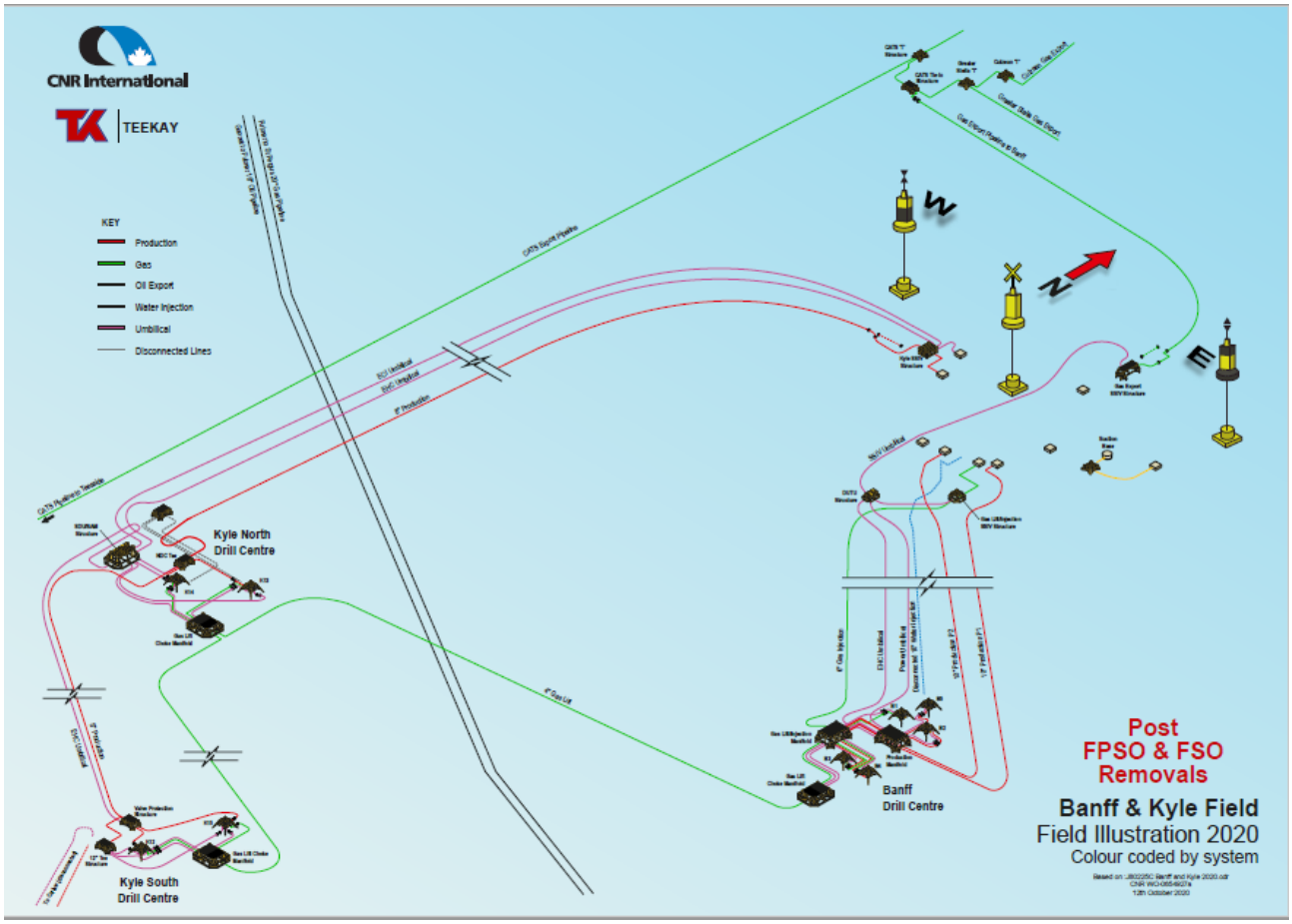
CNR International

TEEKAY



BANFF AND KYLE FPSO AND FSO FLOAT OFF INTERIM CLOSE OUT REPORT

P0009-CNR-EN-REP-00011

Draft Decommissioning Programmes

APPROVALS

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9	Teekay Petrojarl Production AS
10	Premier Oil Plc
11	Premier Oil UK Ltd
12	Ugland Stena Storage AS

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TERMS AND ABBREVIATIONS

Abbrev.	Definition
ASCO	Aberdeen Service Company
BEIS	Department of Business, Energy & Industrial Strategy
CATS	Central Area Transmission System
CNRI	CNR International (U.K.) Limited
CSV	Construction Support Vessel
CI	Corrosion Inhibitor
CIV	Corrosion Inhibitor Valve
CoP	Cessation of Production
DBB	Double Block and Bleed
Disc.	Disconnection
DP	Decommissioning Programmes

Abbrev.	Definition
DSV	Dive Support Vessel
DUTU	Dynamic Umbilical Termination Unit
EA	Environmental Appraisal
EHC	Electrical, Hydraulic and Chemical
EIA	Environmental Impact Assessment
FPSO	Floating Production, Storage and Offloading vessel
FSO	Floating Storage and Offloading vessel
JLM	John Lawrie Metals
M	Metre
MEOH	Methanol
Mg/l	Milligrams per Litre
N/A	Not Applicable
NC	Non-Conformance
OGA	Oil and Gas Authority
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OPEP	Oil Pollution Emergency Plan
PLANC	Permits, Licences, Authorisations, Notifications and Consents
PWAv	Pipeline Works Authorisation variation
ROV	Remotely Operated Vehicle
SAM	Subsea Accumulator Module
SAL	Submerged Anchor Loading
SCM	Subsea Controls Module
SDU	Subsea Distribution Unit
STL	Submerged Turret Loading
TDP	Touch Down Point
Te	Tonne
TFSW	Transfrontier Shipment of Waste
UKCS	United Kingdom Continental Shelf
WROV	Work-Class Remotely Operated Vehicle
XTs	Christmas Trees (Trees)

1. EXECUTIVE SUMMARY

This document contains the close out report for the Banff and Kyle Decommissioning Programmes FPSO and FSO Sail Away, approved by the Secretary of State on the 25th May 2020, one for each set of notices under section 29 of the Petroleum Act 1998.

Key elements of the approved Decommissioning Programmes are summarised below:

- Flushing and cleaning of the subsea production systems, FPSO and FSO;
- Implementation of the required isolations;
- Removal of the FPSO and FSO vessels from the field;
- Removal of buoyant flexible pipelines and vessel mooring infrastructure; and
- Installation of cardinal buoys.

Following completion of the Banff and Kyle Floating Production, Storage and Offloading vessel (FPSO) and Floating Storage and Offloading vessel (FSO) sail away decommissioning operations, CNR International (UK) Ltd. (hereafter referred to as CNRI) and Teekay Petrojarl Floating Production UK LTD (hereafter referred to as TPFP) have reviewed the activities to ensure that the scope was fully executed in accordance with the approved Decommissioning Programmes, that risks to other users of the sea have been removed or reduced to As Low As Reasonable Practical (ALARP) and regulatory requirements have been met.

As a result of monitoring and review of the recorded data, CNRI and TPFP believe that all residual risks to others users of the sea have effectively been removed or mitigated for this scope. Final seabed clearance and certification will be obtained after decommissioning activities for the full Banff and Kyle Field has been completed (to be submitted as part of subsequent Decommissioning Programmes).

2. INTRODUCTION

2.1 PURPOSE

This document contains the close out report for the Banff and Kyle Decommissioning Programmes approved by the Secretary of State on the 25th May 2020, one for each set of notices under section 29 of the Petroleum Act 1998:

The Decommissioning Programmes explains what was to have been achieved after completion of the activities. The Decommissioning Programmes was not required to be supported by a Comparative Assessment. An Environmental Appraisal (EA) will be submitted with the subsequent full Banff and Kyle fields Decommissioning Programmes. The Environmental Impact Assessments (EIA) were included within the relevant Marine Licence Applications.

This decommissioning report provides the outcomes of the Banff and Kyle Decommissioning activities and marks the formal close out submission to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) as described within their Guidance Notes.

2.2 FIELD OVERVIEW

The Banff field is located in UKCS Blocks 29/2a and 22/27a in the UK Sector of the Central North Sea some 200 km due east of Aberdeen in approximately 95 m water depth. The Kyle field is located in UKCS Blocks 29/2c and 29/2h in the UK Sector of the Central North Sea some 200 km due east of Aberdeen in approximately 90 m water depth.

There is one drill centre for the Banff field and two drill centres for the Kyle field – North Kyle and South Kyle. The Banff wells and manifolds are located approximately 1.6 km southeast of the Petrojarl Banff FPSO. The Kyle wells and manifolds are located between 13 km and 16 km south of the Petrojarl Banff FPSO location. There is approximately 3 km between the North and South Kyle drill centres.

The Banff and Kyle fields were tied back to the Petrojarl Banff FPSO. The Petrojarl Banff is a FPSO vessel developed from the Tentech Ramform B-380 design. The FPSO was turret-moored by a 10 leg mooring system with all risers hung off from the turret which was located at approximately mid-ship. The Banff flexible riser system comprised of one 12” oil export riser, two 10” production risers, one 8” gas injection riser, one 8” gas export riser and one control umbilical. The Kyle field was reconfigured as a tieback to the Banff FPSO in the period 2004 – 2005. The Kyle flexible riser system comprised of one 8” production riser and one control umbilical.

The Apollo Spirit is an FSO vessel, which was moored via a Submerged Turret Loading (STL) system. The vessel received processed oil from the Petrojarl Banff via a 12” flexible riser. Oil was stored in the vessel’s cargo tanks, and periodically offloaded to shuttle tankers. The Apollo Spirit had nine cargo tanks, with a total capacity of 910,000 bbl. The previous oil export route for the FPSO was a Submerged Anchor Loading (SAL) system. The components of this system within the water column were removed during 2019 under a decommissioning programmes approved in November 2019.

Produced gas was exported from the Petrojarl Banff via the Central Area Transmission System (CATS) pipeline to the CATS Terminal in Seal Sands, Teesmouth.

Figure 2.1: Field Layout Prior to Decommissioning Activities

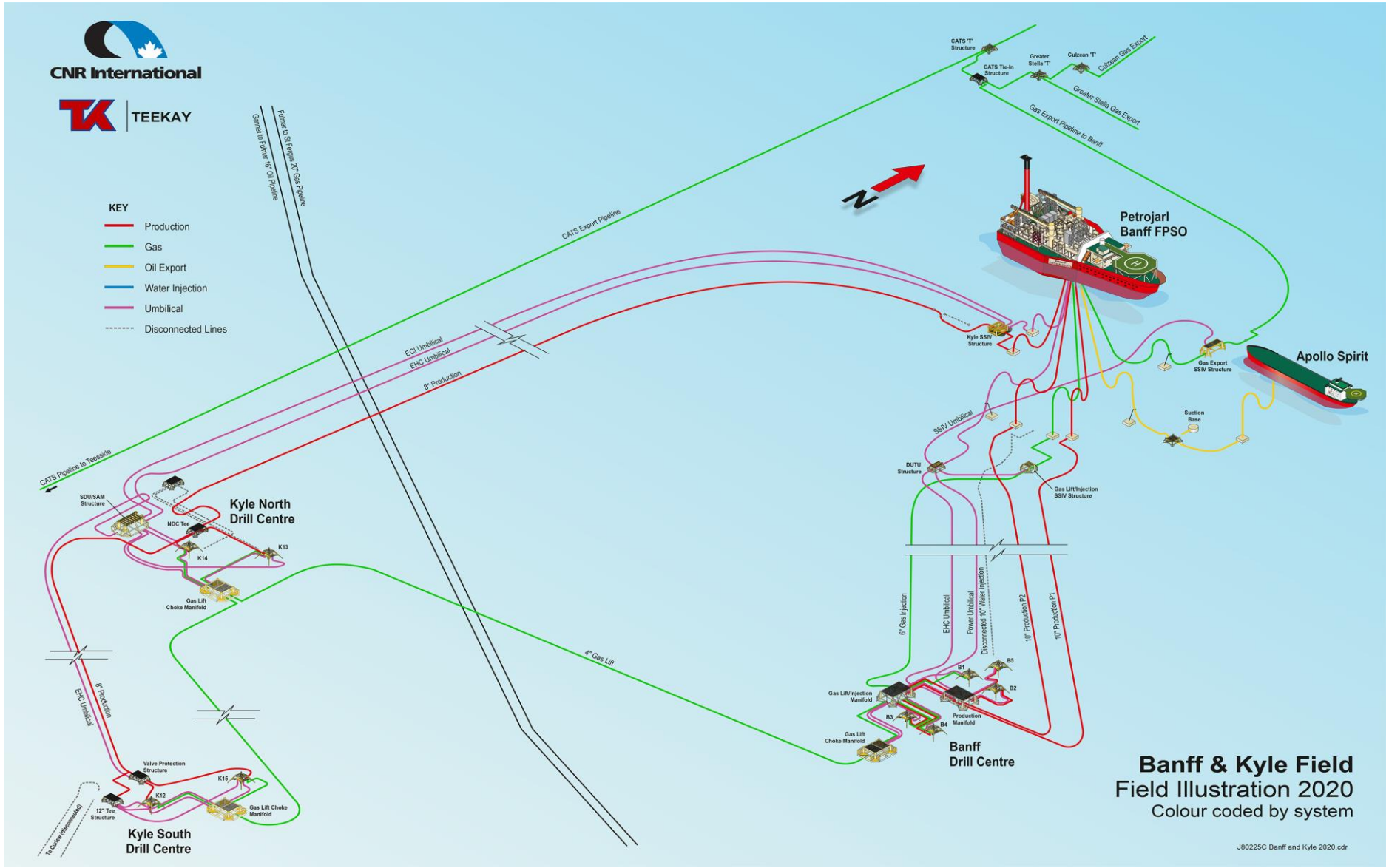
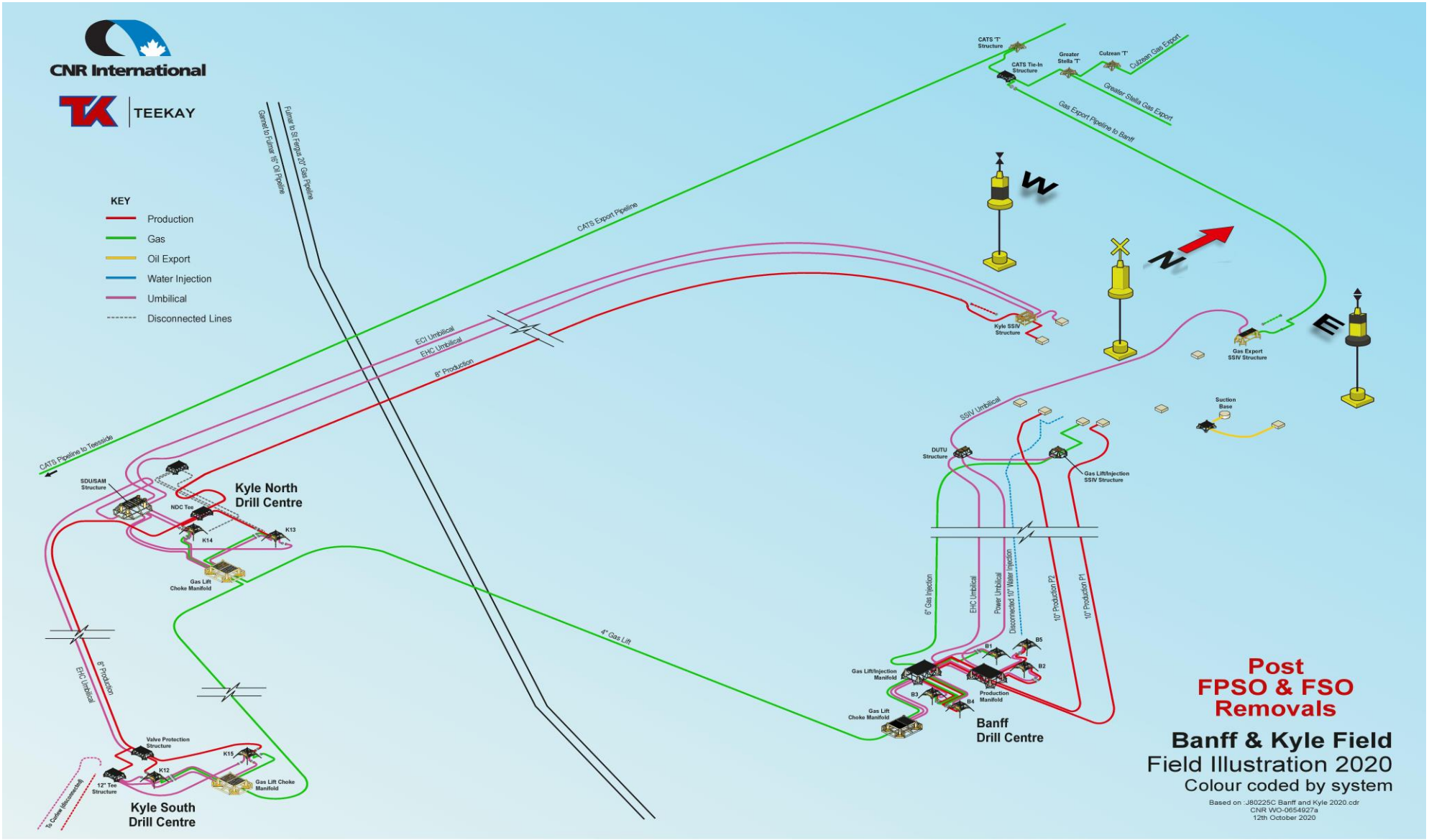


Figure 2.2: Post Decommissioning field layout



3. DECOMMISSIONING PROGRAMMES

A Cessation of Production (CoP) report was submitted to The Oil and Gas Authority (OGA) and approved on the 2nd March 2020, with production ceasing on the 1st June 2020. The Banff and Kyle FPSO and FSO Decommissioning Programmes was submitted to the Secretary of State for Business, Energy and Industrial Strategy (BEIS) on 31st March 2020 and was approved without modifications on 25th May 2020, with reference to CNRI controlled document number P0009-CNR-EN-REP-00007.

Key elements of the approved DP are summarised below and covered in more detail in this report.

- Flushing and cleaning of the subsea production systems, FPSO and FSO;
- Implementation of the required isolations;
- Removal of the FPSO and FSO vessels from the field;
- Removal of buoyant flexible pipelines, and vessel mooring infrastructure; and
- Installation of the Cardinal Buoys.

3.1 AMENDMENTS AND REVISIONS TO THE DP

No formal amendments were made to the approved DP and no deviations to decommissioning guidance and legislation requirements were made during the project.

4. DECOMMISSIONING ACTIVITIES

The following section describes the completed decommissioning activities, how they were executed and confirms that the completed activities were carried out in accordance with the approved DP.

The execution activities were split into two phases: Phase 1 was a Dive Support Vessel (DSV) campaign to conduct subsea well isolations, pipeline flushing and disconnections; Phase 2 was a Construction Support Vessel (CSV) and Anchor Handling Tug (AHT) campaign to conduct FPSO and FSO sail away and then finally Riser and mooring recovery. This was deemed to be the best execution strategy from a cost and scheduling perspective, taking advantage of efficiencies that could be gained during execution phases.

Phase 1 comprised the following:

- Flushing and cleaning of pipelines;
- Barrier Testing;
- Spool Disconnections from 9 off XTs;
- Blind flange installations; and
- Riser disconnections

Phase 2 comprised the following:

- Disconnection and recovery of risers from FPSO Petrojarl Banff and FSO Apollo Spirit;
- Removal of the FPSO Petrojarl Banff and associated mooring system;
- Removal of FSO Apollo Spirit the associated STL buoy and mooring systems; and
- Installation of Cardinal Buoys

4.1 DECOMMISSIONING PROGRAMMES MILESTONES

Discussions with OPRED commenced December 2019 regarding the Phase 1 activities and it was identified that a Decommissioning Programmes would be required.

The offshore works were planned to be executed between 1st June 2020 and 30th September 2020.

The key submission and approval dates for the Decommissioning Programmes were as follows:

- 30th March 2020 Decommissioning Programmes submitted to OPRED
- 25th May 2020 Decommissioning Programmes approved by Secretary of State

The permits and licences obtained for the decommissioning of the Banff and Kyle FPSO and FSO facilities are shown in Table 5.1, including their current status. The Banff and Kyle facilities were subsea so no ‘Consent to Locate’ was required for the decommissioning of the FPSO and FSO or the vessels used to decommission the surface installations. After float off cardinal buoys were located to mark the subsea installations within the area previously covered by the FPSO and FSO. A Consent to Locate was required for the cardinal buoy installation.

The Pipeline Works Authorisation variation for the Banff and Kyle Fields are listed below:

- 37/W/97
- 34/W/98
- 2/W/07

The associated environmental permits and consents are listed in Section 5.2.

4.1.1 OFFSHORE WORKS

The milestones for the offshore works to complete Phase 1 and Phase 2 activities were as follows:

- DSV on location at Banff- commencement of tree isolation – 13th June 2020
- DSV on location at Kyle North- commencement of tree isolation – 26th June 2020
- DSV on location at Kyle South commencement of tree isolation – 30th June 2020
- DSV on location at CATs gas export commencement of isolation – 3rd July 2020
- Completion of DSV scope – 5th July 2020
- Commencement of riser disconnect scope – 3rd August 2020
- Completion of riser disconnect scope – 10th August 2020
- Commencement of riser, mooring and anchor chains recovery scope – 27th August 2020
- Completion of riser, mooring and anchor chains recovery scope – 8th October 2020
- FPSO Sail Away – 31st August 2020
- FSO sail Away – 7th September 2020
- Commencement of Cardinal buoy scope – 28th September 2020
- Completion of Cardinal buoy scope – 30th September 2020

All scopes in line with the DP were completed. Below states what the recovery included and the final date of recovery:

- 10 FPSO Mooring Lines – 14th September 2020
- 10 FPSO Anchors – 14th September 2020
- 8 FSO Mooring Lines – 22nd September 2020
- 9 Risers- 8th October 2020

4.2 PREPARATORY WORK ON BANFF AND KYLE FPSO AND FSO

Prior to arrival of the DSV in the field the following activities were carried out on the Banff and Kyle FPSO and FSO to allow work to commence:

- Various Topsides and Riser flushing procedure preparation and review;
- Isolation preparations;
- Early cargo and slops tank cleaning e.g. Starboard Slops, Cargo Tank 1S cleaning completed and left open;
- Scaffold builds as required for shutdown work sites;
- Running down chemical storage tank inventories to reduce volume of returns; and
- Anchor winch hydraulic system re-piped, for winch to be ready for use.

4.3 PHASE 1 DSV ACTIVITIES

The offshore work was carried out using the DSV Deep Discoverer. The vessel was mobilised from 13th June 2020 until the 5th July 2020. The offshore DSV campaign took approximately 23 days to complete. The decommissioning project was completed as per the request of CNRI and TPFP. The workscopes were carried out at a number of locations within the Banff and Kyle Fields.

4.3.1 FLUSHING, ISOLATION AND DISCONNECTION

4.3.1.1 Banff Field

Prior to disconnection of the production and annulus spools, the Christmas Trees (XT) cavities were flushed with MEG and barrier tests were conducted to ensure isolations from pressure.

At all Banff XTs, divers cut the production spools and the cut off spool pieces were wet stored subsea within the tree envelope, as per PWAV and Marine Licence approval.

Divers inspected both sealing surfaces of flanges at the XTs and new blinds were installed, with new gaskets and bolt tensioned in place. All newly installed flanges have been successfully leak tested.

4.3.1.2 Banff Jumpers Disconnections

Disconnection of Electrical, Hydraulic and Chemical (EHC) jumpers was conducted at the Banff Drill Centre.

All control lines connected to the XTs have been disconnected and plugged at the XT side.

4.3.1.3 Kyle North and Kyle South Drill Centres

Prior to disconnection of the production and annulus spools, the XT cavities were flushed with MEG and barrier tests were conducted to ensure isolations from pressure.

At all Kyle XTs, divers cut the production spools and the cut off spool pieces were wet stored subsea within the tree envelope, as per PWAV and Marine Licence approval.

Divers inspected both sealing surfaces of flanges at XT and new blinds were installed, with new gaskets and bolt tensioned in place. All newly installed flanges have been successfully leak tested.

4.3.1.4 Kyle South and North Jumper Disconnections

Disconnection of EHC jumpers was conducted at North and South Kyle Drill Centres.

All control lines connected to the XT have been disconnected and plugged at the XT side.

4.3.1.5 CATS Spool Disconnection and Blind Flange Installation

The DSV flushed from the CATs structure to the FPSO. On completion of the flushing and barrier testing activities the 6” Gas Export spool was cut and the flange disconnected from the CATS Tie-In structure. The blind flange and Double Block and Bleed (DBB) was then fitted and the flange leak tested.

The 6” Gas Export Spool was cut and the cut off spool pieces were wet stored within the structure envelope, as agreed with the PWAV and Marine Licence approval.

4.3.1.6 Flushing Cleanliness

The estimated cleanliness level was expected at 50 mg/l. Sampling was taken when the flushing fluids were returned to the FPSO. The samples indicated the lines were flushed successfully to a level of cleanliness of between 22.4 mg/l and 4 mg/l. The residual oil concentrations that remains in the flushed infrastructure can be expected, as a worst case, to be at 24.4 mg/l. All pipeline ends have been cut and left open ended.

4.4 PHASE 2 DECOMMISSIONING ACTIVITIES

Three vessels were used to carry out the work and these were:

- The Skandi Iceman;
- Skandi Hera; and
- Assistance from the GH Atlantis Anchor Handling Tug (AHT)

The works commenced with the Skandi Hera on the 19th August 2020 and was completed on 10th October 2020, with the Skandi Iceman.

4.4.1 DISCONNECTION OF THE BANFF FPSO MOORING LINES

Operations to disconnect the mooring lines from the Banff FPSO commenced on the 27th August 2020 when the Skandi Iceman arrived on location. FPSO sailaway occurred on the 31st August 2020. Subsequently the recovery of the mooring lines inclusive of anchor chains and stevpris anchors started on the 31st August 2020.

The as left surveys of the mooring lines were completed on the 14th September 2020 when all ten mooring lines had been successfully recovered.

4.4.2 RECOVERY OF THE BANFF FPSO RISERS

The Skandi Iceman recovered nine risers and six riser ballast sections to deck. The as found survey was performed using Ultra Short Baseline (USBL) positioning for the Work-class Remotely Operated Vehicle (WROV) and was conducted between 27th September 2020 and 28th September 2020.
The steep wave risers recovered were:

- 8” Gas Injection riser
- Kyle 8” Production riser
- Banff 10” P1 production risers
- Banff 10” P2 production risers

The lazy wave risers recovered were:

- 8” Gas Export riser
- 6” Kyle Umbilical
- 6” Banff Umbilical
- Banff 10.75” Oil Export riser
- Apollo 12” Oil Export riser

The as-left surveys was conducted on the 8th October 2020. This survey comprised of the corridor routes of the removed risers, relocated mattresses, all riser stubs and any anomalies identified.

4.4.3 DISCONNECTION AND RECOVERY TO SUPPORT FLOAT OFF

Operations to disconnect the mooring lines from the STL buoy commenced on the 9th September 2020 when the Apollo Spirit FSO moved off location. The Skandi Iceman was utilised to disconnect all mooring lines from the STL Buoy and the STL Buoy was subsequently towed to Peterhead on the 14th September 2020. The GH Atlantis was hooked up to the STL Buoy to support disconnection operations and tow the STL Buoy to Peterhead. Once the STL buoy was disconnected the Skandi Iceman recovered all mooring lines. All mooring lines were removed up to the point of burial adjacent to their respective piles. All piles were left in situ. The as-left survey of the mooring line piles was completed on the 22nd September 2020.

4.4.4 CARDINAL BUOY INSTALLATION

Three cardinal buoys were deployed and installed on 29th September 2020.

The as-left surveys for each Cardinal buoy was conducted after each installation. The position for both anchor weights and the touch down point (TDP) for each cardinal buoy are listed below.

Table 4.1: Cardinal Buoy Location			
Cardinal Buoy location	**Task**	**Latitude WGS84**	**Longitude WGS84**
East Location	Anchor Weight 1	057°00'49.13 N	001°20'00.78 E
	Anchor Weight 2	057°00'49.46 N	001°20'00.67 E
	TDP	057°00'54.26 N	001°19'55.89 E
West location	Anchor Weight 1	056°59'48.46 N	001°17'20.17 E
	Anchor Weight 2	056°59'48.46 N	001°17'20.06 E
	TDP	056°59'53.52 N	001°17'14.80 E
MB1 Central location	Anchor Weight 1	057°00'26.87 N	001°18'27.93 E
	Anchor Weight 2	057°00'26.73 N	001°18'28.06 E
	TDP	057°00'32.04 N	001°18'22.44 E

4.4.5 RECOVERY OF BANFF FPSO MOORING LINES

The recovery of the Banff FPSO Mooring Lines commenced on Monday 31st August 2020 and was completed on the 14th September 2020. The complete mooring system was removed from the seabed. The as left status of the mooring line trenches and anchor weight depressions are listed below in Table 4.2 and Table 4.3.

Mooring Line	**Table 4.2- As left Anchor Depressions**		
	Trench Start Position		**Comments**
	Longitude WGS84	**Latitude WGS84**	**Estimated Dimensions**
1	001°18'25.247 E	057°01'19.9812 N	Approx. 05 m deep depression. No clay lumps
2	001°18'45.23 E	057°01'14.7864 N	Approx. 2 m deep depression. Small clay lumps seen, all less than 0.5 m
3	001°19'56.161 E	057°00'5.7004 N	Approx. 1 m deep depression. One small mound 1.5 x 7 x 5 m.
4	001°19'52.612 E	056°59'52.494 N	Approx. 2 m deep depression. No clay lumps seen Mounds all less than 0.5 m
5	001°18'2.243 E	056°58'55.5348 N	Approx. 2 m deep depression. Small clay lumps seen, all less than 0.5 m
6	001°17'42.724 E	056°58'53.49 N	Approx. 0.7 m seep depressions. No clay lumps seen
7	001°15'41.191 E	056°59'27.1392 N	Approx. 2 m deep depression. Clay on edge of crater less than 0.5 m above seabed.
8	001°15'27.349 E	056°59'38.0436 N	Approx. 1 m deep depression. Clay found on anchor depression less than 0.5 m.
9	001°15'50.508 E	057°00'55.9008 N	Approx. 1 m deep depression. Clay found on anchor depression less than 0.5 m.
10	001°16'6.596 E	057°01'5.6964 N	Approx. 2-3 m deep depression. Clay found around anchor depression less than 0.5 m.

Mooring Line	**Table 4.3- As left Anchor Weight Trench Locations**		
	Trench Start Position		**Comments**
	Longitude WGS84	**Latitude WGS84**	**Estimated Dimensions (Length x Width x Depth[1])**
1	001°17'40.553 E	057°00'13.4208 N	5 m x 5 m x 6 m
2	001°17'42.047 E	057°00'13.086 N	5 m x 5 m x 6 m
3	001°17'46.392 E	057°00'8.8416 N	11 m x 26 m x 11 m
4	001°17'46.144 E	057°00'7.8048 N	5 m x 5 m x 6 m

[1] Depth represented in the table is the maximum depth.

5	001°17'38.962 E	057°00'5.4108 N	5 m x 5 m x 6 m
6	001°17'38.184 E	057°00'4.2336 N	5 m x 5 m x 6 m
7	001°17'30.617 E	057°00'6.3972 N	5 m x 5 m x 6 m
8	001°17'30.397 E	057°00'7.2972 N	5 m x 5 m x 6 m
9	001°17'30.959 E	057°00'11.898 N	16 m x 14 m x 3 m (highest peak 1 m)
10	001°17'31.985 E	057°00'12.7548 N	5 m x 5 m x 6 m

4.4.6 DISCONNECTION AND RECOVERY OF STL BUOY AND MOORING LINES

Operations to disconnect the STL Buoy started on Wednesday 9th September 2020, once the FSO Apollo Spirit had departed the field. All mooring lines were disconnected on 14th September.

The STL Buoy anchor piles were left in situ. The as left status of each pile is detailed in the table below.

Mooring Line	Table 4.4- As left STL Buoy Anchor/ Chain Status		
	Pile Anchor Location		
	Longitude WGS84	Latitude WGS84	Comments
1	001°19'27.167 E	057°01'26.508 N	Anchor pile has approx. 8 m of chain in 60% burial exposed at the pile with no trench visible – no evidence of anchor pile or trench
2	001°20'14.107 E	057°01'15.294 N	Anchor Pile has chain bundle approx. 10 m from the pile position. Chain to pile and pile all in full burial- no evidence of anchor pile or trench
3	001°20'38.897 E	057°00'53.9208 N	Anchor Pile has chain bundle approx. 8 m from suspected position. Chain to pile and pile all in full burial- no evidence of anchor pile or trench.
4	001°20'37.471 E	057°00'25.9524 N	ML4 Anchor Pile has approx. 4 m length of chain in 50% burial 4 m from the estimated pile position. The chain goes in to burial as it approaches the pile- no evidence of anchor pile or trench.
5	001°19'49.67 E	057°00'15.7752 N	ML5 Anchor Pile is visible approx. 30 cm above seabed- 9 m from the pile there is half a link of chain exposed- all other chain in burial.
6	001°19'4.487 E	057°00'21.3192 N	Anchor pile is not visible nor is chain- all in full burial
7	001°18'39.751 E	057°00'42.624 N	Anchor pile is protruding approx. 30 cm above seabed- all chain in full burial
8	001°18'49.9 E	057°01'7.2804 N	ML8 anchor pile is exposed protruding approx. 20 cm above seabed- there is approx. 4 m of chain in 20% burial next to pile.

4.4.7 POST REMOVAL SURVEY

After removal of the FPSO, FSO moorings and anchors, a post removal ROV survey was carried out of the site. The ROV survey indicated that the areas of seabed physically affected by the placement of anchors and mooring system and related disturbance of sediments incurred during their placement and recovery were in line with the anticipated scale of effects described in Section 4.2 of the approved Decommissioning Programmes (DP/163/19).

5. ENVIRONMENTAL IMPACT AND PERFORMANCE

The decommissioning work was undertaken under the existing OPEP for the facilities (OPEP reference number 170009/0). The scope of the OPEP includes decommissioning.

The works undertaken aligned with the proposals submitted in the Decommissioning Programmes.

In summary, as the operations were effectively completed with no incremental environmental impact to those originally evaluated, it is considered that the related extent of any impacts incurred in practice will also have been negligible.

5.1 DECOMMISSIONING OPEP

The works as detailed in the Decommissioning Programmes were conducted under Banff Field Offshore OPEP (170009/0).

5.2 DECOMMISSIONING PERMITS

The environmental impacts of the decommissioning activities were captured under environmental permits and consents which were submitted in place of an Environmental Appraisal. Specifically, the decommissioning activities were subject to an Environmental Impact Assessment (EIA) justification which supported a Decommissioning Master Application Template (MAT) (Reference: DCA/115) comprising a Marine Licence, Oil Discharge Permit and Chemical Permit (Table 5.1). These applications were approved by the Offshore Petroleum Regulator for Environment & Decommissioning (OPRED).

In addition to the above, Cardinal Buoys were installed to mark the infrastructure in the water column within the FPSO and FSO 500 m zones. These were installed under a separate Standalone Application (Reference SA/1320) Consent to Locate Application and Marine Licence (Table 5.1).

The operations were executed in accordance with the proposed scope described in the approved Decommissioning Programmes and related permit applications. Appropriate operating procedures were implemented to manage these operations and no non-compliances were incurred.

The operations took place in the locations outlined in the permit applications and the overall environmental seabed disturbance was within the estimated project footprint detailed in the supporting impact assessment.

In summary, the operations were completed with no incremental environmental impact to those originally evaluated. Therefore, it is considered that the environmental effects of the Phase 1 operations were negligible.

Table 5.1- Decommissioning Permits

	Permit start Date	Expiry Date	Permit Status
Banff Decommissioning Application - DCA/115			
Oil Discharge Permit (OTP/991)	01/06/2020	28/11/2020	Closed
Chemical Permit (CP/2348)	01/06/2020	28/11/2020	Closed
Marine Licence (ML/608)	01/06/2020	28/11/2020	Closed
Cardinal Buoys Standalone Application – SA/1320			
Consent to Locate (CtL/1117)	01/08/2020	01/08/2023	Open
Marine Licence (ML/618)	01/08/2020	01/08/2023	Open

5.3 WASTE MANAGEMENT PERFORMANCE

5.3.1 COMMITMENTS

CNRI and TPFP ensured that the waste management commitments stated in Section 3 of the Decommissioning programmes were adhered to. In particular, the principles of the waste hierarchy were followed to minimise waste production from the decommissioning scope and reuse opportunities were taken wherever possible. The recovered subsea infrastructure was returned to shore and dealt with at suitably licensed waste facilities and appropriate testing was carried out on recovered material to identify the presence and extent of contaminated material (such as NORM). John Lawrie Metals Limited (JLM) was appointed as the primary waste management contractor for the Moorings, Risers and STL buoy. The offshore recovery and transportation was co-ordinated by DOF Subsea.

The inventories outlined in the Decommissioning programmes are summarised in Tables 5.2, 5.3. and 5.4 below. A summary of the Waste Management Performance is provided in Table 5.5

Table 5.2: Inventory Associated with Surface Installations			
Petrojarl Banff FPSO		**Apollo Spirit FSO**	
Material	**Mass (Tonnes)**	**Material**	**Mass (Tonnes**
Carbon Steel	13,418	Steel	32,431
Stainless Steel	562	Misc. Non-Hazardous Material	1,707
Non-Ferrous Metal	1,768	Hazardous material	6
Plastics	161		
Hazardous materials (Norm)	112		
Other non-hazardous	58		
Total	**16,079**	**Total**	**34,144**

Table 5.3: Inventory Associated with Subsea Installations	
Material	**Mass (dry unflooded) (Tonnes)**
Mooring Lines and FPSO anchors	
Carbon Steel	5,468
Plastics	52
STL Buoy	
Carbon Steel	101
Plastics	2
Total	**5,623**

Table 5.4: Inventory Associated with Pipelines	
Pipeline (Riser) Decommissioning	
Material	**Mass (dry unflooded) (Tonnes)**
Carbon Steel	269
Stainless Steel	2
Non-Ferrous Metal	16
Plastics	256
Total	**543**

Table 5.5: Summary of Waste Performance					
Item	**Quantity (tonnes)**	**Landed Location**	**Landed Date**	**Final Fate**	**Notes/Comments**
Banff FPSO					
After discussion with the Regulator, the breakdown of the waste components will not be reported directly through the Close Out Report. However, an end state position for the FPSO in relation to the agreement in the DP has been agreed. The FPSO will be recycled at a European Union (EU) approved disposal site, in line with relevant regulations.					
Apollo Spirit FSO					
After discussion with the Regulator, the breakdown of the waste components will not be reported directly through the Close Out Report. However, an end state position for the FSO in relation to the agreement in the DP has been agreed. The FSO will be recycled at a European Union (EU) approved disposal site, in line with relevant regulations.					
Mooring Lines and Anchors					
Anchors (Mild Steel)	319.56	Montrose Port Berth 1	2nd, 06th and 15th Sep 2020	Recycled	Metal Recycling - European Smelter
Mooring Chain (Grade R4/R5 Steel)	256.42	Montrose Port Berth 1	2nd and 6th Sep 2020	Re-use	Mooring Chain re-used for Aquaculture industry
Mooring Chain (Grade R4/R5 Steel)	2307.81	Montrose Port Berth 1	2nd and 6th Sep 2020	Recycled	Metal Recycling - European Smelter
Wire Rope (Grade R4/R5 Steel)	891.94	Montrose Port Berth 1	2nd and 6th Sep 2020	Re-use	Wire rope re-used for Aquaculture industry
Wire Rope (Grade R4/R5 Steel)	297.31	Montrose Port Berth 1	2nd and 6th Sep 2020	Recycled	Metal Recycling - European Smelter
Mixed Plastics	109.69	Montrose Port Berth 1	2nd and 6th Sep 2020	Landfill	Landfill at Easter Hatton Environmental Village, Balmedie, Aberdeenshire
STL Buoy					
Carbon Steel	84.6	Smith Quay, Peterhead	15th Sep 2020	Recycled	Metal Recycling - European Smelter
Ballast Water	13.6	Smith Quay, Peterhead	15th Sep 2020	Treatment / disposal	No hazardous treated ballast water – disposed at ASCO Treatment plant, Peterhead
Pipelines (Risers)					
Steel	209.66	Duthies/ Clipper Quay, Aberdeen	03rd and 9th Oct 2020	Recycling	Subsea riser components Metal Recycling - European Smelter
Mixed Plastics	205.45	Duthies/ Clipper Quay, Aberdeen	03rd and 9th Oct 2020	Landfill	Subsea riser components and buoyancy modules - Landfill at Easter Hatton Environmental Village, Balmedie, Aberdeenshire
Buoyancy modules (Steel/plastic)	55.410	Duthies/ Clipper Quay, Aberdeen	03rd Oct 2020	Re-use	2 Buoyancy modules refurbished for re-deployment
Steel	8.57	Kishorn Port	30th Nov 2020	Recycling	FPSO Topside Bend stiffeners only Metal Recycling - European Smelter
Plastics	8.23	Kishorn Port	30th Nov 2020	Landfill	FPSO Topside Bend stiffeners only Landfill at Easter Hatton Environmental Village, Balmedie, Aberdeenshire

5.3.2 FPSO AND FSO

Banff FPSO

The Banff FPSO was moored at Kishorn Port, North West Scotland, following float off. The vessel will transit to a European Union (EU) approved recycling yard, M.A.R.S Europe located in Denmark, where it will be decommissioned.
The Transfrontier Shipment of Waste (TFSW) permit for the vessel is authorized by SEPA under UK Notification GB 0002 000689.

Apollo Spirit

Following float off, the Apollo spirit vessel was temporarily situated in the Moray Firth. The FSO was towed by ALP Maritime Services to Aliaga Ship Recycling Facility situated on the Mediterranean coast of Western Turkey where it will be decommissioned. The TFSW permit for the vessel is authorised by SEPA under UK Notification GB 0002 000684.

5.3.3 ANCHORS AND MOORINGS

Anchors and moorings

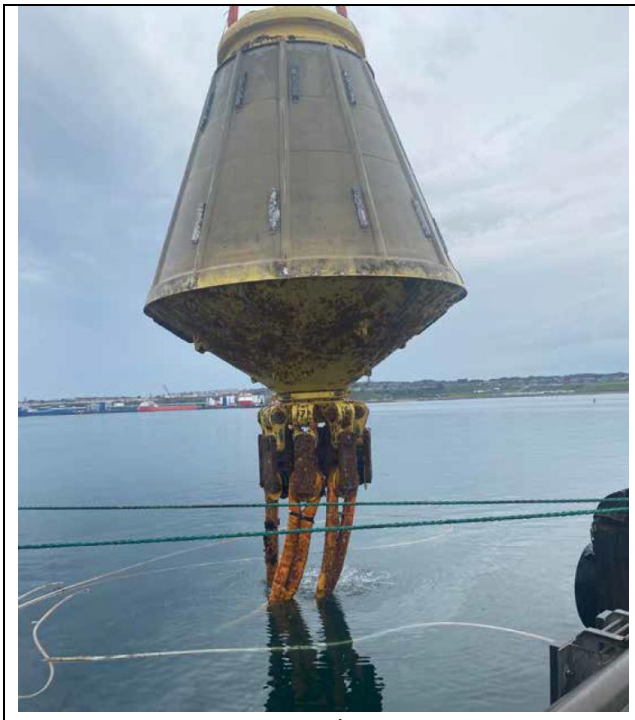
The Anchors and mooring chains were recovered to the dedicated chain and moorings handling facility at Montrose Port. From here, the waste was managed by John Lawrie. Following the waste Hierarchy principles, 10% of the mooring chains and 75 % of the wire rope were able to be re-purposed for re-use in the aquaculture industry. All other metal components were sent to smelter for recycling. The plastic, which could not be recycled was sent to local landfill.

STL Buoy

The STL Buoy was towed to shore and recovered at Smith Quay, Peterhead. The management of the STL Buoy was undertaken by John Lawrie Metals (JLM) alongside NorSea. The STL Buoy was broken down into its steel components as shown in Figure 5.1 and recycled.

There was treated ballast tank water which was removed as part of downsizing process. This was analysed for potential NORM contamination. The Ballast tank water was determined to be non-hazardous and was drained off and transported to Aberdeen Service Company (ASCO) in Peterhead for appropriate treatment and disposal

Figure 5.1: STL Buoy Recovery



STL Buoy Recovery to Quayside

STL Buoy Laydown at Quayside

5.4 HEALTH AND SAFETY

5.4.1 KEY PERFORMANCE DATA

The SHE Key Performace data for the project is listed in Table 5.6. A number of Key Performance Indicators were tracked on the project.

Table 5.6 Health and Safety Summary

Description	Deep Discoverer DSV Campaign	CSV Campaign
Days Away from Work Case	0	0
Restricted Work Case	0	0
Occupational Illness	0	0
Medical Treatment Injury	0	0
First Aid Case	0	2
Non Work Related Medical Case	0	0
Damage Incidents	0	0
Incident	0	0
Environmental Incident- Minor Non-Reportable	0	0
Environmental Incident- Reportable	0	0
Near Miss	1	1
Non-conformance report (internal)	-	1
Drops Inspections	10	-
OMT HSEQ Inspection	2	1
Safety Officer- Area Safety Tour	1	0

Although the overall HSE performance during the project was strong, three minor incidents occurred: two first aid cases and one near miss.

As is standard procedure when incidents occur, we have examined the root cause of the events and incorporated any lessons learned into our procedures and processes so that we can avoid the reoccurance of similar incidents in future.

Overall we believe that the HSE performance during the Banff and Kyle Decommissioning project was acceptable.

5.5 NON-CONFORMANCE DURING PROJECT

There were no non-conformance (NC) with the any of the permits and activities related to the approved DP (as mentioned in Table 5.1.).

6. SCHEDULING COMMITMENTS

6.1 ORIGINAL SCHEDULE

Figure 6.1 shows the outline schedule commitment for the Banff and Kyle FPSO and FSO sail away and decommissioning activities as presented in the original decommissioning programmes.

Figure 6.1: Schedule of Project Plan

Activity	2019		2020				2021	
	H1	H2	Q1	Q2	Q3	Q4	H1	H2
Decommissioning Planning								
COP Approval								
Anticipated DP Approval								
Cessation of Production								
Pipeline Flushing / Isolations								
FPSO Make Safe / Disconnection / Removal								
Riser removal								
Mooring system removal								
Close out reports								

6.2 AS-BUILT SCHEDULE

Figure 6.2 presents the as-built schedule for Banff and Kyle FPSO and FSO sail away and decommissioning activities.

Figure 6.2: As Built Schedule of project.

Activity	2020							
	May	June	July	August	September	October	November	December
Milestones								
COP			1st June 2020					
MATS and SATS		19th May 2020						
Submit PWA		8th May 2020						
Execution								
DSV Phase 1- Deep Discoverer (23 days)								
Tree Isolation- DSV (20 days)								
Riser Disconnection- Phase 2 (7 days)								
Riser, mooring and anchor recovery (42 days)								
Cardinal Buoy installation (2 days)								
FPSO sail away					31st August 2020			
FSO sail away					9th August 2020			

7. EVIDENCE OF COMPLETION OF ACTIVITIES

A photographic record was maintained for some of the decommissioning activities as included below.

7.1 PHASE 1 ACTIVITIES

7.1.1 PIPELINE FLUSH AND SPOOL DISCONNECTION SCOPE

DSV activities are covered in Section 4.3.1.

Figure 7.1 DSV Activities

Photo 1: 12 inch dead leg flushing blind during flush on Kyle South Manifold. Photo 2: Divers prep to remove 6 inch spool piece from K15.

7.2 PHASE 2 ACTIVITIES

7.2.1 RISER CUT AND RECOVERY SCOPE

Riser Recovery activities are covered in Section 4.4.2

Figure 7.2 Riser Cuts

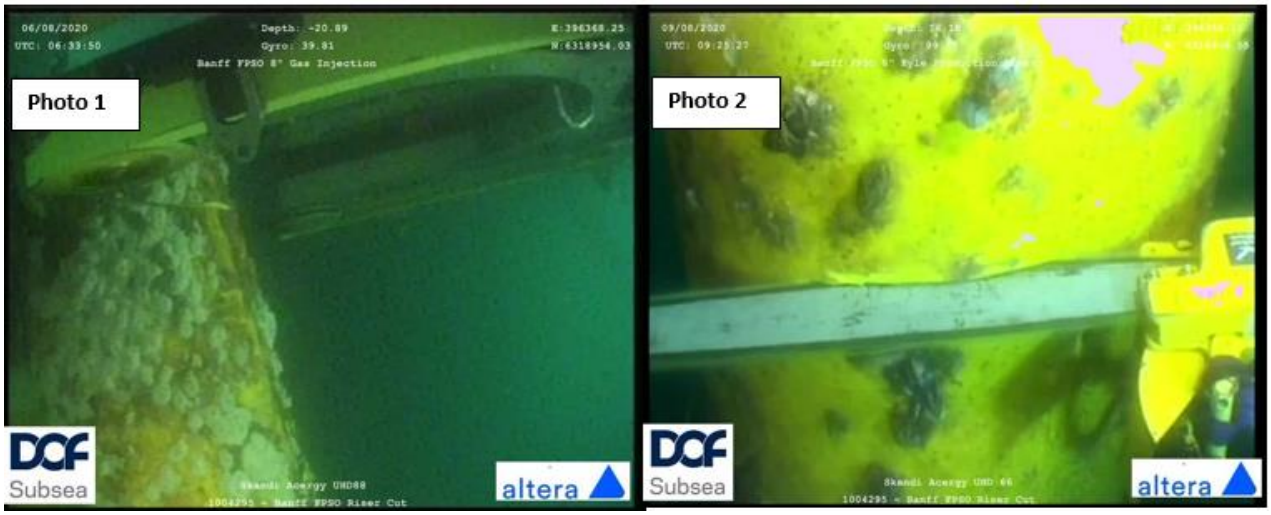


Photo 1: Banff FPSO Riser cut- 8” Gas Injection. Photo 2: Banff FPSO Riser Cut- 8” Kyle Production Riser.

7.2.2 ANCHOR AND MOORING LINES RECOVERY SCOPE

DSV activities are covered in Section 4.4.5

Figure 7.3 Anchor Recovery scope

Photo 1: Anchor recovered to deck. Photo 2: Banff Anchor 02 Stevpris 50 Te.

7.2.3 CARDINAL BUOY INSTALLATION

As described in Section 4.4 three cardinal buoys were deployed and installed.

Figure 7.4 Cardinal Buoy Installation

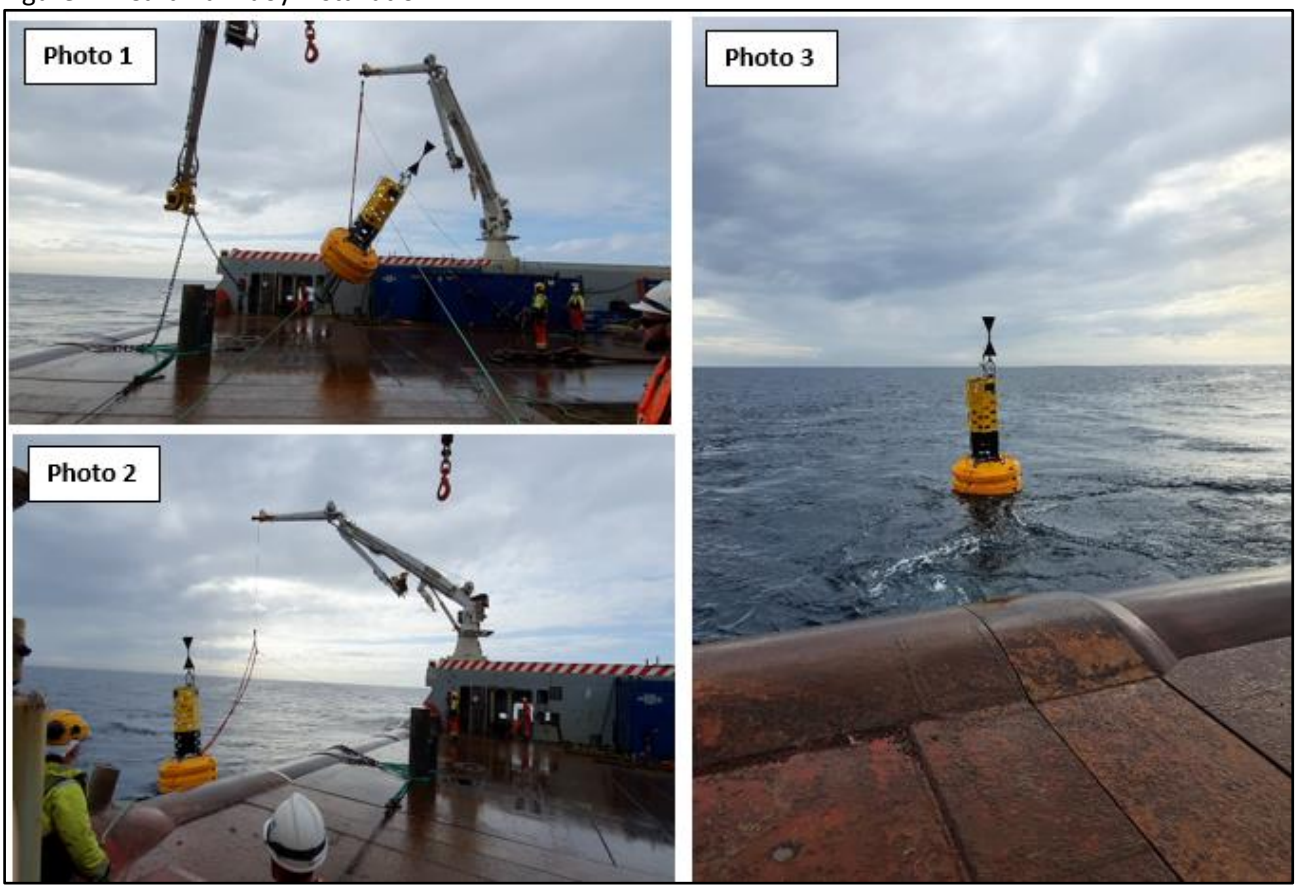


Photo 1: Cardinal Buoy (CB1) being lifted off the vessel. Photo 2: CB1 being positioned in the water. Photo 3: CB1 Safely lifted into water.

7.2.4 FPSO AND FSO SAIL AWAY

Figure 7.5 FPSO and FSO Sail away

Photo 1: Apollo Spirit FSO being towed. Photo 2: Petrojarl Banff FPSO being towed by GH Atlantis on route to Kishorn.

7.2.5 OFFLOADING ONSHORE

During the recovery scope there were multiple offloading trips onshore.

Figure 7.6 Anchor Offloading Onshore

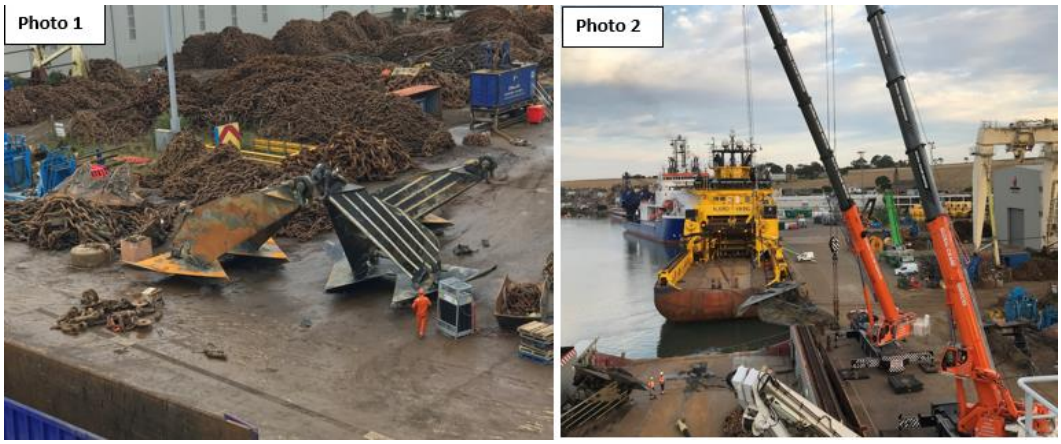


Photo 1: Banff Anchor lifted onto quayside. Photo 2: Tandem crane lift in Montrose Port 6th September 2020.

8. DECOMMISSIONING COST ESTIMATION

Costs will be published in the overall field Close Out Report, costs for this Interim Close Out Report will be provided separately to OPRED.

9. CONCLUSIONS

Following completion of the Banff and Kyle FPSO and FSO operations, CNRI and TPFP has reviewed all activities to ensure that the scopes have been fully executed in accordance with the approved DP, that risks to other users of the sea have been removed or reduced to ALARP and all regulatory requirements have been met. Where any deviations from the scope have occurred these have been highlighted in this report, however there have been no variations to the DP.

As a result these activities will be followed by subsequent decommissioning programmes to cover full Banff and Kyle Field Decommissioning. This should be considered an interim close out report, for activities covered under DP/163/19.

10. REFERENCE

CNR (2020) Banff and Kyle Decommissioning Programmes for FPSO and FSO Sail away, P0009-CNR-EN-REP-00007

DOF Subsea (2020). As Built Survey Report. Reference: 321348-TEK-SU-REP-00012.

John Lawrie (2020) Decommissioning at NorSea Smiths Quay, Peterhead Client Photo Report. September 2020.

OGA (2020) Pipeline Works Authorisation HOLD, Approved by OGA June 2020

OGA (2020) Pipeline Works Authorisation HOLD, Approved by OGA June 2020

OGA (2020) Pipeline Works Authorisation HOLD, Approved by OGA June 2020

Technip FMC (2020) Report- Banff and Kyle Decommissioning Final Report (EnerMech). Reference 321348-TEK-SU-REP-00011

Technip FMC (2020) Report- Banff and Kyle As Built Manual Reference 321348-TEK-SU-REP-Z3-00001

APPENDIX A: BANFF FIELD CUT SPOOL POSITIONS

ANDREWS SURVEY

FIELD RESULT SHEET

Subject:	Banff Drill Centre	Document No:	AS-P4918-FRS-0002	Rev:	C1

9. FIELD LAYOUT – SPOOL POSITIONS

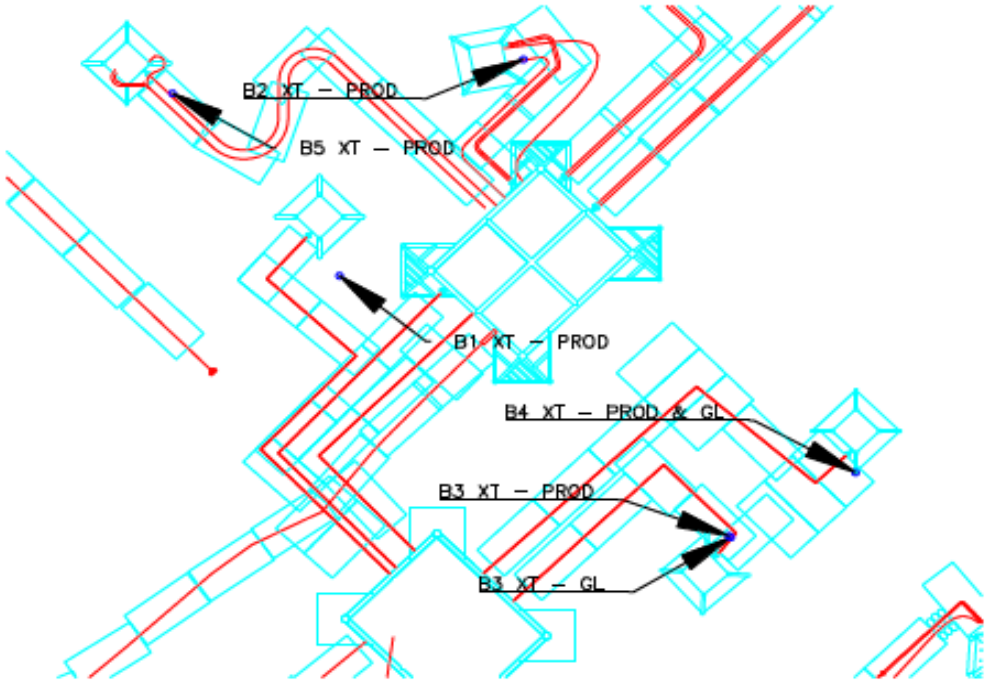


Figure 80: Banff Field Cut Spool Positions

APPENDIX B: KYLE NORTH CUT SPOOL POSITIONS

ANDREWS SURVEY

FIELD RESULT SHEET

Subject:	Kyle North	Document No:	AS-P4918-FRS-0003	Rev:	C1

6. FIELD LAYOUT – SPOOL POSITIONS

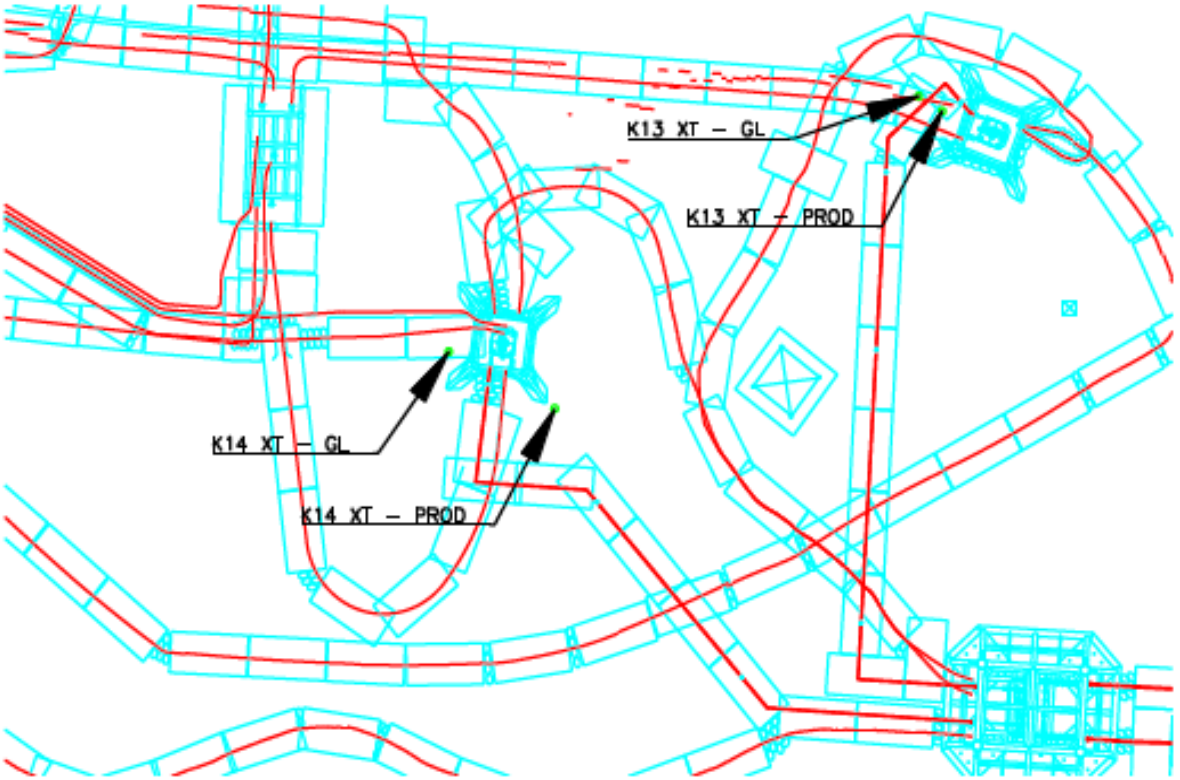


Figure 56: Kyle North Cut Spool Positions

APPENDIX C: KYLE SOUTH CUT SPOOL POSITIONS

ANDREWS SURVEY

FIELD RESULT SHEET

Subject:	Kyle South	Document No:	AS-P4918-FRS-0004	Rev:	C1

6. FIELD LAYOUT – SPOOL POSITIONS

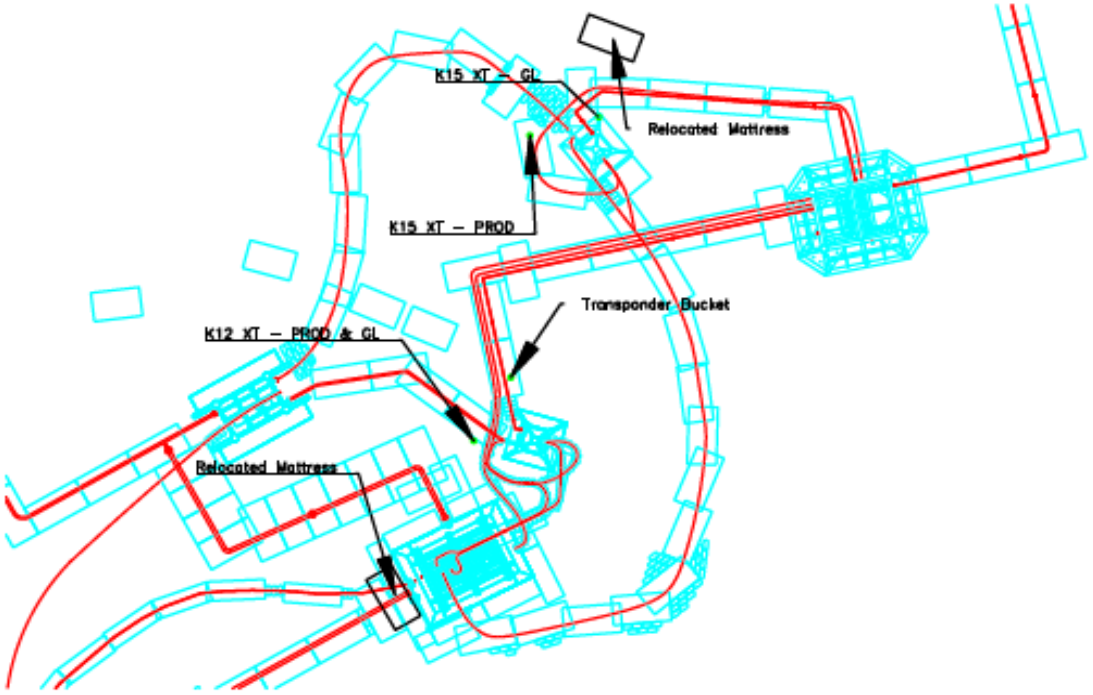


Figure 54: Kyle South Cut Spool Positions

APPENDIX D: CATs CUT SPOOL POSITIONS

ANDREWS SURVEY

FIELD RESULT SHEET

Subject:	CATS	Document No:	AS-P4918-FRS-0005	Rev:	C1

4. FIELD LAYOUT – SPOOL POSITIONS

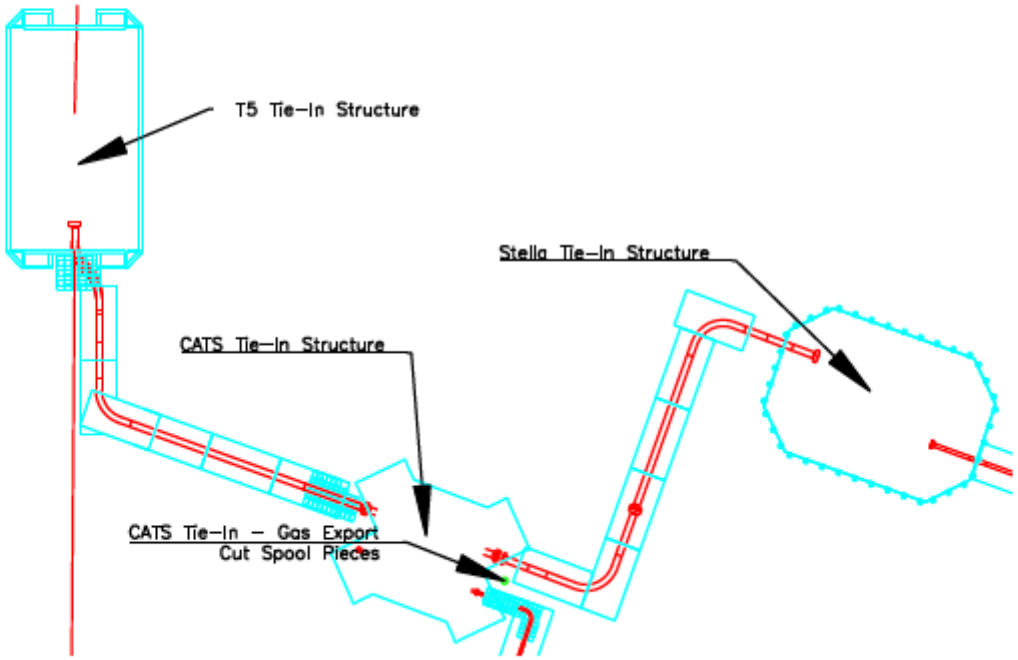


Figure 27: CATS Cut Spool Position