Perenco Gas (UK) Ltd
Pickerill Alpha (A) and Pickerill Bravo (B) Installations
Partial Decommissioning Programme

FINAL VERSION

Document Control

Approvals

	Name	Signature	Date
Prepared by	Julie Summerell		12/03/19
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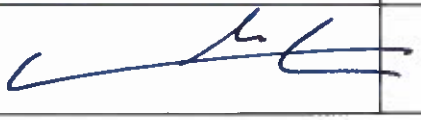
Approved by	Laurent Combe		12/03/19

Revision Control

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0	Initial Draft	Internal Review	03/12/18
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Distribution List

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Contents

Terms and Abbreviations

Abbreviation	Explanation
A	Alpha
AtoNs	Aids to Navigation
B	Bravo
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CO_2	Carbon Dioxide
COP	Cessation of Production
EA	Environmental Appraisal
EL	Elevation
ESDV	Emergency Shutdown Valve
HCF	Hydrocarbon Free
HPU	Hydraulic Power Unit
HSE	Health and Safety Executive
JNCC	Joint Nature Conservation Committee
KM	Kilometres
LAT	Lowest Astronomical Tide
M	Metres
NFFO	National Federation of Fishermen's Organisations
NORM	Naturally Occurring Radioactive Material
NUI	Normally Unmanned Installation
OGA	Oil and Gas Authority
OGUK	Oil and Gas UK
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
P&A	Plug and Abandonment
PDO	Potential dropped objects
Perenco	Perenco Gas (UK) Limited
PL	Pipeline
PWA	Pipeline Works Authorisation
rel	Relative to
Te	Tonnes
TFSW	Transfrontier Shipment of Waste
TGT	Theddlethorpe Gas Terminal
UK	United Kingdom

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Appendices

1 Executive Summary

1.1 Decommissioning Programme

This document contains a partial decommissioning programme for the removal of potential dismantlement obstructions on the Pickerill A and Pickerill B installations which are part of the Pickerill field, these obstructions include:

- The telecommunications (telecom) tower and associated equipment
- Equipment and appurtenances located below the cellar deck
- Tertiary steelwork supporting the equipment located below the cellar deck

The remaining infrastructure and equipment on the Pickerill field A & B installations which are on the Section 29 Notice will be subject to separate decommissioning programmes at the end of field life; this includes a full Pickerill A & B Installations Decommissioning Programme and a Pickerill A & B Pipeline Decommissioning Programme. The infrastructure and equipment removed under this Partial DP will not prejudice any other further decommissioning activity on the Pickerill A & B platforms.

During the Hydrocarbon Free (HCF) campaign, Perenco Gas (UK) Limited (Perenco) propose to remove the telecom towers on the Pickerill A and Pickerill B installations for the following reasons:

- To aid removal of the topsides during the dismantlement phase by reducing obstruction and stability concerns
- To reduce the duration of a Heavy Lift campaign and associated costs if the tower was removed by a Heavy Lift Vessel
- To eliminate the risks associated with the structural integrity of the towers during Lighthouse Mode and dismantlement and the associated financial consequences

Whilst the telecom tower was historically used to support communication in the area, it is no longer a requirement for the platform operation as alternative technologies are now available. In the very unlikely case of reinstatement of the platform past the removal of the communication tower, a communication dish would be installed to ensure a similar level of communication.

In addition, Perenco are currently looking at alternative options for removal of the topsides and jacket. These options include ‘skidding’ or ‘floating’ the topsides and/or jackets and would require the removal of the towers, equipment and appurtenances below the cellar deck, and associated tertiary support steelwork located below the cellar deck prior to the removal phase.

Not being able to perform the removal of these obstructions during the HCF phase would result in additional offshore works and associated safety related, environmental and cost implications. It would also restrict the flexibility for Perenco to investigate and implement alternative removal methodologies as per the expectations set by the OGA, which may result in additional costs for all parties involved.

1.2 Requirement for Decommissioning Programme

Installations:
In accordance with the Petroleum Act 1998, the Section 29 notice holders of the Pickerill field (see Table 1.1) are applying to The Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for the partial decommissioning of the installations detailed in Section 2.1. See also Section 7 - Partner Letter of Support.

The decommissioning programme is submitted in compliance with national and international regulations and OPRED guidelines. The schedule outlined in this document is for a five-year decommissioning project plan due to begin in December 2018.

A Cessation of Production application for the Pickerill field has been approved by the Oil and Gas Authority; the field ceased production in July 2018. It is no longer economic to operate the Pickerill field after 2018. Additionally, the Theddlethorpe Gas Terminal to which Pickerill Gas was exported to shut down in October 2018. The remaining potential within Pickerill, combined with the prospectivity of near-field opportunities, is inadequate to merit additional expenditure through pipelines to re-route gas, infill wells to increase production or wells to appraise nearby prospects.

1.3 Overview of Infrastructure Being Decommissioned

The Pickerill Field comprises of two normally unmanned installations (NUI); Pickerill B (44/11a) and Pickerill A (48/11b). The design and layout of Pickerill B and Pickerill A are the same, except that the Pickerill A installation has a sub-cellar deck fabricated in 2014 to accommodate the Juliet Field development (i.e. the Juliet ESDV and appurtenances), and Pickerill B does not have a sub-cellar deck.

The two NUI platforms are connected via two pipelines: a 16” export gas pipeline (PL818) and the 3” Methanol pipeline (PL819). Pickerill A is connected to the Theddlethorpe Gas Terminal (TGT) via the 24” gas export pipeline (PL816) and the 3” Methanol pipeline (PL817). The Theddlethorpe Gas Terminal COP has also been approved and the terminal is no longer operating.

The Juliet subsea development owned by Neptune E&P Ltd (Neptune) is located to the west of the Pickerill Field and comprises of two subsea (free flowing) wells. The Juliet development was connected to Pickerill A via a 12” pipeline (PL3121) in 2014. Neptune received approval of COP for the Juliet Field for 12 December 2018, and have submitted a Pipeline DP for decommissioning of the Juliet pipeline.

The Pickerill A & B steel telecommunications towers (height = 65m, mass = 33 Te) are located at the south-east corner of the main decks of Pickerill A and Pickerill B (ref. Figure 1.2a below). The tower is supported on a cantilevered triangular support frame. The transmit and receive antennae (i.e. satellite dishes) are situated on the telecom tower. The tower is illuminated by floodlights and red obstruction lights at various levels.

At the point of tower removal, the platforms will no longer be producing and will not be under the control of the Bacton Control Room. The telecom towers are therefore no longer required. If unforeseen events force the abandonment of the HCF campaign, a temporary dish will be installed on the handrail; reinstating communications to the Bacton Control Room if required.

Two different options were considered for the removal of the telecom tower:

- Option 1 – working at height, cut the top section of the tower by working at height. Using the main 300 Te jack-up crane, lift the top section onto a transport barge in a vertical position and seafasten. Then, working at height, remove the rest of the tower in a piecemeal fashion from the platform.
- Option 2 - working at height, cut the tower into three sections. Using the main 300 Te jack-up crane, lift each section onto a transport barge, and once the section is on the transport barge, rig up the lower end of the section and up-end the section using the secondary 75 Te jack-up crane. Finally, lay each section on its side and seafasten on the transport barge.

The first option was discounted as the process would be less efficient and would result in significant amount of overboard working and working at height with significantly greater safety implications.

The tower will therefore be cut into 3 sections; top section from EL +57.150m to EL +65.000m; middle section from EL +34.350m to EL +57.150m; bottom section EL +0m to EL +34.350m. The sections will be laid down on the transport barge in the methodology depicted in Figure 1.1 below.

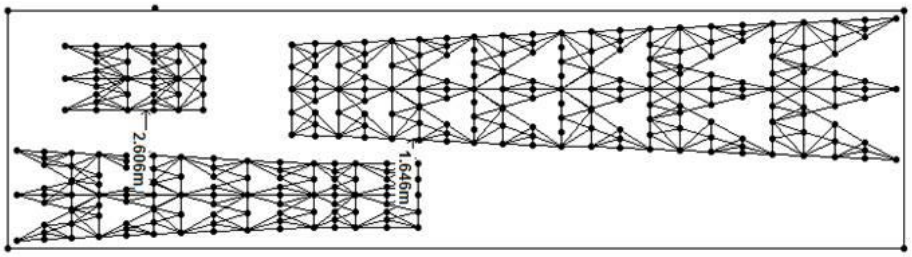

Figure 1.1: Positioning of tower sections on the transport barge

Once HCF verification has been achieved, the following equipment which is located below the cellar deck will be removed on Pickerill A and Pickerill B as they are potential dismantlement obstructions:

- Caissons, associated tanks and lift pumps (i.e. Seawater, Drains, Diesel Overflow, Greywater)
- Supply hoses (i.e. fresh water and diesel)
- Pipeline riser ESDVs

The associated tertiary steelwork used to support the equipment listed above and all appurtenances including pipework, hydraulic power units, cabling, signage, access ladders/steps, etc. associated with the equipment listed above, will be removed.

The removal of the riser ESDVs will be subject to an approved PWA variation from the OGA.

In order to accommodate the Juliet development, a sub-cellar deck structure was fabricated on Pickerill A in order to locate a temporary sphere launcher and the associated Juliet riser ESDV and associated pipework and appurtenances (Ref. Figure 1.2b below). The temporary sphere launcher has since been removed.

Whilst the engineering performed to date has confirmed the need for removal of all items below the cellar deck on Pickerill B, the different design associated with Juliet incoming riser on Pickerill A might alter the preferred option for dismantlement preparation. At the present time, it is proposed that the Juliet riser ESDV and the fabricated sub-cellar deck is dismantled and removed on Pickerill A. However, OPRED will be kept aware of the preferred solution and rationale in due time for the removal of the Pickerill A sub-cellar deck.

It should be noted that the list of equipment to be removed during the HCF campaign (presented above) is not exhaustive. The following types of redundant equipment are decommissioned and may be removed from the platform in preparation for the Lighthouse Mode:

- All temporary equipment including portable firefighting equipment, temporary pumps, smoke detectors, CO_2 cylinders, and non-integral batteries
- Equipment that can be reused on Perenco's producing platforms, this includes power generation equipment, pumps, hydraulic power units, and decommissioned/redundant lifesaving equipment (e.g. life rafts, life jackets, etc.)
- Potential dropped objects (PDOs) which could lead to a major accident hazard identified during the PDO sweeps; this includes gratings, pipe supports, cable trays and supports, ladder racks, etc. Crane wire ropes, blocks and hook are also removed as the cranes are decommissioned and made redundant and will not be maintained during the lighthouse period.

- Existing platform navigational aids. These will be replaced with two self-contained solar powered Aid to Navigation systems (AtoNs), which will be commissioned and fully functional prior to the departure of the jack-up barge.

The primary and secondary structure will not be modified during the HCF campaign and are not affected by the removal of the equipment or tertiary steelwork. In addition structural analysis has verified that removing the equipment and steelwork will not impact on the Centre of Gravity of the platform prior to removal of the topsides and will not result in stability issues. Tower lift analysis has also verified that the tower structure will withstand the expected lift and upend loads during its removal.

During the HCF campaign, the platform wells will be plugged and abandoned in compliance with the HSE regulation, i.e. “The Offshore Installations and Wells (design and construction etc.) Regulations 1996”, and in accordance with OGUK Well Decommissioning Guidelines, Issue 6, June 2018. The wellheads, Xmas trees and conductors will therefore be removed in order to decommission the wells to Phase 3 abandonment.

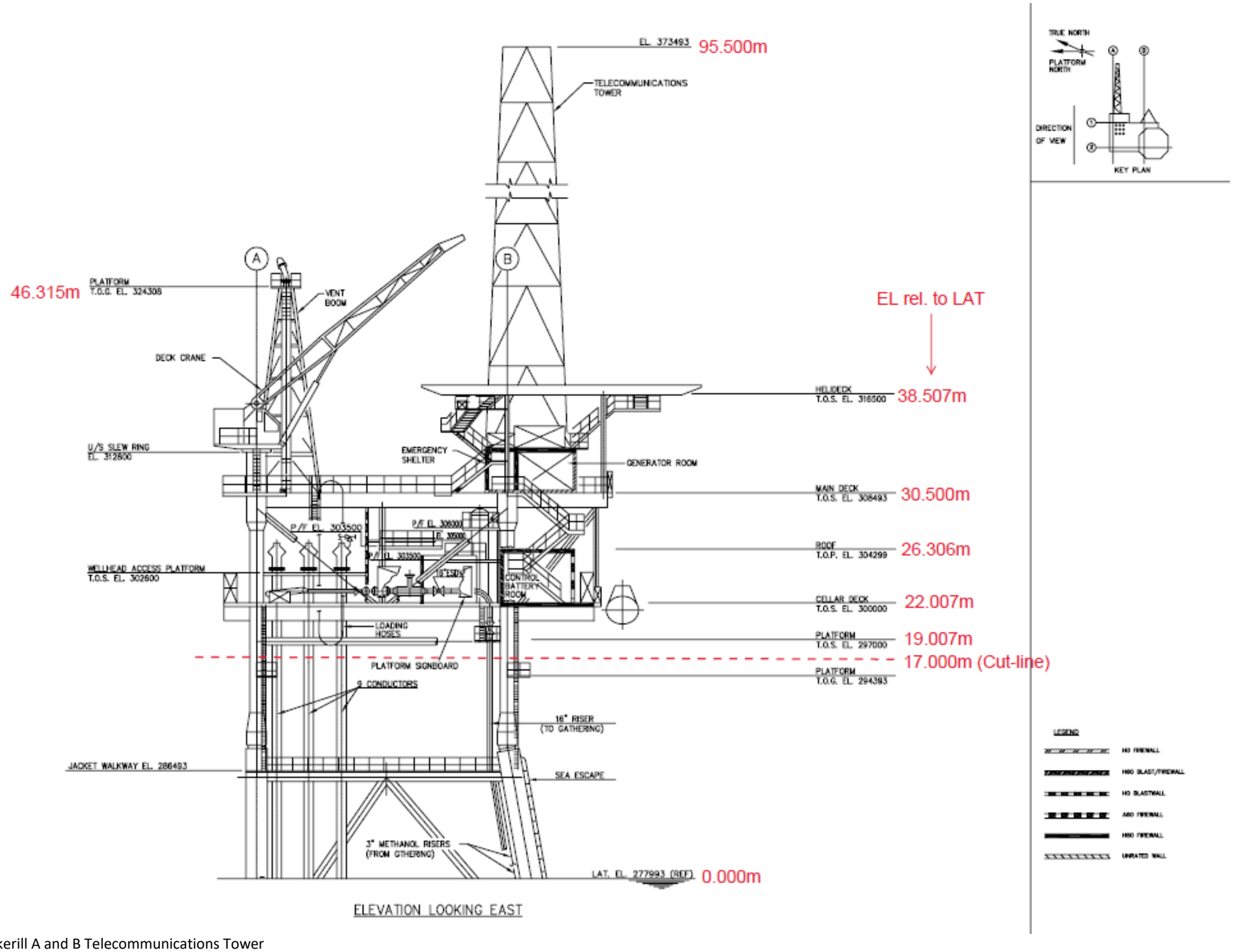

Figure 1.2a: Elevation and position of Pickerill A and B Telecommunications Tower

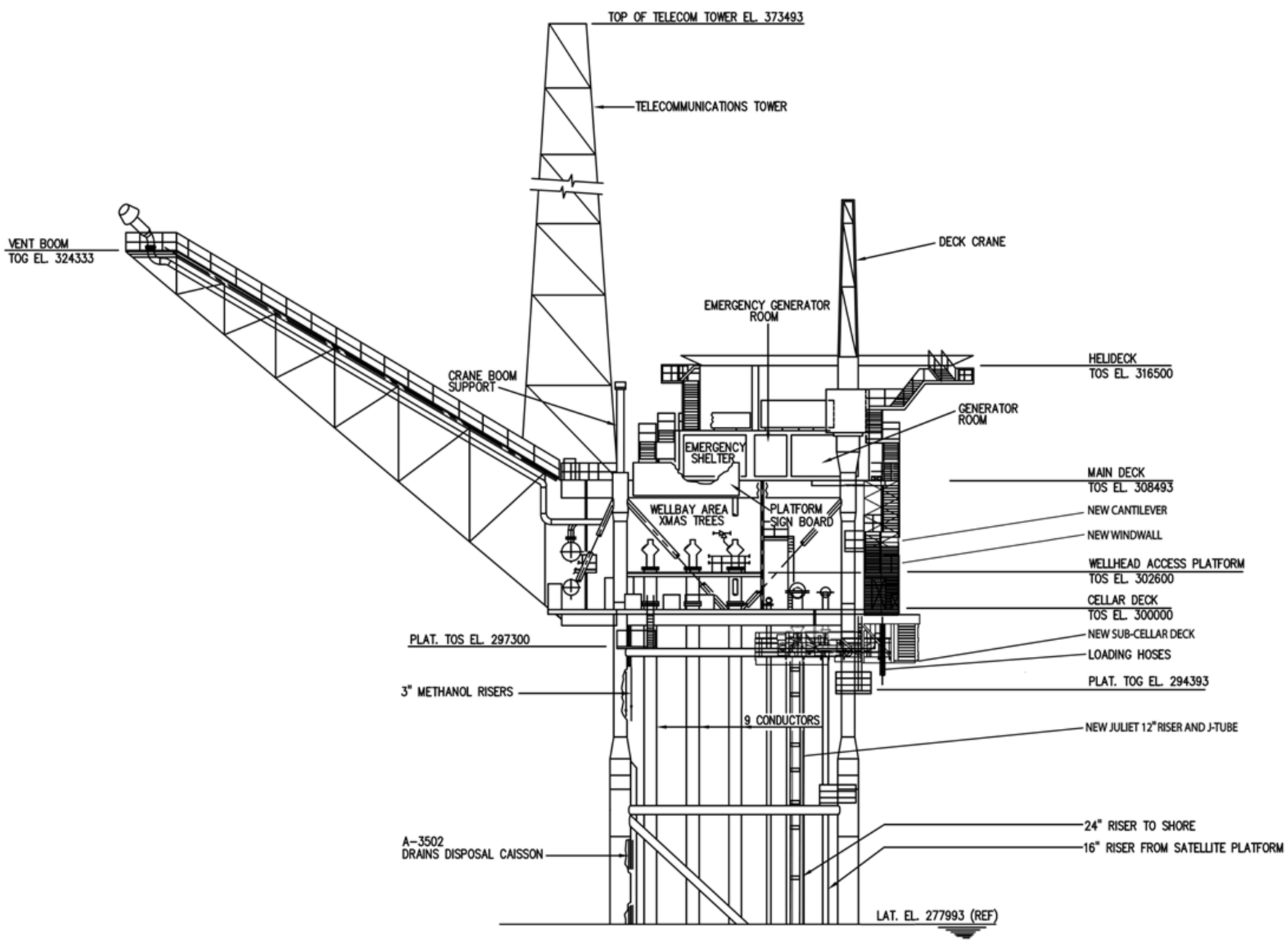

Figure 1.2b: Elevation and position of Pickerill A Sub-cellar deck

1.4 Field Location

The Pickerill gas field is located in the United Kingdom Continental Shelf (UKCS) Block 48/11 in the Southern North Sea, 65km offshore from the Theddlethorpe Gas Terminal (TGT). The Pickerill Field comprises of two normally unmanned installations (NUI); Pickerill B (44/11a) and Pickerill A (48/11b). Pickerill B lies to the east of Pickerill A platform. The Juliet Field subsea development is tied-back to the Pickerill A platform.

Figure 1.3: Pickerill A and B location within Southern North Sea

Figure 1.4: Field Layout

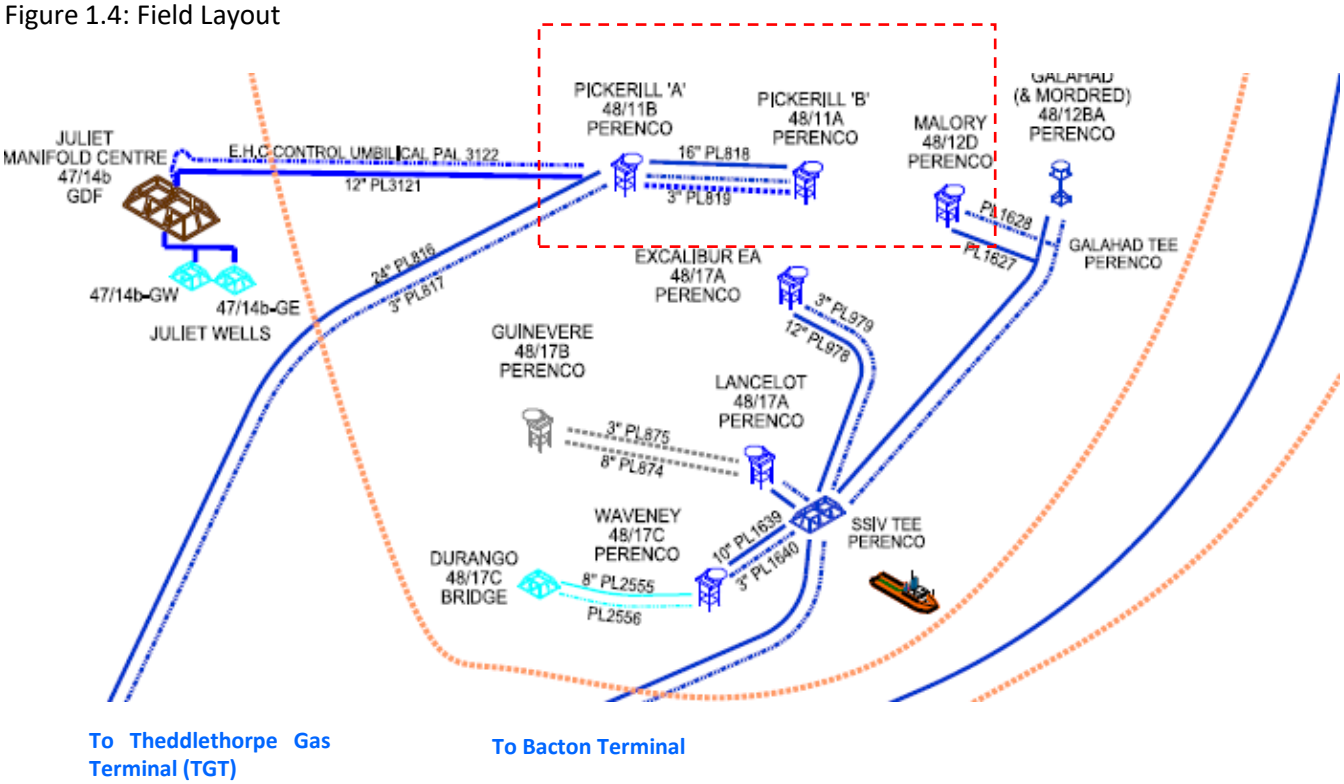

Table 1.1 - Installations Section 29 Notice Holders Details		
Section 29 Notice Holder	**Registration Number**	**Equity Interest (%)**
Perenco Gas (UK) Limited	00715529	94.78
Marubeni Oil and Gas (U.K.) Limited	03947050	5.22
Apache Beryl I Limited	BR001327	0.00
Arco British Limited, LLC	BR001713	0.00
Marubeni Oil & Gas (North Sea) Limited	SC238015	0.00
Noble Energy (SIE) Limited	SC071090	0.00
Noble Energy (Oilex) Limited	00797339	0.00
Perenco UK Limited	04653066	0.00
Petro-Canada Energy North Sea Limited	03084447	0.00

2 Description of Items to Be Decommissioned

2.1 Installations

Table 2.1a – Description of Items to be Decommissioned on Pickerill A			
Installation	**Size/Weight (Te) if relevant**	**Location (WGS84 Decimal)**	**Comments**
Pickerill A – Telecom Tower	Height - 65m Mass - 33 Te	53° 32' 59.81" N 01° 04' 37.99" E	The weight includes the steel tower, antennae and lights
Pickerill A – Sub-cellar deck equipment & appurtenances	Mass - 36 Te		Includes: - Supply hoses (i.e. fresh water and diesel) - Pipeline riser ESDVs - Caissons, associated tanks and lift pumps (i.e. Seawater, Drains, Diesel Overflow, Greywater) And all appurtenances including pipework, hydraulic power units, cabling, signage, access ladders/steps, etc. associated with the equipment listed above
Pickerill A – Sub-cellar deck tertiary steelwork	Mass - 122 Te		Sub-cellar deck tertiary steelwork supporting sub-cellar deck equipment
Pickerill A – Equipment for re-use and PDOs	Mass – 5 Te (estimate)		The weight is an estimate and includes: - Temporary equipment - Equipment for reused on Perenco's producing platforms, e.g. pumps, HPUs - Potential dropped objects (PDOs) - Existing platform navigational aids

Table 2.1b – Description of Items to be Decommissioned on Pickerill B			
Installation	**Size/Weight (Te) if relevant**	**Location (WGS84 Decimal)**	**Comments**
Pickerill B – Telecom Tower	Height - 65m Mass - 33 Te	53° 31' 29.78" N 01° 09' 38.40" E	Includes the steel tower, antennae and lights
Pickerill B – Equipment & appurtenances below the cellar deck	Mass - 18 Te		Includes: - Supply hoses (i.e. fresh water and diesel) - Pipeline riser ESDVs - Caissons, associated tanks and lift pumps (i.e. Seawater, Drains, Diesel Overflow, Greywater) And all appurtenances including pipework, hydraulic power units, cabling, signage, access ladders/steps, etc. associated with the equipment listed above.
Pickerill B – Tertiary steelwork below the cellar deck	Mass - 11 Te		Tertiary steelwork supporting all equipment and appurtenances below the cellar deck.
Pickerill B – Equipment for re-use and PDOs	Mass – 5 Te (estimate)		Estimate only and includes: - Temporary equipment - Equipment for reused on Perenco's producing platforms, e.g. pumps, HPUs - Potential dropped objects (PDOs) - Existing platform navigational aids

2.2 Inventory Estimates

The removed equipment, appurtenances and steelwork will be transported onshore to a dismantlement yard for reuse, recycling or disposal.

Table 2.2a- Inventory Estimate for Pickerill A		
Material	**Weight (Te)**	**Estimated volume (m^3)**
Steel	196	25
Concrete	0	0
Plastic	Negligible	Negligible
Non Ferrous	0	0
Hazardous	0	0
Radioactive waste (NORM etc.)	0	0
Other	Negligible	Negligible

Table 2.2b- Inventory Estimate for Pickerill B		
Material	**Weight (Te)**	**Estimated volume (m^3)**
Steel	67	9
Concrete	0	0
Plastic	Negligible	Negligible
Non Ferrous	0	0
Hazardous	0	0
Radioactive waste (NORM etc.)	0	0
Other	Negligible	Negligible

3 Removal and Disposal Methods for Wastes

In line with the waste hierarchy, the re-use of the removed equipment is the preferred decommissioning option.

Perenco will initially assess options for relocation of the equipment to another producing asset, adding to our existing asset portfolio spares inventory, or for resale to the open market. However, recovered material that cannot be re-used by Perenco will be landed ashore for disposal by a contractor in accordance with the Waste Framework Directive.

It is not possible to forecast the wider reuse market with any accuracy or confidence this far forward. Perenco will continue to track reuse market trends in order to seize reuse opportunities at the appropriate time.

At present, Perenco do not intend to ship the recovered material outside of the UK; however, in the event that we do ship the material outside of the UK, a Transfrontier Shipment of Waste (TFSW) permit will be required. In this eventuality, Perenco will liaise with the relevant Waste Authority and ensure that all relevant permits and consents are in place in accordance with the Transfrontier Shipment of Waste Regulations 2007 (as amended).

Table 3.1 - Waste Stream Management Methods	
Waste Stream	**Removal and Disposal method if applicable**
NORM/LSA Scale	Tests for NORM will be undertaken offshore by the Radiation Protection Supervisor and any NORM encountered will be dealt with and disposed of in accordance with guidelines and company policies and under appropriate permit.
Asbestos	No asbestos has been documented specifically for Pickerill but in the event that small quantities are found they will be dealt with and disposed of in accordance with guidelines and company policies.
Other hazardous wastes	Other hazardous waste will be recovered to shore and disposed of according to guidelines and company policies and under appropriate permit.
Onshore Dismantling sites	Appropriate licensed sites will be selected. The dismantling site must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver innovative re-use and recycling options

4 Environmental Appraisal Overview

It is proposed that the removal of the dismantlement obstructions is carried out during the HCF campaign with the support of a jack-up barge. All necessary environmental permits associated with locating the jack-up barge on site to complete this work are in place, e.g. Consent to Locate.

As this work is to remove topsides equipment, OPRED have advised Perenco that no Environmental Appraisal for the removal of the obstructions is required.

An approved Marine Licence will be required to carry out the removal of the well conductors as the conductors will need to be cut below the seabed in accordance with industry guidelines.

5 Interested Party Consultations

Consultations Summary:

Perenco are currently developing the Environmental Appraisal for the Pickerill A & B Installations DP; as part of this process the following stakeholders have been informed via a stakeholder consultation letter of the intention to remove the Pickerill Field installations. No specific comments with respect to the removal of topsides infrastructure or equipment have been received.

- *Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)*
- *Environment Agency (EA)*
- *Oil and Gas Authority (OGA)*
- *North Norfolk District Council*
- *Lincolnshire Council*
- *Joint Nature Conservation Committee (JNCC)*
- *Centre for Environment, Fisheries and Aquaculture Science (CEFAS)*
- *Natural England*
- *Global Marine Systems Limited*
- *National Federation of Fishermen's Organisations (NFFO)*

In addition, Perenco meet with OPRED and OGA at quarterly meetings where forthcoming decommissioning programmes are discussed.

The Health and Safety Executive have been informed of Perenco's proposal to remove the potential dismantlement obstructions during the HCF campaign via the Safety Case process for the Pickerill Field.

6 Programme Management

6.1 Schedule

Project Plan:

Perenco propose to carry out the removal of the potential dismantlement obstructions during the HC campaign for the Pickerill A and Pickerill B platforms. The Pickerill B campaign will be carried out before the Pickerill A HCF campaign. The Pickerill B campaign will be commence in December 2018 and is due for completion in Q2 2019. The jack-up barge will then move to Pickerill A to commence the Pickerill A HCF campaign. The Pickerill A HCF campaign is due for completion in Q4 2019. (Ref. Figure 6.1).

Based on the current plan for Pickerill B, the proposal to remove the dismantlement obstructions is planned for during the HCF campaign and once approval has been granted via this partial DP. On Pickerill A the potential obstructions will be removed while the jack-up barge is on location, a more specific plan will be developed as the engineering progresses.

Year	2018				2019				2020				2021				2022				2023			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
HCF - Pickerill B																								
Pre-engineering/planning																								
Pre-decommissioning surveys																								
Pipeline flushing																								
Well P&A																								
Purge topside and leave platform black																								
Verify HCF																								
HCF - Pickerill A																								
Pre-engineering/planning																								
Pre-decommissioning surveys																								
Pipeline flushing																								
Well P&A																								
Purge topside and leave platform black																								
Verify HCF																								

Figure 6.1 – Project Schedule for Pickerill Field HCF campaigns

Proposed timing of telecom tower removal (to be optimised for weather window opportunities)

6.2 Costs

A cost estimate for the preparation, removal and disposal of the platform and jacket will be provided to OPRED with the full Pickerill A & B Installations Decommissioning Programme. As the removal of the dismantlement obstructions is part of a much larger scope of work within the HCF campaign we are not able at this time to provide an accurate cost estimate for the specific activities required to complete the removal of the towers.

The decommissioning costs for the scope of work detailed within this partial DP will be provided to OPRED upon completion of this discrete scope of work.

7 Partner Letter of Support

Marubeni
Oil & Gas (U.K.)

Attention: Debbie Taylor
Senior Decommissioning Manager
OPRED – BEIS
AB1 Building
Crimon Place
Aberdeen, AB10 1BJ

13 March 2019

Dear Ms Taylor

PETROLEUM ACT 1998
DISCRETE DECOMMISSIONING PROGRAMME - PICKERILL A&B INSTALLATIONS
TELECOMMUNICATION TOWERS

We, Marubeni Oil & Gas (U.K.) Limited, confirm our support of the proposals detailed in the Discrete Decommissioning Programme for the Pickerill A&B Installations Telecommunications Towers dated 12th March 2019 (the, "Discrete Decommissioning Programme").

We also authorise Perenco Gas (UK) Limited to submit the Discrete Decommissioning Programme to the Secretary of State for approval under section 29 of the Petroleum Act 1998.

Yours sincerely

For and on behalf of Marubeni Oil & Gas (U.K.) Limited
Gary Nienow
Director

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