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## **DOCUMENT CONTROL**

### **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
Approved by	Peter Lee	<i>P. Lee</i>	18/01/2021

### **REVISION CONTROL**

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## Terms and Abbreviations

Term	Meaning
BEIS	Department of Business, Energy and Industrial Strategy
CGBS	Concrete Gravity Base Substructure
COP	Cessation of Production
CSV	Construction Support Vessel
DFGI	Dunlin Fuel Gas Import
DP	Decommissioning Programme
DPI	Dunlin Power Import
DSV	Diving Support Vessel
EPRD	Engineering, Preparation, Removal, Disposal
FBL	Fairfield Betula Limited
FEL	Fairfield Energy Limited
HS&E	Health, Safety and Environment
MER	Maximising Economic Recovery
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
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
ROGI	Report of an Oil and Gas Incident
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SID	Subsea Infrastructure Decommissioning
SSIV	Subsea Isolation Valve
THC	Total Hydrocarbon Content



## 1 Summary

### 1.1 Summary of Decommissioning Programme

The DFGI/DPI infrastructure Decommissioning Programme (FBL-DUN-DUNA-HSE-01-PLN-00002) was approved on the 14<sup>th</sup> 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.

A 4 inch Dunlin Fuel Gas Import (DFGI) pipeline was installed in 2012, allowing natural gas to be imported from the EnQuest Thistle Alpha platform for use as fuel gas for the Dunlin Alpha Water Injection primary movers.

In addition, a 5 inch Dunlin Power Import (DPI) cable runs subsea from the Shell operated Brent Charlie platform to the Dunlin Alpha platform and was used as a contingency source of power for the Dunlin Alpha platform.

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 9<sup>th</sup> July 2015, with Cessation of Production (COP) on 15<sup>th</sup> June 2015, confirmed by letter dated 15<sup>th</sup> January 2016.

Table 1-1: Overview of the Decommissioned Installation(s)		
Subsea Installation(s)	Quantity	
Wells	0	
Associated Cuttings Pile(s)	0	
SSIV Manifold & Riser Protection Structure (RPS)	2	
Stabilisation Features <sup>1</sup>	Estimated Quantity	Actual Removed <sup>2</sup>
Concrete Mattresses	82	83
Grout Bags	898 (698 to be removed) (200 to be removed by others)	880
Sand Bags	80 (to be removed by others)	0
Other (concrete arches)	2 (to be removed by others)	0

<sup>1</sup> 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.

<sup>2</sup> 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 Pipelines & Controls Umbilicals**

Item being Decommissioned	Components	Total length (km)	Total length removed (km)	Total length left <i>in situ</i> (km)
Pipelines/Spools/Jumpers	6	10.685	0.588	10.097 (0.186 is within the CGBS)
Control Umbilicals/Cables	2	22.463	1.624	20.839 (0.197 is within the Brent Charlie CGBS and 0.180 is within the Dunlin alpha CGBS.
<b>Total</b>	<b>8</b>	<b>33.148</b>	<b>2.212</b>	<b>30.936</b>

**Table 1-3: Summary of the Approved Decommissioning Options**

Selected Option	Reason for Selection	Approved Decommissioning Solution
<b>Subsea Installations</b>		
DFGI SSIV	Removal of all seabed structures to leave a clear seabed.	Full removal
Riser Protection Structure	Removal of all seabed structures to leave a clear seabed.	Full removal
<b>Pipelines, Flowlines and Umbilicals<sup>3</sup></b>		
Group 1a: deposits	Leaves clear seabed and meets regulations.	Full removal
Group 1b: structures	Leaves clear seabed and meets regulations.	Full removal
Group 2: buried structures and deposits	Comparatively assessed as preferred option. Leaves clear seabed and meets regulatory requirements.	Full removal
Group 3: rigid risers	Comparatively assessed as preferred option. The risers are contained within the Dunlin Alpha concrete gravity based structure.	Partial removal
Group 4: surface laid rigid spools	Leaves clear seabed and meets regulations	Full removal

<sup>3</sup> FBL-DUN-DUNA-SSP-01-RPT-00002 - Dunlin Subsea Assets (DPI & PL2852), Burial Status.



**Table 1-3: Summary of the Approved Decommissioning Options**

Selected Option	Reason for Selection	Approved Decommissioning Solution
Group 5: trenched and buried pipelines	Comparatively assessed as preferred option. The pipelines 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 6: rock covered surface laid rigid spools	Comparatively assessed as preferred option. Leaves clear seabed and meets regulatory requirements.	Full removal
Group 7: rock covered surface laid umbilicals	Comparatively assessed as preferred option. Leaves clear seabed and meets regulatory requirements.	Full removal
Group 8: riser cable (Dunlin Alpha)	Comparatively assessed as preferred option. The riser is contained within the Dunlin Alpha concrete gravity based structure.	Partial removal
Group 9: trenched and buried cable	Comparatively assessed as preferred option. The cable is 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 10: riser cable (third party infrastructure)	Comparatively assessed as preferred option. The riser is contained within the Brent Charlie concrete gravity based structure.	Partial removal

#### **7. Interdependencies (prior to decommissioning)**

DFGI (PL2852) crosses over both the Thistle Alpha to Dunlin Alpha export pipeline (PL13) and the Murchison to Dunlin Alpha export pipeline (now disconnected PL115), plus crosses over the DPI cable (PL4334).

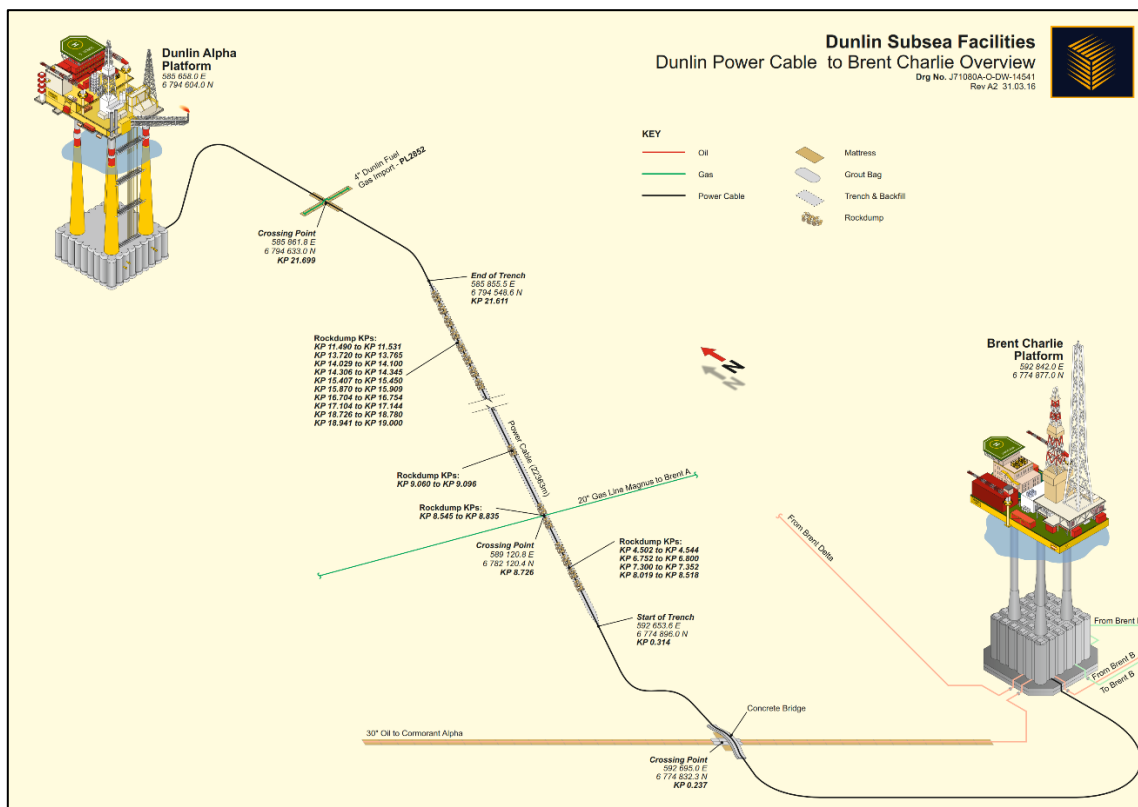
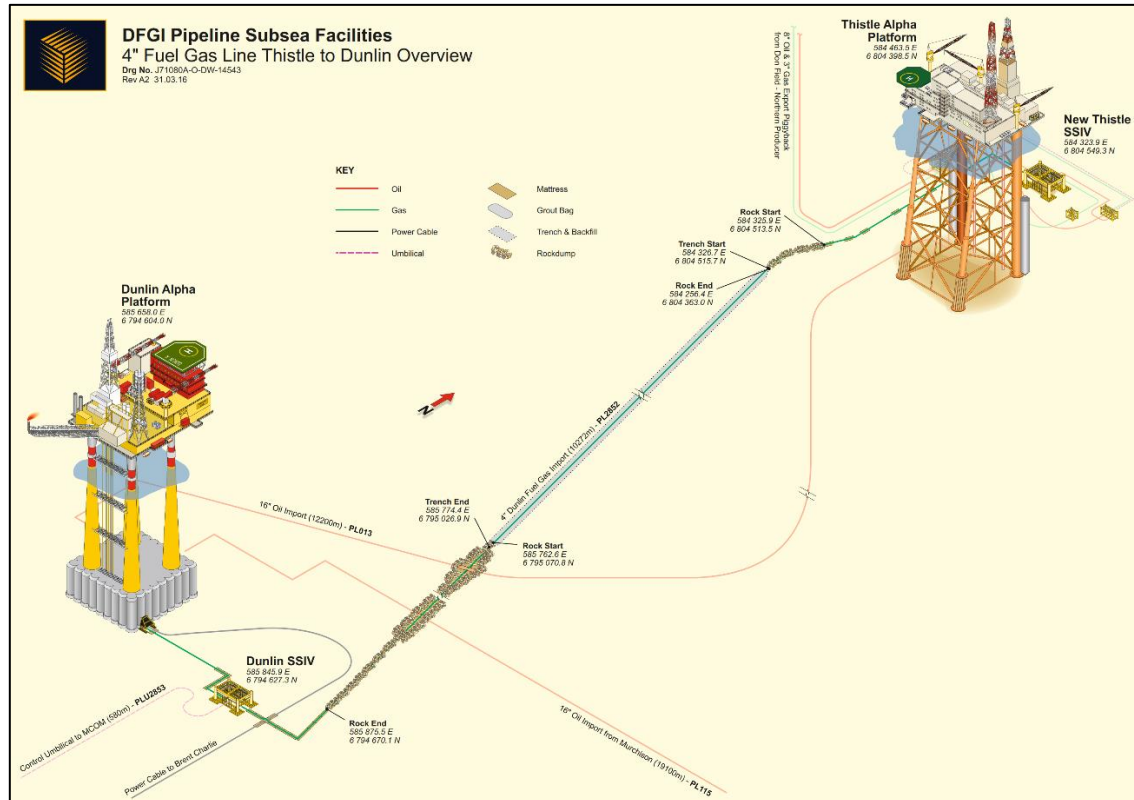
The umbilical (PLU2853) for the DFGI SSIV crosses the Dunlin Alpha to Cormorant Alpha export pipeline (PL5).

DPI (PL4334) passes under the DFGI pipeline (PL2852) and crosses over both Magnus to Brent Alpha 20" export pipeline (PL164) and Brent Charlie to Cormorant Alpha 30" export pipeline (PL1).



## 1.2 Schematic of Field Layout

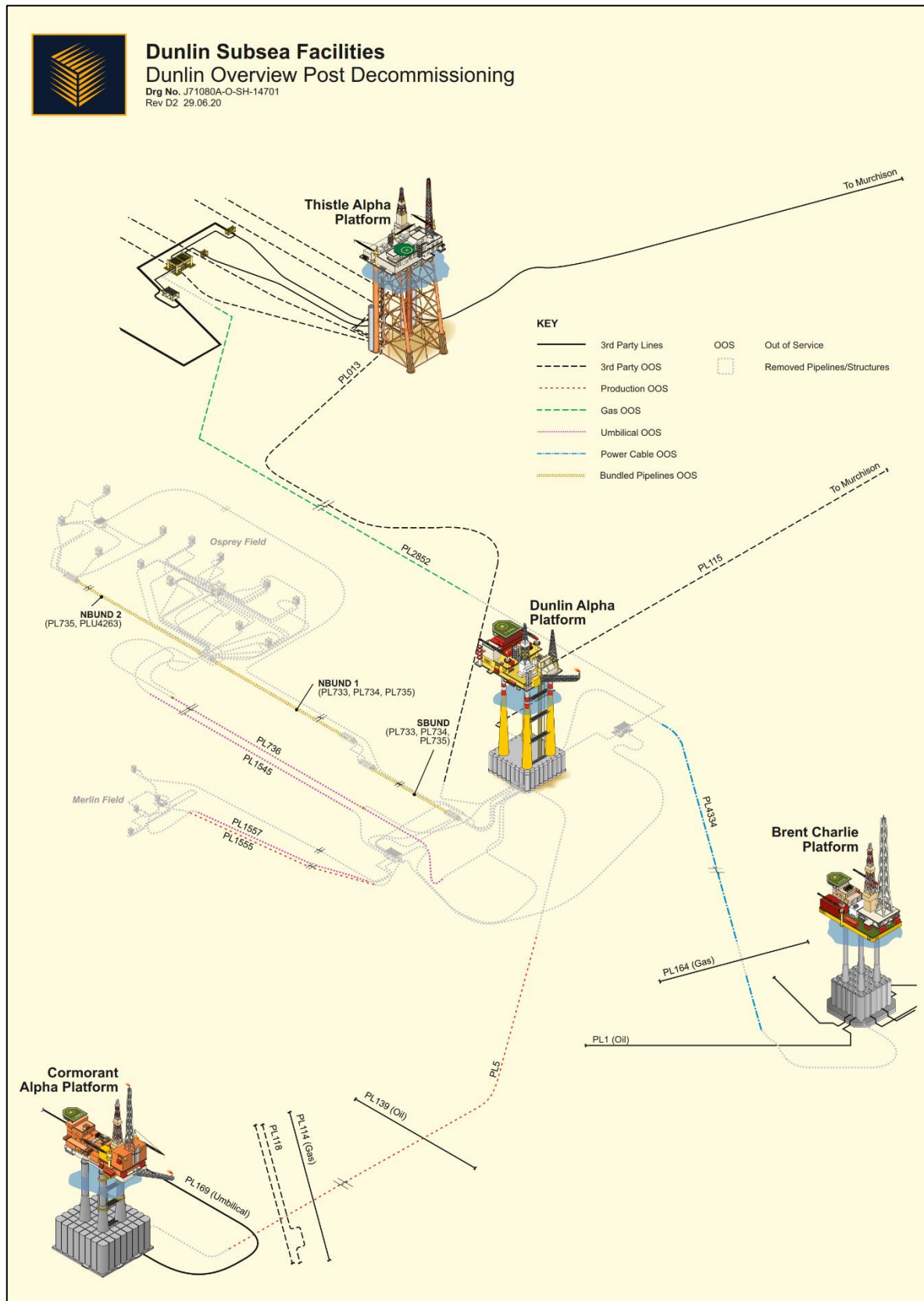
### 1.2.1 Operational





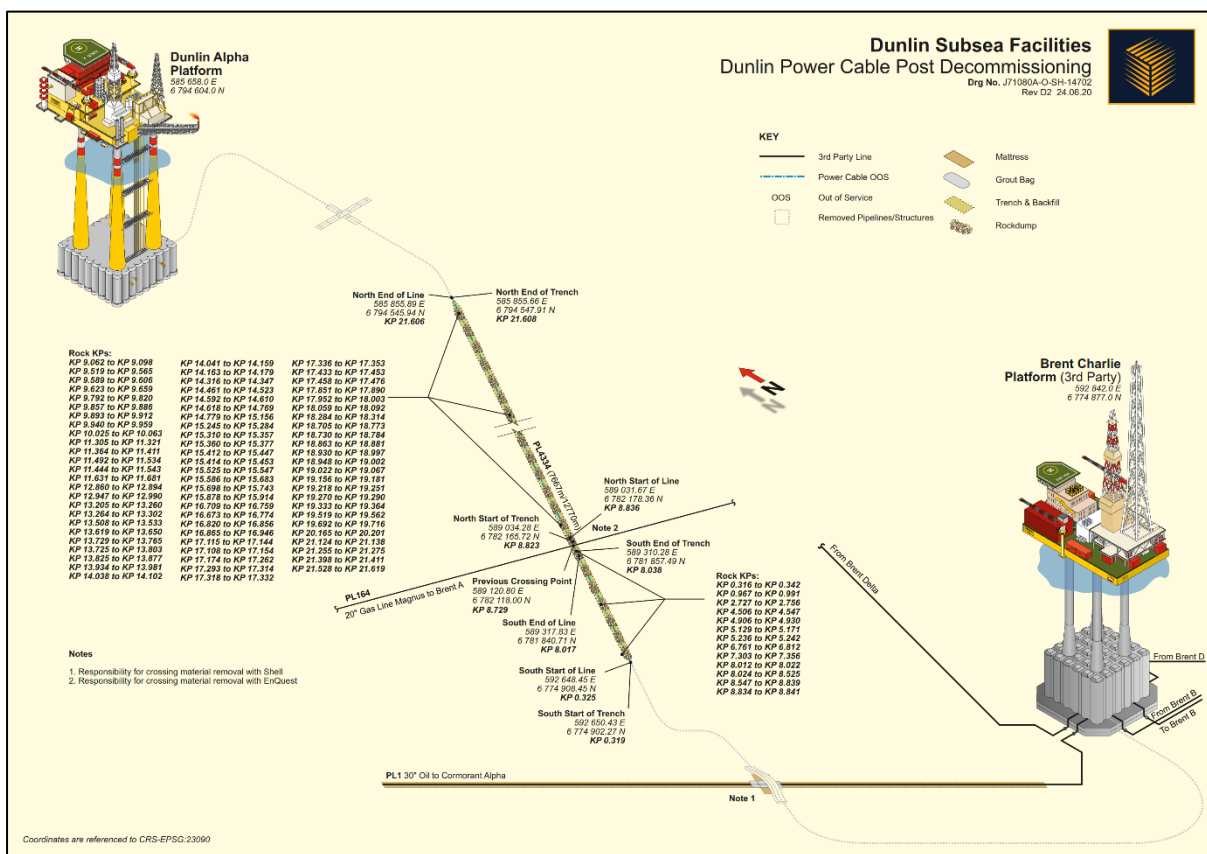
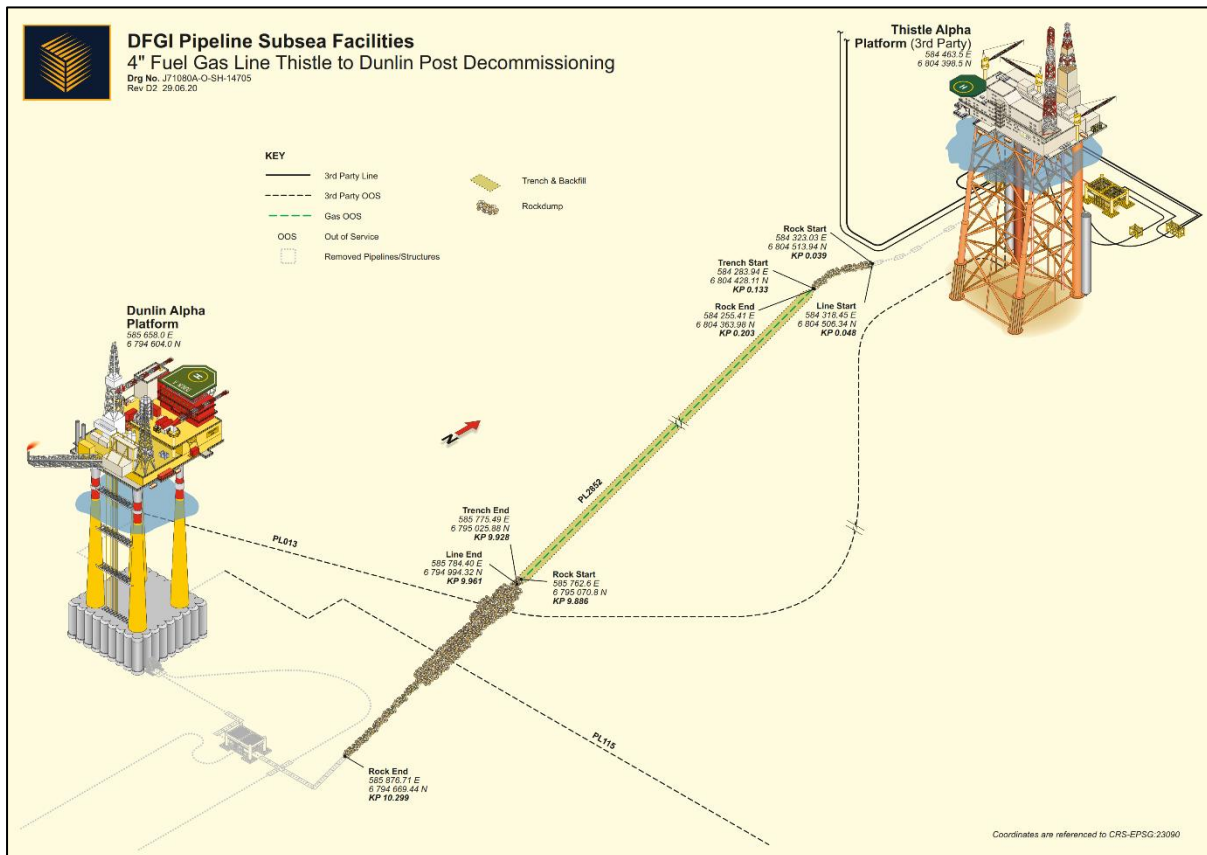


## 1.2.2 Post Decommissioning





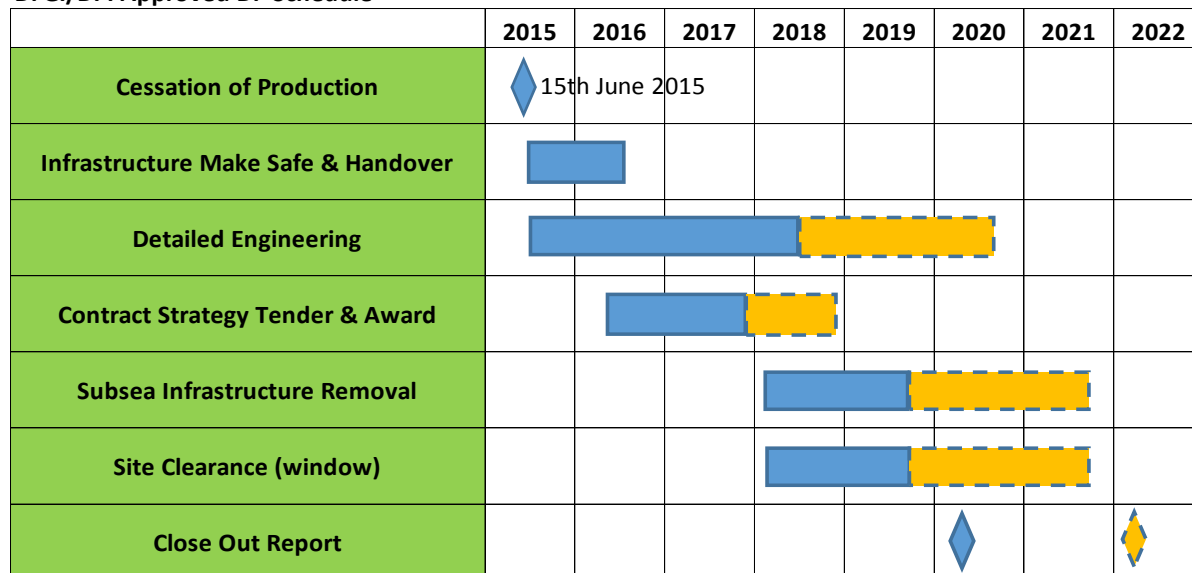
# Dunlin DFGI/DPI Pipelines & Structures Decommissioning Programme Regulatory Close Out Report





### 1.3 Project Delivery against Approved Schedule

DFGI/DPI Approved DP Schedule

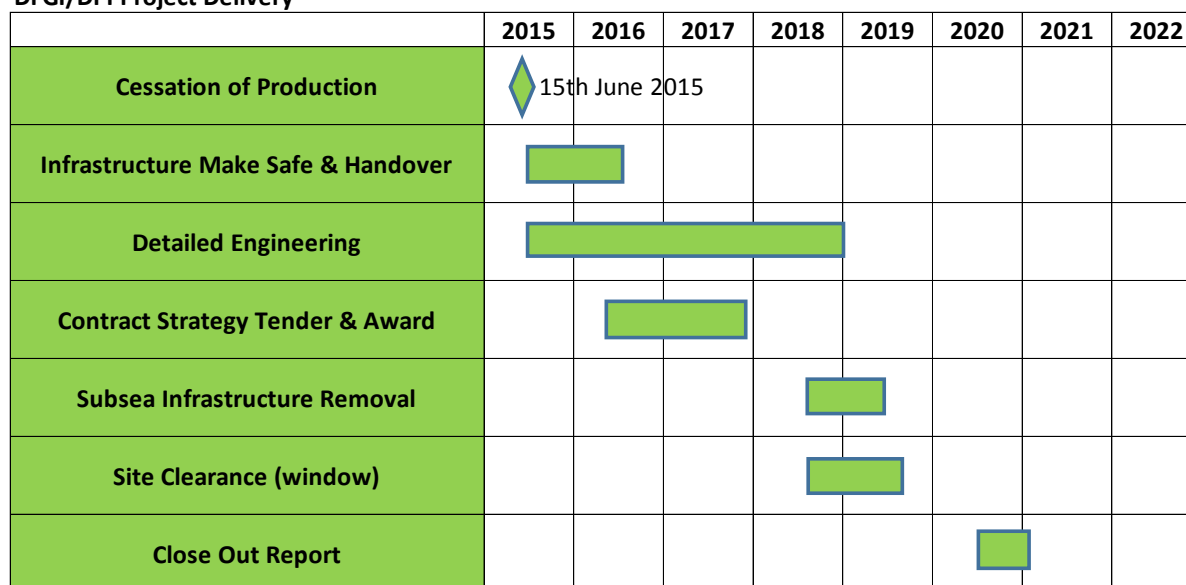


Earliest Potential Activity



Potential Activity Schedule Windows

DFGI/DPI Project Delivery



Actual (complete)



## 1.4 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	n/a
Topside Removal	This will be completed as part of the Approved Dunlin Alpha Topsides Decommissioning Programme
Subsea Installation Removal	Pipeline Application (PLA) permit PLA/535 (DFGI) & PLA/536 (DPI) (Approved 13/08/2018) Required for marine licences and /or oil/chemical discharge
Pipeline Preparatory Works	n/a
Pipeline Works Authorisation (PWA)	<b>DFGI/DPI</b> PWA 19/W/11 435/V/18, Approved 07/08/2018 Recovery of 1 off Umbilical & Modification of 2 off Pipelines and Cables to remain <i>in situ</i> Advised work Completed 01/11/2019

Supporting documents are:

1. DFGI/DPI Pipelines and Structures Decommissioning Programmes (DP4)  
(FBL-DUN-DUNA-HSE-01-PLN-00002 rev A9)
2. DFGI/DPI Comparative Assessment Report (FBL-DUN-DUNA-HSE-01-RPT-00002 rev A03)
3. DFGI/DPI Environmental Statement (XOD-DUN-HSE-RPT-00003 (Xodus) rev A05)
4. DFGI/DPI Cost Summary Report (confidential) (FBL-DUN-DUNA-HSE-01-RPT-00003 rev A1)

No amendments have been made since approval.



## 2 Decommissioning Activities

The DFGI/DPI infrastructure Cessation of Production (COP) occurred on the 15<sup>th</sup> June 2015 followed by an approved decommissioning programme on the 14<sup>th</sup> December 2017.

The following sections detail the DFGI/DPI decommissioning activities that have taken place.

### 2.1 Contracts Awarded

**Table 2-1: Contracts Awarded**

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
n/a	n/a	n/a	n/a

### 2.4 Subsea Installations

**Table 2-4: Subsea Installations**

Description	Planned status (Estimated quantity)	Total removed (Actual)	Total left <i>in situ</i>
Dunlin DFGI SSIV structure	Removal (1 off)	1	0
DFGI Riser Protection Structure (RPS)	Removal (1 off)	1	0
Other (concrete arches)	Leave <i>in situ</i> (2 off removed by others)	0	2



## 2.5 Pipelines / Umbilicals & Jumpers

Table 2-5: Pipelines / Umbilicals & Jumpers			
PL number	Description	Agreed Decom Solution	Status
PL2852	Thistle SSIV tie-in spool	Removal	Removed
PL2852	DFGI pipeline	Partial Removal	Partially Removed
PL2852	Dunlin SSIV tie-in spool	Removal	Removed
PL2852	DFGI SSIV <sup>4</sup>	Removal	Removed
PL2852	Dunlin riser dropdown tie-in spool	Removal	Removed
PL2852	Dropdown spool	Removal	Removed
PL2852	DFGI riser	Leave <i>in situ</i>	<i>In situ</i>
PLU2853	DFGI SSIV control umbilical	Removal	Removed
PL4334	DPI cable	Partial Removal	Partially Removed

The Thistle Alpha export pipeline to Dunlin Alpha (PL13) and Murchison export pipeline to Dunlin Alpha (PL115) have been disconnected from Dunlin Alpha. The DPI cable (PL4334) crossed section has been removed and DFGI pipeline (PL2852) has also been cut back to such an extent that it no longer crosses any lines.

The DFGI SSIV Umbilical (PLU 2853) has been removed and therefore has no associated crossings.

The DPI cable (PL4334) no longer has any crossings. PL2852 has been removed in this area and the cable over the Magnus 20" export pipeline to Brent Alpha (PL164) and Brent Charlie 30" export pipeline to Cormorant Alpha (PL1) has been removed.

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<sup>4</sup> DFGI SSIV is also listed as a structure in section 2.4 above and Table 2-2 of the Decommissioning Programme



## 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 82 off)	The amount removed by Fairfield was 83. All visible mats have been removed.
Grout Bags	Removal (estimated 898 off, 698 off by Fairfield and 200 off by others)	The amount removed by Fairfield under the approved DFGI/DPI DP was 880. 200 grout bags remain and these will be removed by others under separate DP's.
Sand Bags	Leave <i>in situ</i> (estimated 80 off)	80 sand bags remain and these will be removed by others under separate DP's.

All deposits identified during decommissioning, not subject to alternative decommissioning programmes, were removed and returned to shore for re-use or disposal.

Marine licences ML/375 and ML/376 were varied throughout the decommissioning campaigns to account for inventory changes discovered during the operations.

Under the approved decommissioning programme both the buried and exposed deposits were to be removed and returned to shore for disposal. In addition, the approved decommissioning programme made an allowance that the crossing materials associated with PL4334 over PL1 and PL164 would be the subject of separate decommissioning programmes, with the responsibility for removal to be agreed with the 3<sup>rd</sup> party infrastructure owners.

Shell U.K. are responsible for the crossing materials associated with PL1 and EnQuest are responsible for the crossing materials associated with PL164.

Commercial and contractual arrangements were made with Shell U.K. and EnQuest for the submission of suitable decommissioning programmes and to decommission the crossing materials in accordance with those programmes.

## 2.7 Drill Cuttings

Table 2-7: Drill Cuttings		
Description	Agreed Decom Solution	Status
n/a	n/a	n/a





## 2.8 Results of Post Decommissioning & Environmental Surveys

**Table 2-8: Post Decommissioning & Environmental Surveys Summary**

Post decommissioning site surveys were undertaken within the subsea installation 500 m safety zones and along the pipeline corridors to a distance of 100 m either side of the lines. Debris identified during the survey was investigated and oilfield related debris and items that posed a significant risk to other users of the sea were removed and returned to shore for disposal. Multi beam echo sounder, side scan sonar and visual survey methods were employed to verify a clear seabed. In addition, post decommissioning pipeline surveys were undertaken utilising the same survey techniques but with the addition of sub bottom imaging and pipe tracking to verify that the items remaining *in situ* fulfilled the requirements of the decommissioning programme.

A post-decommissioning environmental survey and habitat assessment was conducted along the Dunlin Power Import (DPI) and the Dunlin Fuel Gas Import (DFGI) route corridors. Environmental operations were carried out by Benthic Solutions Limited (BSL) aboard the DSV Rever Sapphire and Normand Clipper from July to September 2019.

### **Dunlin Power Import (DPI) Corridor**

A total of twelve environmental stations were sampled along the DPI corridor. Four grab samples were acquired at each location; one for physico-chemical and three for macrofaunal analysis. Sampling locations were selected in order to directly compare results with the pre-decommissioning environmental survey undertaken in 2016.

The sediment along the DPI route represented typical background sediment for the NNS, with most stations assigned to the category of 'muddy sand' or 'slightly gravelly muddy sand'. Granulometry data collected during the DPI pre-decommissioning survey in 2016 recorded a larger mean particle size compared to the 2019 survey, reflecting an increase in sedimentary fines. Total Organic Carbon (TOC), Total Organic Matter (TOM), and moisture content of the seabed along the DPI route was also homogeneous and representative of typical background conditions for the northern North Sea (NNS).

Hydrocarbon results at a total of eight stations were observed to exceed the UKOOA 95<sup>th</sup> percentile for the NNS (20.3mg.kg<sup>-1</sup>), however levels at all stations were considerably below the OSPAR 50 ppm threshold. As would be expected, higher total hydrocarbon concentrations (THC) were recorded at stations closest to the Dunlin Alpha and Brent Charlie installations when compared to samples from across the mid-section of the DPI route. This is most likely relating to the dispersion of some contaminants from the two platforms.

The concentration of total Polyaromatic Hydrocarbons (PAHs) and Naphthalene, Phenanthrene-Dibenzo(ah)anthracene (NPD) at all DPI stations was low with all PAH results below the US EPA Toxicity Reference Value (TRV: 0.87mg.kg<sup>-1</sup>), reflecting the uncontaminated sediment sampled throughout. Lower PAH levels were recorded when compared to the pre-decommissioning data, providing further evidence for the natural weathering of hydrocarbon material.

Heavy metal concentrations along the DPI cable route were low and reflective of background North Sea conditions, with all metals except for arsenic found to be below their respective reference values. Arsenic was elevated above the NOAA ERL (8.2mg.kg<sup>-1</sup>) at all 12 DPI stations, which had increased since the pre-decommissioning survey. However, a similar pattern was observed for the stations sampled across the Osprey, Merlin and DFGI pipeline routes, suggesting the increase may relate to a regional variation in the metal and the increase in sedimentary fines across the sites.

A rich macrofaunal community was observed at all stations sampled along the DPI cable route reflecting the uncontaminated sediment present throughout.





**Table 2-8: Post Decommissioning & Environmental Surveys Summary**

Comparison with pre-decommissioning data showed an increase in species richness which possibly indicates the recovery of the macrofaunal community within the survey area. Five juvenile individuals of the environmentally sensitive species *Arctica islandica* were identified, however no distinct *A. islandica* siphons were seen on the underwater footage.

#### **Dunlin Fuel Gas Import (DFGI) Corridor**

A total of ten environmental stations were sampled along the DFGI corridor. Four grab samples were acquired at each location; one for physico-chemical and three for macrofaunal analysis. As with the DPI route corridor, sampling locations were selected in order to directly compare results from the pre-decommissioning environmental survey undertaken in 2016.

The sediment along the DFGI corridor represented typical background sediment for the NNS, with most stations assigned to the category of 'muddy sand'. Granulometry data collected during the pre-decommissioning survey recorded a larger mean particle size compared to the 2019 survey, reflecting an increase in the proportion of sedimentary fines across all but one station located adjacent to a decommissioned subsurface isolation valve (SSIV). It is likely that the sediment at this station was disturbed during decommissioning operations with finer material having been re-suspended and re-distributed further away, resulting in increased sand content and decreased fines content in comparison to the pre-decommissioning survey data.

Low levels of organic enrichment were evident at the two stations sampled closest to the Thistle Alpha and Dunlin Alpha platforms. The remaining stations sampled along the mid-section of the route were representative of typical background sediment. TOC had decreased at the sampling station nearest to Dunlin Alpha which may relate to the disturbance of organic material during the removal of the nearby SSIV.

Total hydrocarbon concentrations were variable across the DFGI route. Stations sampled along the mid-section of the corridor recorded THC levels typical of background uncontaminated sediment. Minor variations in the THC results were noted at most stations when compared to the pre-decommissioning surveys; this is thought to relate to the natural variation in hydrocarbon material re-suspended and redistributed along the DFGI route.

The two sampling stations in close proximity to Dunlin Alpha and Thistle Alpha platforms recorded elevated THC concentrations above the OSPAR 50 ppm threshold. An increase in THC was recorded at the Dunlin Alpha location when compared to the pre-decommissioning survey, suggesting a localised disturbance of drilling related materials having occurred during the removal of the SSIV.

Elevated PAH concentrations were found at the two stations closest to the Dunlin Alpha and Thistle Alpha platforms, relating to the aged diesel-based signature present. The remaining DFGI stations recorded low levels of PAHs and NPD reflecting uncontaminated sediment sampled across the mid-section of the DFGI route. Normalised PAH were calculated to allow comparison to OSPAR BACs, with all but one station sampled closest to the Thistle A platform falling below the BAC.

Heavy metal concentrations were generally higher at stations sampled along the DFGI pipeline route indicating a greater influence by the surrounding Osprey, Merlin, Dunlin and Thistle infrastructure. Arsenic was elevated above the NOAA ERL ( $8.2\text{mg.kg}^{-1}$ ) at all stations sampled along the DFGI route with the increase from the pre-decommissioning survey attributed to regional variation in the metal. However, there was a clear removal or disturbance of material rich in Cr, Zn, Cu, Pb, and Cd (associated drilling metals) at the station closest to the Dunlin A platform, which most likely relates to the removal of the SSIV in this location. Levels of As, Cd, and Pb exceeded their corresponding OSPAR BAC values at all stations after normalisation to 5% aluminium.



**Table 2-8: Post Decommissioning & Environmental Surveys Summary**

The macrofauna across the DFGI survey area was variable. All stations sampled along the DFGI route corridor showed an increase in species richness when compared to the pre-decommissioning data, indicating the possibility of the macrofaunal community recovering within the survey area. However, different species were recorded in higher abundance at the two stations previously highlighted for higher levels of hydrocarbon and organic enrichment. Significant correlations between the macrofaunal data and physico-chemical parameters such as hydrocarbons and heavy metals corroborated the impact of historical drilling related activity on the macrofaunal communities sampled closest to the Dunlin Alpha platform.

One adult specimen and two juvenile individuals of the environmentally sensitive species *Arctica islandica* were identified, however no distinct *A. islandica* siphons were seen on the underwater footage.

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

- Dunlin Subsea Assets Site Clearance Summary (DUN-SSP-01-RPT-0002)
- Dunlin *in situ* Subsea Assets, Post Decommissioning Status (FBL-DUN-DUNA-SSP-01-RPT-00003)
- 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 Report – Dunlin (ROUK-SC-321-K12-0004)
- PL2852 (TA- DA) Alignment Chart (UK1077-SVY-DA-PL2852-001 to 003)
- PL4334 (BC - DA) Alignment Chart (UK1077-SVY-DA-PL4334-001 to 006)

## 2.9 Key Milestones

**Table 2-9: Key Milestone Summary**

Jun 2015	COP from the Greater Dunlin area
2016	DFGI pipeline preparation for flushing undertaken
2017	DFGI flushing of subsea umbilicals completed
Dec 2017	DFGI/DPI 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.
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 12<sup>th</sup> January 2018 to discuss waste management requirements, which were incorporated in the project waste management plan.
2. Regulatory project execution progress reports (FBL-DUN-DUNA-HSE-01-RPT-00005) 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. No payments to UK Fisheries Offshore Oil and Gas Legacy Trust Fund Limited (FLTC) were required.



### 3 Impact on the Environment

#### 3.1 Activities

There were no significant environmental impacts resulting from the DFGI/DPI infrastructure decommissioning activities. Seabed disturbance associated with the recovery of infrastructure, stabilisation materials and debris would have resulted in minimal impacts on the marine environment. 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-K12-0004 Environmental Monitoring Report

Marine licences ML/375 and ML/376 were varied throughout the decommissioning campaigns to account for inventor changes discovered during the operations.

#### 3.2 Future Monitoring

The following Long Term Legacy Management Plan is in place for future monitoring.

Table 3-1: Future Surveys and Monitoring Proposals	
1. Substructure (Jackets)	
n/a	
2. Pipelines, Flowlines & Umbilicals	
<p>The Dunlin power cable and gas import pipeline corridors are well known since their development in 2001 and 2012 respectively. Surveys have been undertaken periodically to monitor the status of the installed infrastructure, both of which are trenched and buried. The most recent surveys in this series were conducted in 2009, 2012, 2014 and 2016 for the DPI cable (PL4334) and in 2012 and 2016 for the DFGI pipeline (PL2852). Data from each of these surveys confirm stable seabed environments with consistent and acceptable depth of lowering and depth of cover. Details of lowering and cover from these historic reports can be provided upon request.</p> <p>In accordance with the approved Decommissioning Programme, this limited infrastructure remaining <i>in situ</i> has been re-confirmed by post decommissioning survey to be fully trenched and backfilled or buried under placed rock. Due to its location and the low seabed mobility, this infrastructure is considered unlikely to become exposed such that it could interact with other users of the sea.</p> <p>Fairfield Betula Limited 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>	
3. Pipeline Stabilisation Features	
Monitoring of stabilisation features will form part of the proposed pipeline and cable survey.	
4. Drill Cuttings	
n/a	



**Table 3-1: Future Surveys and Monitoring Proposals**

**5. Environmental Surveys**

As described above, the post decommissioning survey provides evidence of continued recovery along both the DPI power cable route and DFGI gas pipeline corridor. There was evidence of some increased contamination at sample stations near the Dunlin Alpha, Brent Charlie and Thistle Alpha installations respectively but this is likely to be the result of the decommissioning work undertaken and/or natural variation. 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 Betula Limited that further environmental survey is not warranted.

## **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):

02/09/2018	ROGI [895D742E7F] Reported by Bibby	CSV Normand Clipper	Crew member on board the CSV Normand Clipper sustained an injury to left index finger during PLU2853 mattress beam operations.
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See UK1077-HSE-RPT-001 for further information on safety performance.



## 5 Waste

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

Subsea waste returned to shore during the decommissioning of DFGI/DPI is detailed below.

Table 5-1: Waste Returned to Shore	
Infrastructure	Weight Returned (t)
<b>Ferrous Metal</b> - <i>Steel all grades</i>	205
<b>Non-ferrous Metal</b> - <i>Non-ferrous (copper; aluminium; zinc; indium)</i>	
<b>Concrete</b> - <i>Aggregates (mattresses; grout bags; sand bags)</i>	435
<b>Plastics</b> - <i>Rubbers; Polymers</i>	0
<b>Hazardous</b> - <i>Asbestos containing materials, Residual Fluids (hydrocarbons; chemicals; control fluid)</i>	1
<b>Hazardous</b> - <i>NORM Scale</i>	0
<b>Other</b> - <i>Debris</i>	49
<b>Total</b>	<b>690</b>

It should be noted that the SID (DFGI/DPI, Merlin and Osprey) 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 items were discharged at Greenhead Base, Gremista, Lerwick 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 DFGI/DPI Merlin and Osprey Decommissioning Album



**Debris Recovery**



**Infield Jumpers and Flowlines Recovered**



**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

