder Engagement Summary

1. Engaged with SEPA on 12th January 2018 to discuss waste management requirements, which were incorporated in the project waste management plan.
2. Regulatory project execution progress reports (FFL-DUN-OSP-HSE-01-RPT-00003) post approval of the Decommissioning Programme were issued to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) for reporting periods Q1-18 (rev A1), Q2-18 (rev A2), Q3-18 (rev A3), Q4-18 (rev A4), Q1-19 (rev A5), Q2-19 (rev A6), Q3-19 (rev A7) and Q4-19 (rev A8). Execution work was completed in Q4-19.
3. Engaged with SFF in relation to Deviations/Dispensations for overtrawling of the installation site, this was sought and approved, see section 2.8 for further details.
4. Contribution to the UK Fisheries Offshore Oil and Gas Legacy Trust Fund Limited (FLTC) made in respect of the Osprey bundles.

3 Impact on the Environment

3.1 Activities

There were no significant environmental impacts resulting from the Osprey infrastructure activities.

Temporary impacts on the marine environment would have resulted from seabed / drill cuttings disturbance associated with the recovery of infrastructure, concrete blocks, stabilisation materials and debris. Further details of the post-decommissioning environmental status can be found in:

- ROUK-SC-321-K12-0005 for Environmental Survey
- ROUK-SC-321-K12-0001_1926 for Habitat Assessment
- ROUK-SC-321-K12-0003_1926 for Cuttings Information

Marine licence ML/378 was varied throughout the decommissioning campaigns to account for inventory changes discovered during the operations.



3.2 Future Monitoring

The following monitoring plan is proposed for the infrastructure decommissioned *in situ*.

Table 3-1: Future Surveys and Monitoring Proposals	
1. Substructure (Jackets)	n/a
2. Pipelines, Flowlines & Umbilicals	<p>In accordance with the approved Decommissioning Programme, the infrastructure remaining <i>in situ</i> is effectively limited to umbilical PL736 (trenched and buried); umbilical PL1545 (trenched with spot rock cover); and the bundles containing PL733, PL734, PL735 and PLU4263 (surface laid).</p> <p><u>Trenched</u></p> <p>The Osprey pipeline corridors are well known since their development in the 1990's and pipeline surveys have been undertaken periodically to monitor the status of the installed infrastructure. The most recent surveys in this series were conducted in 2009, 2012 and 2016. Data from each of these surveys confirm a stable seabed environment with consistent and acceptable depth of lowering and/or depth of cover on the two trenched umbilicals that have been partially decommissioned <i>in situ</i> (PL736 and PL1545). Details of lowering and cover from these historic reports can be provided upon request.</p> <p>Post decommissioning survey has re-confirmed that PL736 and PL1545 have sufficient depth of lowering and/or depth of cover to prevent interactions with other users of the sea. Natural backfill of PL1545 is expected to continue. Due to the low seabed mobility, this infrastructure is considered stable and unlikely to become exposed such that it could interact with other users of the sea in future. Fairfield proposes that one further condition survey be undertaken to confirm that no exposures, spans or interactions have materialised. Fairfield believes the interval for this follow-up survey should be in the order of five years. If evidence of anomalies are subsequently found, any necessary remedial action would be undertaken and the survey results used to inform both the owners and the regulator on whether an additional future survey was warranted.</p> <p><u>Surface Laid</u></p> <p>Jumpers, towheads and appurtenances have been removed from the Osprey bundles and remedial rock cover placed at exposed ends and any areas of spanning. Post decommissioning survey has also confirmed that remaining wall thicknesses on the bundles are sufficient for both trawler board impact and sectional cut and recovery. Fairfield proposes to periodically review the bundles with a view to selecting a permanent option in the future (e.g. full removal or full rock placement), dependent on technology advances and an associated step change in safety (relative to the other options). Technological advances will be monitored and reported via the Osprey Field Bundle Annual Assessment Report with any permanent solution discussed and agreed with regulators. In support of this assessment, Fairfield proposes to undertake the next condition survey at an interval of five years with the survey results used to inform both the owners and regulators on the need for future surveys.</p>
3. Pipeline Stabilisation Features	<p>In accordance with the approved Decommissioning Programme, all as-found stabilisation features (concrete mattresses, grout bags and sand bags) were removed. Please see section 2.6 for further details. No ongoing monitoring is required.</p>



Table 3-1: Future Surveys and Monitoring Proposals

4. Drill Cuttings
<p>Post decommissioning survey of the cuttings piles has demonstrated limited impact from the completed decommissioning activities. In general, the piles have low and reducing hydrocarbon persistence although THC has increased across the comparable stations between the pre and post decommissioning surveys, indicating there may have been movement of hydrocarbon material during decommissioning activities. The physical and chemical extent of the piles falls within OSPAR and OLF guidelines and the data suggests a general decline in the chemical components of the piles when compared to the pre-decommissioning survey. It is the opinion of Fairfield that further survey and assessment of the cutting piles is unwarranted.</p>
5. Environmental Surveys
<p>As described above, the post-decommissioning environmental survey confirmed areas of muddy sand with little variation or features, albeit with higher fines evident at the cutting piles from past drilling activity. Results were moderate for organics and low for aromatics and heavy metals across the area of interest and generally consistent with pre-decommissioning survey data. While the impact of drilling is evident on species diversity at the drill sites, improved species richness and abundance is evident along the pipeline route, suggesting that the macrofaunal community is showing signs of recovery. Given the results of the pre and post-decommissioning surveys being broadly similar and showing signs of recovery, the need for future remedial action seems most unlikely. Based on the above, it is the opinion of Fairfield that further environmental survey is not warranted.</p>



4 Impact on HS&E

4.1 Details of any Incidents / Accidents during Project Execution

RIDDOR reportable injuries and dangerous occurrences, and reportable releases to sea (PON1):

12/02/2018	PON10	P&A MODU T712	Foghorn failed to meet performance standard of 2 nautical miles, as required under Consent to Locate.
05/03/2018	PON1	P&A MODU T712	Estimated 50 kg of glycol/water mix (Koomey fluid) lost due to a leak at the Upper Outer kill failsafe
18/09/2018	PON1 Reported by Bibby	DSV Bibby Sapphire	Estimated 1.1 kg of oil lost when removing blind flange from PL738 to allow flushing equipment installation.
11/04/2019	Dangerous Occurrence	Rever Polaris	COBRA Backpack leak discovered during routine maintenance. Rever had an issue with a PRV on one set and increased surveillance on all other units on the Polaris and across their fleet.
27/04/2019	PON1	Dunlin Platform Infrastructure Removal	During recovery of mattresses from the Osprey bundle, within the Dunlin 500 m zone, small sheens were observed at surface.

See UK1077-HSE-RPT-001 for further information on safety performance.



5 Waste

Fairfield have had ongoing engagement with SEPA who have provided positive feedback on the project waste management strategy (FBL-DUN-HSE-STR-00003). The waste management strategy is a key document for informing the production of an Active Waste Management Strategy to ensure compliance with the Waste Framework Directive.

Waste returned to shore during the decommissioning of the Osprey field is detailed below, noting that well P&A waste 3 m below the mudline and lower is not included in the decommissioning programme waste. The tubulars from 3 m below the mudline and above, wellhead, Xmas tree, flowbase and surface laid equipment is included.

Table 5-1: Waste Returned to Shore	
Infrastructure	Weight Returned (t)
Ferrous Metal - <i>Steel all grades</i>	1343 (Subsea)
Non-ferrous Metal - <i>Non-ferrous (copper; aluminium; zinc; indium)</i>	731 (XMTs)
Concrete - <i>Aggregates (mattresses; grout bags; sand bags)</i>	1360
Plastics - <i>Rubbers; Polymers</i>	6 tonnes included in the metallic inventory
Hazardous - <i>Asbestos containing materials, Residual Fluids (hydrocarbons; chemicals; control fluid)</i>	1
Hazardous - <i>NORM Scale</i>	Trace
Other- Debris	104
Total	3,539

It should be noted that the SID (Merlin, Osprey and DFGI/DPI) field decommissioning was completed as a joint campaign to optimise recovery efficiency. The weights recorded above are wet weights as per the materials allocation per field. Due to the proximity of fields some of the material has been combined, leading to over/under allocation per field, however on balance the SID returns are greater than forecast.

All subsea related items were discharged at Greenhead Base, Gremista, Lerwick, all surface P&A related items were discharged at Peterhead for processing. All weight figures are approximate.

For further information see VEOLIA-ROUK-RE-0001-I03 for waste figures.

All recovered infrastructure materials were returned to shore and recycled utilising Fairfield contracted, appropriately licenced, waste management and recycling contractors.

6 Lessons Learned

No significant industry learnings to report. Project was delivered as expected.



7 Cost Summary

Project cost data has been forwarded to OPRED and the OGA separately.



8 Photographs

Combined Osprey, Merlin and DFGI/DPI Decommissioning Album



Debris Recovery



Infield Jumpers and Flowlines Recovered



Normand Clipper Reverse Reeling 8" Water Injection Line, PL735A



Normand Clipper Reverse Reeling



Mattresses Recovered from Osprey, Merlin and Dunlin



Wire Debris & Fishing Debris Recovered



Waste Preparation & Separation



Mixed Sand / Grout / Mattress Deposits Recovered for Landfill
(Note flexible hose and umbilical were not recovered by Fairfield)



Flexible Pipeline and Umbilicals Prepared for Transport to Recycling Facility



9 Appendices

