bp

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Friday 6th May 2011

For the attention of:
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Dear Kevin,

Re: Don Decommissioning Programme Petroleum Act 1998

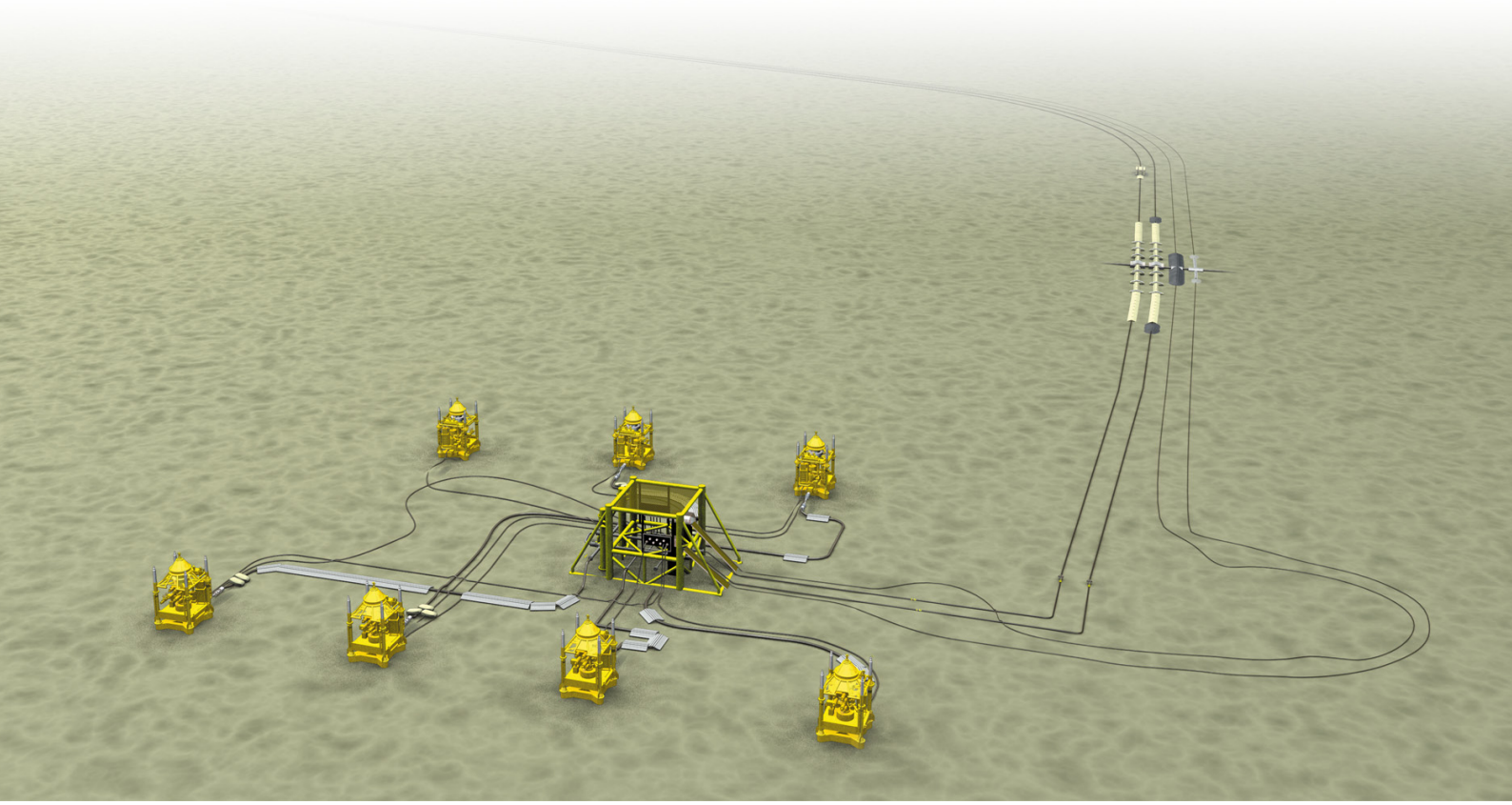
The Don Co-Ventures- Britoil Public Limited Company and ConocoPhillips Theta Limited herby formally submit to the Secretary of State, the Abandonment Programmes for the Don Field and Pipelines PL 598, PL 599 and PL600. This is in accordance with the letters from Mr Kevin Munro of the Offshore Decommissioning Unit, acting on behalf of the Secretary of State for Energy and Climate Change, dated the 7th of April 2011, ref 12.04.06.08/19.c

For reference, Kevin Munro's letter of the 7th April 2011 directed the Don Co-Ventures to submit Abandonment Programmes for the Don Field installation and Submarine Pipelines in accordance with the relevant notices issued under section 29(1) of the Petroleum Act.

Yours Faithfully
For and on behalf of Britoil plc

Trevor Garlick
Regional President – BP North Sea

Don Field Decommissioning Programme



DON-BP-001

May 2011

Contents

Glossary of Terms

Definitions

A

Algae	Various chiefly aquatic, eukaryotic, photosynthetic organisms, ranging in size from single-celled forms to giant kelp.
Alternating Current (ac)	An electrical current where the magnitude of the current varies in a cyclical form.

B

Barrel (bbl)	A measurement of oil with one barrel equalling 159 litres, 35 imperial gallons, 42 US gallons or 0.159m^3.
Benthic	Relating to the bottom of the sea.
Benthic Epifauna	Organisms living on the seabed.
Benthic Infauna	Organisms living in the seabed.
Benthos	Animals living on, in or near the seabed.
Buckle	A pipeline arch upward into the sea or sideways across the bottom due to the axial compressive force induced by the operating temperature and pressure.

C

Cathodic Protection	Blocks (anodes) attached to steel structures and pipelines to reduce corrosion by sacrificial loss of anode material.
Centimetre (cm)	A metric unit of distance, equal to 0.01 metre. One centimetre is approximately 0.394 inches.

D

Demersal	Dwelling at or near the bottom of the sea.
Drill Cuttings	Rock chippings that result from drilling operations.
Drilling Mud	A mixture of clays, chemicals and water pumped down the drill pipe to lubricate and cool the drilling bit, and to flush out the cuttings, strengthen the sides of the hole and contain the downhole pressure whilst drilling.

Definitions (cont'd)

E

Emergency Response and Rescue Vessel (ERRV)	New terminology replacing Standby Vessel (SBV).
Ethylene Propylene Diene Monomer (EPDM)	A closed-cell industrial grade rubber used to insulate pipelines.
Exposure	An uncovered section of pipeline or umbilical which has previously been trenched and backfilled or protected by other means.

F

Fisheries Research Services (FRS)	An executive agency of the Scottish Executive Environment and Rural Affairs Department.
Fishsafe	A computer-based early warning system, developed by Oil & Gas UK (formerly UK Offshore Operators Association (UKOOA)) for the fishing industry to warn of the presence of surface and subsea obstructions.
Flowline	Small diameter pipeline on the seabed.

G

Gram (g)	A unit of mass in the metric system equal to approximately 0.035 ounce. Refer also to kilogram.
Grout Bags	Polypropylene bags pre-filled with grout or sand, typically weighing 25kg for ease of handling by divers. Bags can be stacked and are normally used for pipeline stabilisation. Larger bags, up to several cubic metres, can also be used but these require filling at the location.
Grout Formwork	A heavy-duty reinforced polypropylene bag deployed to its location and then injected with grout to provide a rigid protection feature. Size and shape vary according to the protection required. Also known as canvas mattresses.

H

Hertz (Hz)	A unit of measurement of frequency, equivalent to one cycle per second.

I

IN	Identification for Don Field water injection well followed by well number, eg IN07.

Definitions (cont'd)

J

K

Kilogram (kg)	A metric unit of weight. One kilogram equals 1000 grams, approximately 2.205 pounds. Refer also to gram.
Kilometre (km)	A metric unit of distance. One kilometre equals 1000 metres, approximately 0.62 miles.
Kilometre Post/Point (KP)	A measurement taken from a source point (Thistle Installation for the Don Field) along a pipeline or umbilical.
Kilometres per Hour (kph)	A metric unit of speed. 1 kilometre per hour is approximately 0.621 miles per hour.

L

Low Specific Activity (LSA) Scale	A by-product of Naturally Occurring Radioactive Material (NORM) in the reservoir water that can deposit in pipework and process equipment.

M

Mattress (Flexible)	Cubic or hexagonal concrete blocks linked together by rope and used to stabilise pipelines. Also known as flexiweight mattress.
Metre (m)	The metric unit of distance. One metre is approximately 1.094 yards.
Metres per Second (m/s)	A metric unit of speed. One metre per second is approximately 3.28 feet per second.
Microgram (µg)	A metric unit of mass equal to one millionth of a gram. Refer also to gram.
Millimetre (mm)	A metric unit of distance. One millimetre equals 0.001 metres, approximately 0.039 inches.

N

Nanogram (ng)	A metric unit of mass equal to 10^{-9} gram. Refer also to gram.
North Sea Task Force (NSTF)	An organisation set up by North Sea governments to assess the patterns of inputs and dispersion of contaminants, ecological conditions and effects of human activities.

Definitions (cont'd)

O

OSPAR	Oslo and Paris Commissions who have worked as one since 1992 as the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic.
OSPAR Decision 98/3	This decision covers the Disposal of Disused Offshore Installations, effective 9th February 1999.

P

Pelagic	Organisms that swim or drift in a sea or lake, as distinct from those that live on or near the bottom. Includes plankton, fish species (eg herring, capelin) and oceanic birds.
Phytoplankton	Microscopic plants that float in aquatic or marine environments.
Pig	A device, self-driven or propelled through a pipeline by pressure difference, used for cleaning and/or inspection purposes (the activity is known as pigging).
Plankton	Small or microscopic organisms, including algae and protozoans that float or drift in great numbers in fresh or salt water, especially at or near the surface.
Plug (and abandon)	A method of permanently sealing a well by injecting cement grout down the well.
PN	Identification for Don Field production well followed by well number, eg PN06.
Polycyclic Aromatic Hydrocarbon (PAH)	A hydrocarbon compound with multiple benzene rings. PAHs are typical components of asphalts, fuels, oils and greases. Also known as polynuclear aromatic hydrocarbons.
Pose Little Or No Risk (PLONOR)	An OSPAR list of substances/preparations used offshore which are considered to pose little or no risk to the environment.

Q

R

Reverse Reeling	A method of retrieving a flexible pipeline from the seabed using a storage reel on board a vessel.

Definitions (cont'd)

Riser(s)	Tubulars, flexible or rigid pipe that connects the topsides facilities to those on the seabed.
Rock Dump	A mixture of natural rock used to reinstate the depth of cover over lines or for stabilising the seabed against scouring. Rock dump containing smaller particles may also be called gravel dump.

S

Safety Case	A document required by law under the Offshore Installations (Safety Case) Regulations, SI 1992/No 2885 for fixed and mobile Installations operating in British waters and in UK designated areas of the continental shelf. The document describes the Installation systems, management of health and safety, and control of major hazards.
Section 29 Notice Holders	The mechanism by which the Government balances taxpayer protection and increasing UKCS productivity through licence trading is by the serving and withdrawal of notices under Sections 29 and 31(5) of the Petroleum Act 1998, as amended by the Energy Act 2008. Notices under Section 29 of the Petroleum Act may be served on those persons (ie Section 29 Notice Holders) with any interest of a kind set out in Section 30(1) of the Petroleum Act in respect of each individual offshore Installation on the UKCS, and in respect of Section 30(2) of the Petroleum Act in respect of each individual offshore pipeline. These Section 29 notices require the recipient to submit a decommissioning programme at such time as the Secretary of State may call for it.
Serving	A strong outer layer of material used to protect the inner layer of a cable or umbilical.
Span	A stretch of pipeline or umbilical that has become unsupported.
Statutory Instrument (SI)	Statutory Instruments are parts of UK law, separate from Acts of Parliament, which do not require full parliamentary debate before becoming law. These are usually brought to Parliament by a Government Minister, exercising legislative powers delegated to them by an Act of Parliament.

T

Tonne	A metric unit of weight equal to 1000 kilograms or approximately 2204.6 pounds.
Topsides	Installation facilities above the waterline.

Definitions (cont'd)

U

V

Volts (V)	A unit of electric potential.

W

Wellhead	An assembly that provides termination of a wellbore above seabed level, incorporating facilities for installing casing hangers and hanging the production tubing. A xmas tree sits on top of the wellhead.

X

Xmas Tree	An assembly of piping and valves installed on the wellhead to control the flow of the well and provide a means of entry for well intervention.

Y

Z

Zooplankton	Microscopic animals that move passively in aquatic ecosystems.

Abbreviations

A

ac	alternating current
ALARP	As Low As Reasonably Practicable
API	American Petroleum Institute
ASTM	American Society for Testing and Materials

B

Ba	Barium
BAT	Best Available Technique
bbl	barrel
BEP	Best Environmental Practice
BERR	(Department for) Business Enterprise and Regulatory Reform (formerly Department of Trade and Industry (DTI). See also DECC
BoD	Basis of Design
BOP	Blowout Preventer
bpd	barrels per day
Britoil plc	Britoil public limited company (a subsidiary of BP)

C

cm	centimetre
CNR	Canadian Natural Resources Limited
ConocoPhillips	ConocoPhillips (UK) Theta Limited
COP	Cessation of Production
CoP	ConocoPhillips (UK) Theta Limited
Cr	Chromium
cSAC	candidate Special Area of Conservation
Cu	Copper
CVP	Capital Value Process

Abbreviations (cont'd)

D

DCR	The Offshore Installation and Wells (Design and Construction etc) Regulations, SI 1996/No 913
DECC	Department of Energy and Climate Change **Note:** DECC was created in October 2008, bringing together energy policy (previously with BERR) with climate change mitigation policy (previously with DEFRA). For the purposes of this document, any BERR/DTI documentation will be referred to as DECC documents.
DEFRA	Department for Environment, Food and Rural Affairs
dSAC	draft Special Area of Conservation
DSV	Diving Support Vessel

E

EA	Environmental Assessment
EC	European Community
EIA	Environmental Impact Assessment
EMEA	Europe, Middle East and Africa (Lloyds Register EMEA)
ENVHID	Environmental Hazard Identification
ENVID	Environmental Issue Identification
EPDM	Ethylene Propylene Diene Monomer
EPR	Ethylene Propylene Rubber
EPS	Expandable Polystyrene
ERRV	Emergency Response and Rescue Vessel
ES	Environmental Statement
ESDV	Emergency Shutdown Valve
EU	European Union

F

FBE	Fusion Bonded Epoxy
FEPA	Food and Environment Protection Act 1985
FRS	Fisheries Research Services

Abbreviations (cont'd)

G

g	gram
GHG	Greenhouse Gas
GRP	Glass Reinforced Plastic
GSWA	Galvanised Steel Wire Armour
GVI	General Visual Inspection

H

HAZID	Hazard Identification
HAZOP	Hazard and Operability
HMSO	Her Majesty's Stationery Office
HSE	Health, Safety and Environment (BP terminology)
HSE (OSD)	Health and Safety Executive (Offshore Safety Division)
Hz	Hertz

I

ICES	International Council for the Exploration of the Sea
in	inch
IVB	Independent Verification Body

J

JIP	Joint Industry Project
JNCC	Joint Nature Conservation Committee

K

kg	kilogram
km	kilometre
KP	Kilometre Post/Point
kph	kilometres per hour

L

LAT	Lowest Astronomical Tide
LSA	Low Specific Activity
LWIV	Light Well Intervention Vessel

Abbreviations (cont'd)

M

m	metre
MAOP	Maximum Allowable Operating Pressure
MAPD	Major Accident Prevention Document
MCA	Maritime and Coastguard Agency
MDBRT	Mean Depth Below Rotary Table
mm	millimetre
MMSTB	Million Stock Tank Barrels
MODU	Mobile Offshore Drilling Unit
m/s	metres per second

N

NB	Nominal Bore
Ng	Nanogram
NLGP	Northern Leg Gas Pipeline
NORM	Naturally Occurring Radioactive Material
NPD	Nitro-o-PhenyleneDiamine
NSTF	North Sea Task Force

O

OD	Outside Diameter
OGUK	Oil & Gas UK (formerly the United Kingdom Offshore Operators Association (UKOOA))
OiW	Oil in Water
OSPAR	Combined Oslo and Paris Commissions (see definitions)

P

PAH	Polycyclic Aromatic Hydrocarbon
Pb	Lead (chemical symbol)
PBU	Pressure Build-up
PE	Polyethylene
PEP	Project Execution Plan
PGB	Permanent Guide Base
PLL	Potential Loss of Life

Abbreviations (cont'd)

PLL	Probability of Loss of Life
PLONOR	Pose Little Or No Risk
PON	Petroleum Operations Notice
PP	Polypropylene
ppm	parts per million
psig	pounds per square inch gauge
pSPA	potential Special Protection Area
PU	Performance Unit
PVDF	Polyvinylidene Fluoride

Q

QRA	Quantitative Risk Assessment

R

ROV	Remotely Operated Vehicle

S

SAC	Special Area of Conservation
SAE	Society of Automotive Engineers
SAST	Seabirds at Sea Team
SCM	Subsea Control Module
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SI	Statutory Instrument
SMS	Safety Management System
SSSI	Sites of Special Scientific Interest

T

TD	Total Depth
THC	Total Hydrocarbon
TOC	Top of Cement
TOL	Top of Liner
TVDSS	True Vertical Depth Subsea

Abbreviations (cont'd)

U

µg	microgram
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
UKOOA	United Kingdom Offshore Operators Association (replaced in 2007 by Oil & Gas UK (OGUK))
	Note: For the purposes of this document, any UKOOA documentation will be referred to as OGUK documents

V

V	Vanadium
V	Volts

W

WI	Water Injection
WT	Wall Thickness

Section 1
Introduction

1 Purpose

The purpose of this document is to describe the Decommissioning Programmes for the Don North-East and South-West Fields under the Petroleum Act 1998 [1.1]. The programmes have been prepared taking into account the OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations [1.2] and in line with the Department of Energy and Climate Change (DECC) Decommissioning Guidance Notes [1.3].

2 Don Field

The Don North-East and South-West Fields comprises four operating licences, Don North-East (P104, P236 and P296) and Don South-West (P236). The Fields were operated by BP and are located approximately 230km north-east of the Shetland Islands in Block 211/18a in the United Kingdom sector of the northern North Sea, in a water depth of 160m. The Fields were discovered in 1976. Oil was first produced in October 1989, and exported via the Thistle Installation to the Sullom Voe oil terminal on Shetland. The Don Field is illustrated in Figure 1.1.

Britoil public limited company (Britoil plc) and ConocoPhillips (UK) Theta Limited (ConocoPhillips) were granted Cessation of Production (COP) consent from the DECC on 7th January 2005.

The Section 29 Notice Holders for these programmes are Britoil plc and ConocoPhillips (UK) Theta Limited. It is currently estimated that the decommissioning liabilities of each portion is as follows:

- Don North-East: 80.3% Britoil plc 19.7% ConocoPhillips (UK) Theta Limited
- Don South-West: 58.3% Britoil plc 41.7% ConocoPhillips (UK) Theta Limited

Notes: (1) Britoil plc is a subsidiary of BP and, for the purposes of this document, the term 'BP' is used hereafter and ConocoPhillips (UK) Theta Limited will be referred to as ConocoPhillips.

(2) Hereafter, reference within this document to Don North-East and South-West Fields will be called collectively as the 'Don Field'.

As the Don Field no longer serves its intended purpose, the Section 29 Notice Holders submit these Decommissioning Programmes for approval under the Petroleum Act 1998 [1.1] and in line with the DECC Decommissioning Guidance Notes [1.3].

3 Scope

This document describes the Decommissioning Programmes for the following Don Field subsea items:

- Five production wells
- Two water injection wells
- Don subsea manifold

- Infield flowlines, chemical injection and control umbilical jumpers between the subsea manifold and wells
- From the subsea manifold to the Thistle Installation 500m zone (17.3km):
  - 8in production pipeline (PL598)
  - 8in water injection pipeline (PL599)
  - 4in control umbilical (no pipeline number allocated)
  - 3in chemical injection umbilical (PL600)

The Don riser bridge, riser, pipeline and umbilical systems within the platform 500m zone will be decommissioned at the same time as the Thistle Installation.

The Don crossing of the NLGP pipeline will be decommissioned at the same time as the NLGP.

This decommissioning programme does not apply to any other current or future developments in the Don area.

4 Don Field Decommissioning Programmes

This document contains separate Don Field Decommissioning Programmes, submitted by BP on behalf of the relevant Section 29 Holders (BP and ConocoPhillips), for each set of notices [1.4, 1.5] served under Section 29 of the Petroleum Act 1998 [1.1] for the Don Field facilities.

The Decommissioning Programmes are set out in line with the DECC Decommissioning Guidance Notes [1.3] to present the reasoning and activities involved in these programmes. This document presents the two Decommissioning Programmes as one, which is permitted by the guidelines.

The Decommissioning Programmes, together with the applicable sections of this document, are detailed in Table 1.1.

5 References

[1.1] Petroleum Act 1998, http://www.hmso.gov.uk/.

[1.2] The Convention for the Protection of the Marine Environment of the North-east Atlantic OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations, http://www.ospar.org/.

[1.3] DECC Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, http://www.decc.gov.uk/.

[1.4] DECC (Department of Trade and Industry) Notice Under Section 29 of the Petroleum Act 1998 Offshore Installations, Don Field Subsea Equipment, dated 29th June 2004 (RDBF/001/00191C).

[1.5] DECC (Department of Trade and Industry) Notice Under Section 29 of the Petroleum Act 1998 Offshore Installations, Don Field Pipelines, dated 29th June 2004 (RDBF/002/00235C).

No	Decommissioning Programme Description	Applicable Document Sections
1	Subsea Equipment as follows: • Don Field manifold • wellheads • xmas trees	1.0 to 9.0 inclusive 11.0 to 18.0 inclusive
2	Pipelines, Flowlines and umbilicals as follows: • The 8in production pipeline (PL598) from the double spoolpiece flange at the Don manifold to the pig trap on the Thistle topsides, including the associated riser and valves • The 8in water injection pipeline (PL599) from the double spoolpiece flange at the Don manifold to the pig trap on the Thistle topsides, including the associated riser, valves and tee-piece • The 3in chemical injection umbilical (PL600) between the Don manifold and Thistle topsides • The 4in control umbilical between the Don manifold and Thistle topsides • Flowline jumpers, and chemical injection and control umbilical jumpers between the Don manifold and individual wells	1.0 to 3.0, 4.3, 5.3, 6.3, 7.3, 7.5, 9.7.1, 9.7.5, 10.0 to 18.0 inclusive

Table 1.1 Don Field Decommissioning Programmes and Applicable Document Sections

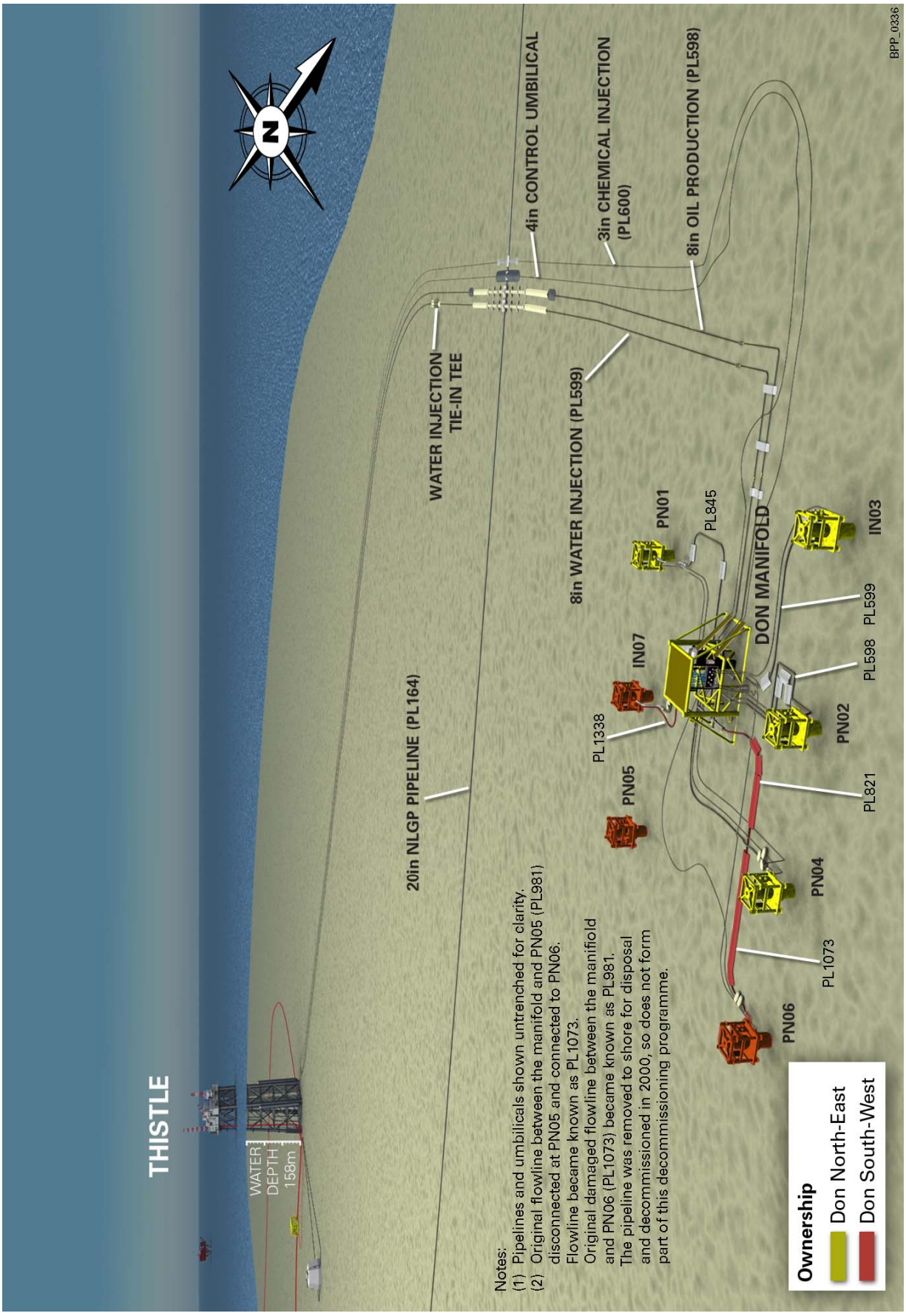


Figure 1.1 Don Field

Section 2
Executive Summary

1 Overview

The objective of these Decommissioning Programmes is to plan and execute the decommissioning of the Don Field in a safe, professional and environmentally responsible manner with an outcome acceptable to the United Kingdom Authorities, the Section 29 Notice Holders and other interested parties.

The Don Field has reached the end of its economic life, having produced a total of 15.8 Million Stock Tank Barrels (MMSTB), with COP [2.1] on 15th January 2005. These Decommissioning Programmes outline the Section 29 Notice Holders' plans for the decommissioning of the following:

- Don Field subsea equipment (ie Don manifold, wellheads – including xmas trees)
- Flowlines, chemical injection and control umbilical jumpers between the wells and the Don manifold
- Pipelines, umbilicals, and protection and stabilisation features between the Don manifold and the Thistle topsides

With a view to decommissioning the above, the Decommissioning Programmes recommend that:

- Wells are plugged and abandoned, and the wellheads and manifold removed (manifold piles will have a clearance to 3m below the existing seabed level)
- All flowlines, associated flexiweight mattresses, chemical injection and control umbilical jumpers between the wells and the Don manifold are removed
- Pipelines and umbilicals between the Don manifold and the Thistle Installation 500m zone are decommissioned in situ
- Flexiweight mattresses and associated uncovered pipe along the pipelines are removed
- Grout formwork will remain in situ subject to successful over trawl trials
- Pipeline and umbilical Northern Leg Gas Pipeline (NLGP) crossings will be deferred until the NLGP is decommissioned
- Sections of the pipeline within the 500 metre zone, the pipebridge, risers and associated topsides equipment at Thistle will be deferred until the Thistle Installation is decommissioned
- Drilling cuttings will be left undisturbed

This Decommissioning Programmes are fully consistent with the Department of Energy and Climate Change (DECC) Guidelines [2.6], and require no derogation from the requirements of OSPAR Decision 98/3 [2.2].

2 Background

The Don Field is located approximately 230km north-east of the Shetland Islands in Block 211/18a in the United Kingdom sector of the northern North Sea and lies in 160m of water. The Field was discovered in 1976 and oil was first produced in October 1989 from which it was then exported via the Thistle Installation to the Sullom Voe oil terminal on Shetland.

As shown in Figure 2.1, fluid from each of the five Don subsea production wells was routed to the Don manifold through a 4in flowline jumper. At the manifold the fluids were commingled and flowed 17.3km south through an 8in production pipeline (PL598) to Thistle, where the fluids were processed.

In February 2000, the Don subsea facilities suffered failure of the control system, with all hydraulic functions lost and only intermittent control communication with the wells.

An initial seabed survey was carried out to identify any debris. A fishing net and associated trawl debris were then recovered.

There was an urgent requirement to secure the facility, protect the environment and resume production. So, it was decided to disconnect the serviceable redundant flexible flowline (PL981) at the shut-in well PN05 and connect it between PN06 and the subsea manifold. Under a variation to the Pipeline Works Authorisation, the flowline became known as PL1073, and the original damaged PN06 flowline (PL1073) became known as PL981 and was removed to shore for disposal.

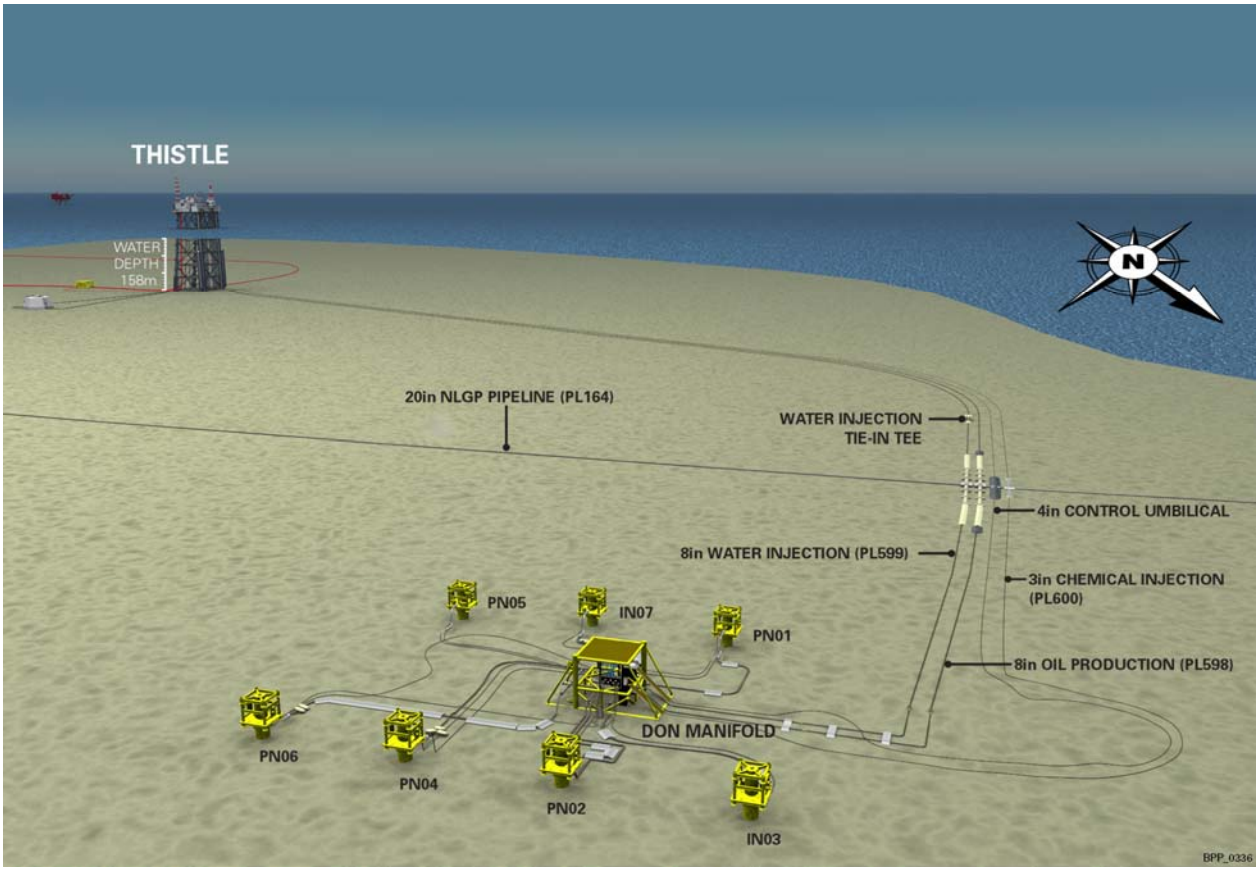
Refer to the 'Don Field: Decommissioning of Pipeline PL981' letter from the DECC to BP [2.3], giving permission to decommission the line from PN05. Replacement of some umbilicals and damaged rigid spools between the Don manifold and the PN06 xmas tree was also necessary.

After completion of the repairs, production was resumed from PN06 with water injection support via IN07.

An 8in water injection pipeline (PL599), which runs parallel to the production pipeline, supplied treated seawater from Thistle to the Don manifold. From the manifold, flowline jumpers supplied treated seawater to the two water injection wells. A tie-in tee-piece and protection frame is located 13.1km from Thistle.

A 4in electro-hydraulic control umbilical (no DECC pipeline number allocated) and a 3in chemical injection umbilical (PL600) follow a similar route from Thistle to the Don manifold. From the manifold, umbilical jumpers connected to the individual wells.

Approximately 2km from the Don manifold, the four lines cross over the NLGP.



Note: Pipelines and umbilicals are shown untrenched for clarity.

Figure 2.1 Don Field Pipeline System Layout

3 Current Status

Table 2.1 details the current status of the pipelines and umbilicals.

Both 8in pipelines and the two umbilicals between the Thistle Installation and the Don manifold are buried over 98% of their route and all are stable. ROV surveys have not found any FishSafe spans since their installation in 1988.

The Don oil production and water injection pipelines have been out of service since 2003. Both pipelines are at present isolated at Thistle and at ambient pressure. The pipelines were made hydrocarbon free, filled with inhibited seawater, and isolated at the Thistle topsides and wells during 2009.

The last intelligent pig run was performed in 1996 and the results indicated that the oil production pipeline was fit for purpose. However, the results indicated channelling in the water injection pipeline.

Table 2.1 Current Status of Pipelines (sheet 1 of 2)

Pipelines and Umbilical between Thistle and the Don Manifold			Comments
DECC No	**Type**	**Status**	
PL-598	Production	Connected	Would require to be intelligently pigged to determine condition if further use was found. Filled with inhibited seawater and isolated at the Thistle topsides and wells.
PL-599	Water Injection	Connected	Internal corrosion. Filled with inhibited seawater and isolated at the Thistle topsides and wells.
PL-600	Chemical Injection Umbilical	Connected	Not fit for purpose - umbilical blocked.
—	Control Umbilical	Connected	Not fit for purpose - known problems with control lines. Disconnected at the Thistle topsides.

Jumpers between Don Manifold and Wells								Comments
Well	**Type**	**Locat**	**Drilled**	**Susp'd**	**Jumpers**			
					DECC No	**Type**	**Status**	
PN01	Prod	Don NE	May 1989	1999	PL845	Flowline	Disconnected	Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	
					—	Chem Umb	Disconnected	
PN02	Prod	Don NE	July 1989	1995	PL598	Flowline	Disconnected	SCM removed and flowline disconnected at manifold.
					—	Cont Umb	Recovered	
					—	Chem Umb	Disconnected	
IN03	WI	Don NE	Sept 1990	1995	PL599	Flowline	Disconnected	SCM removed and flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	
PN04	Prod	Don NE	Nov 1990	1996	PL821	Flowline	Disconnected	Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	
					—	Chem Umb	Disconnected	

Table 2.1 Current Status of Pipelines (sheet 2 of 2)

Jumpers between Don Manifold and Wells								Comments
Well	Type	Locat	Drilled	Susp'd	Jumpers			
					DECC No	Type	Status	
PN05	Prod	Don SW	Sept 1993	2000	PL981	Flowline	Removed	Decommissioned SCM removed. Serviceable flexible flowline connected to PN06 and became known as PL1073. Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Removed	Reconnected to PN06.
					—	Chem Umb	Disconnected	
PN06	Prod	Don SW	Nov 1994	2002	PL1073	Flowline	Disconnected	PN05 serviceable flexible flowline (PL981) and control umbilical connected and replacement SCM fitted (2000) following fishing damage. PL981 became known as PL1073. Original damaged PL1073 flowline became known as PL981 and removed to shore for disposal. Mothballing operations in May 2003 suspended due to lack of controls to subsea facilities. Pipeline isolated and depressurised at Thistle. No PBU in flowline from PN06. Controls isolated. Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	Original recovered and replaced by umbilical to PN05.
					PL1073A	Chem Umb	Disconnected	
IN07	WI	Don SW	June 1996	2002	PL1338	Flowline	Disconnected	Leak tested and recommissioned (2000) following fishing activity. Mothballing operations in May 2003 suspended due to lack of controls to subsea facilities. Pipeline isolated and depressurised at Thistle. No PBU in flowline from IN07. Controls isolated. Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	

4 Removal and Disposal Options

Selection of the best decommissioning option for the Don facilities was based on thorough and comprehensive evaluation of the relevant decommissioning options [2.7], with particular consideration given to the following selection criteria:

- Technical (feasibility, complexity and risk)
- Safety (offshore and onshore hazards/risks)
- Environmental (ecosystem impacts, energy and waste)
- Social (effects on other users of the sea, eg shipping and fishing)
- Economics (costs and economic impact)

Shortlisting and final selection of the best overall option were guided by an evaluation of these selection criteria.

As the decommissioning studies progressed and more information was made available for evaluation, the number of options was reduced to a shortlist from which the best decommissioning option for the facility was selected. Where more than one decommissioning option was shortlisted, they were evaluated on a systematic, qualitative and quantitative basis.

Refer to Section 6 for further details.

5 Recommendations

5.1 General

In line with DECC Guidelines [2.6], the following items will be removed and returned to shore for recycling or disposal:

- All wellheads and xmas trees
- The Don manifold (manifold piles to have a clearance to 3m below the existing seabed level)
- Production and water injection pipeline subsea tie-in double spoolpieces and associated isolation valves between the Don manifold and the Thistle 500m zone
- Flowline and umbilical jumpers between the Don manifold and wells
- Flexiweight mattresses and small grout bags
- Sections of pipe and umbilical that emerge out of the seabed (cut back and buried so that there is no possibility of a snagging hazard)

As a result of the comparative assessment, the following items will not be removed:

- Pipelines and umbilicals
- NLGP crossing (to be removed in conjunction with decommissioning of the 20in NLGP)

- Grout formwork
- Residual Drill Cuttings

A detailed description of the items to be left is discussed in Paragraphs 5.2 to 5.4.

5.2 Pipelines and Umbilicals between the Don Field and Thistle

Shortlisted options for the pipelines and umbilicals between the Don Field and Thistle were each subject to a comparative assessment. The options were:

- Leave in situ
- Leave in situ with selective recovery
- Full recovery

The recommended option is selective recovery for both pipelines and umbilicals. This is primarily due to the imposed safety risk to divers involved in the removal activities. Full recovery is more technically complex and costly due to the challenges of recovering aged pipelines and umbilicals through the trench soil, as discussed in the Independent Review of BP Don Pipeline Decommissioning Options [2.9].

5.3 Protection Features

Grout Formwork

The grout formwork (contained within approximately 9m x 2m x 0.4m canvas sacks weighing in excess of 20 tonnes) will remain in situ because it has no lifting strength due to being grouted in situ with no reinforcement.

The grout formwork is fully supported on the seabed, but would not support its own weight during any lifting operation. There are no lifting points and any lift would require to be configured in such a way as to fully support the concrete. The concrete grout would fail under tension loads and may crumble in compression.

The existing grout formwork is over-trawlable and this can be confirmed by trawling trials. For these reasons, it is proposed that the best option is to leave the grout formwork in situ and confirm over-trawlability by trawl trials.

During the lifetime of the oil production pipeline, remedial work was performed at several locations that involved installation of grout formwork due to upheaval buckling that could potentially compromise the depth of burial of the pipelines. Grout formwork has also been installed on the water injection pipeline.

Since installation, the grout formwork has remained stable, maintained the depth of burial of the pipelines and prevented any fishing interaction with the pipelines.

The locations where the grout formworks are decommissioned in situ will be included in the future monitoring campaign as part of BP's commitment to monitor the pipelines for as long as necessary. If found that the grout formwork potentially poses a risk, then action will be taken to manage the risk.

5.4 Drill Cuttings

No action will take place because over the years the cuttings have dispersed and the seabed will continue to recover as the cuttings continue to disperse. During 2006 diving activities, no evidence was found of a discernable cutting pile.

The recommendation to take no action on the Don Field cuttings is sensible given the current distribution of cuttings at the field, estimated to be 1763m^3 spread over 47,745m^2. The effect of long-term persistence of cuttings on the seabed is considered to be minimal [2.4]. Left undisturbed, the cuttings will continue to naturally erode.

Refer to Section 8 for further details.

6 Interested Party Consultations

Informal consultation has been undertaken with a range of interested parties, including the Scottish Fishermen's Federation (SFF). In addition, as required under Section 29 of the Petroleum Act 1998 [2.5], a period of statutory consultation has also been undertaken.

Consultation will continue with all relevant interested parties as the decommissioning of the Don Field progresses.

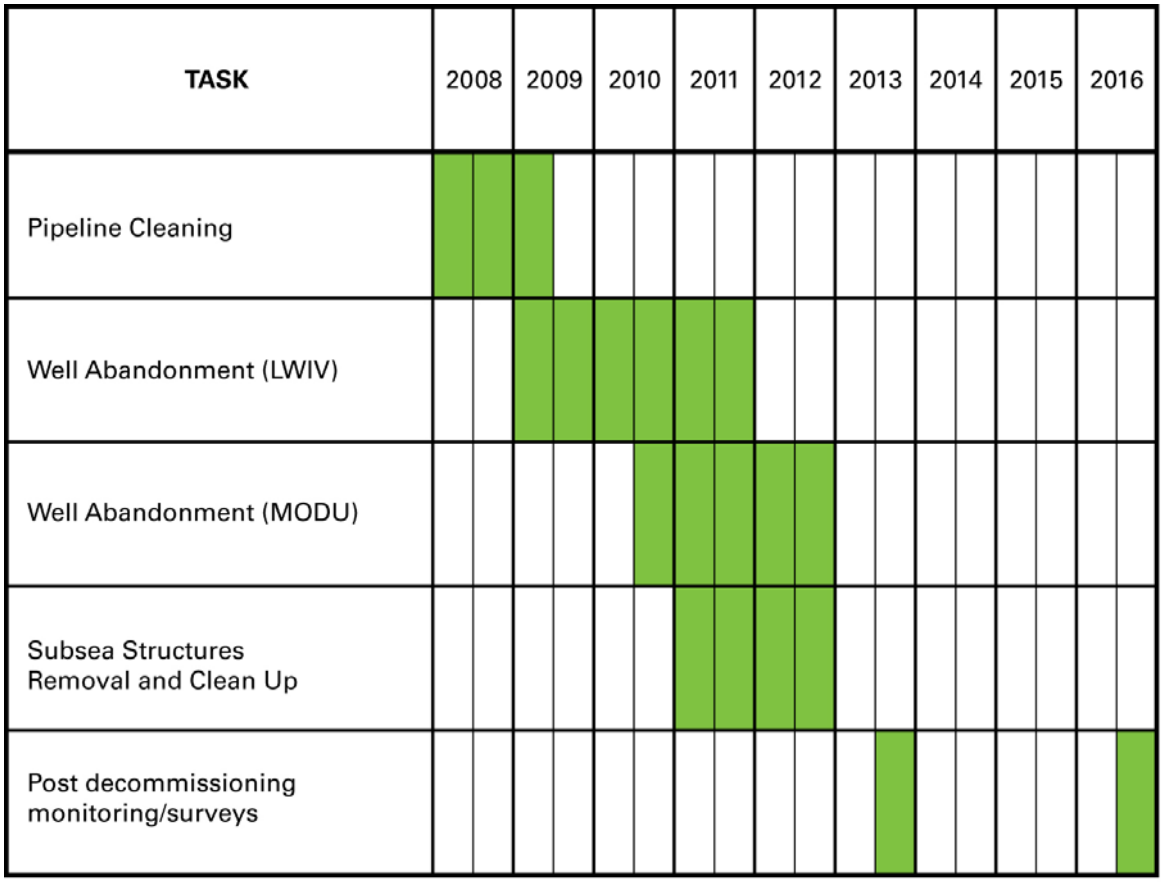
7 Costs

The overall total cost for the Don Field Decommissioning Programme is expected to be in the order of £150 million. This cost is expressed in 2009 values and includes allowances for engineering, project management and support costs.

8 Indicative Schedule

The indicative schedule for decommissioning the Don Field, as shown in Figure 2.2, has been developed taking into consideration the following:

- An appropriate timescale for regulatory approvals in accordance with the DECC Guidelines [2.6]
- The expected duration of decommissioning activities and the seasonal nature of the decommissioning and abandonment work
- Achieving the most efficient and cost effective way of executing the decommissioning activity, with the possibility taking advantage of opportunities for 'bundling' with similar work in other projects



Note: Cessation of Production January 2005

Figure 2.2 Don Field Decommissioning Indicative Timeline

The offshore work programme for decommissioning will typically have the following main phases:

- Pre-decommissioning Surveys
- Field Abandonment
- Well Abandonment

9 Legacy

The owners will be responsible for monitoring material left in situ as a result of carrying out these Decommissioning Programmes and for ensuring that the site and the material left remain in situ as expected.

A photographic survey and study of the area was undertaken in 2004 prior to commencement of decommissioning work. A further survey will be carried out on completion of decommissioning work.

Once all facilities have been removed, post-decommissioning surveys and oilfield debris removal will be carried out to ensure that the seabed is clear of obstructions that might affect fishing activities or other users of the sea. The results of the debris clearance shall be independently verified.

An 'as-left' survey will be completed to provide a baseline and an inspection regime implemented to monitor the status of the pipelines, post decommissioning. As indicated in Section 10, Paragraph 7 the first survey will be carried out within one year of the decommissioning work. The second survey will be carried out within three years of the initial survey and a future survey regime will be determined in conjunction with the DECC, based on the analysis of the first two surveys.

An environmental survey of the Don manifold area and pipeline corridor will be carried out within one year of completion of the decommissioning work with a further survey three years later. Results of these surveys will be submitted to the DECC and a future survey schedule will be agreed with the DECC.

The Don Field owners are committed to perform any remedial action that may be identified during the future monitoring programme.

10 References

[2.1] COP Letter from Simon Toole, DECC (BERR) Director Exploration, Licensing, Development and Production to Dr Norrie Ramsay BP Decommissioning Manager, dated 3rd February 2005.

[2.2] The Convention for the Protection of the Marine Environment of the North-east Atlantic OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations, http://www.ospar.org.

[2.3] 'Don Field: Decommissioning of Pipeline PL981' letter from the DECC (BERR) to BP, ABE/20/4/13, 20 September 2000.

[2.4] Oil & Gas UK Drill Cuttings Initiative, Final Report. OGUK Drills Cuttings Initiative Executive Committee, February 2002, http://www.oilandgas.org.uk/.

[2.5] Petroleum Act 1998, http://www.hmso.gov.uk/.

[2.6] DECC Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, http://www.decc.gov.uk/.

[2.7] Don Pipeline System Decommissioning Technical Report, Lloyd's Register EMEA, Ref No R-658-40621-1B July 2005.

[2.8] Don Pipeline Features Technical Note, BP, 6th May 2008.

[2.9] Independent Review of BP Don Pipeline Decommissioning Options, Atkins Boreas, Revision C, Ref No BR07028 2008.

Section 3
Background Information

1 Field Location

This section provides a review of the physical characteristics of the offshore area in which the subsea Don Field is located.

The location of the Don Field covered by these Decommissioning Programmes is shown in Figure 3.1.

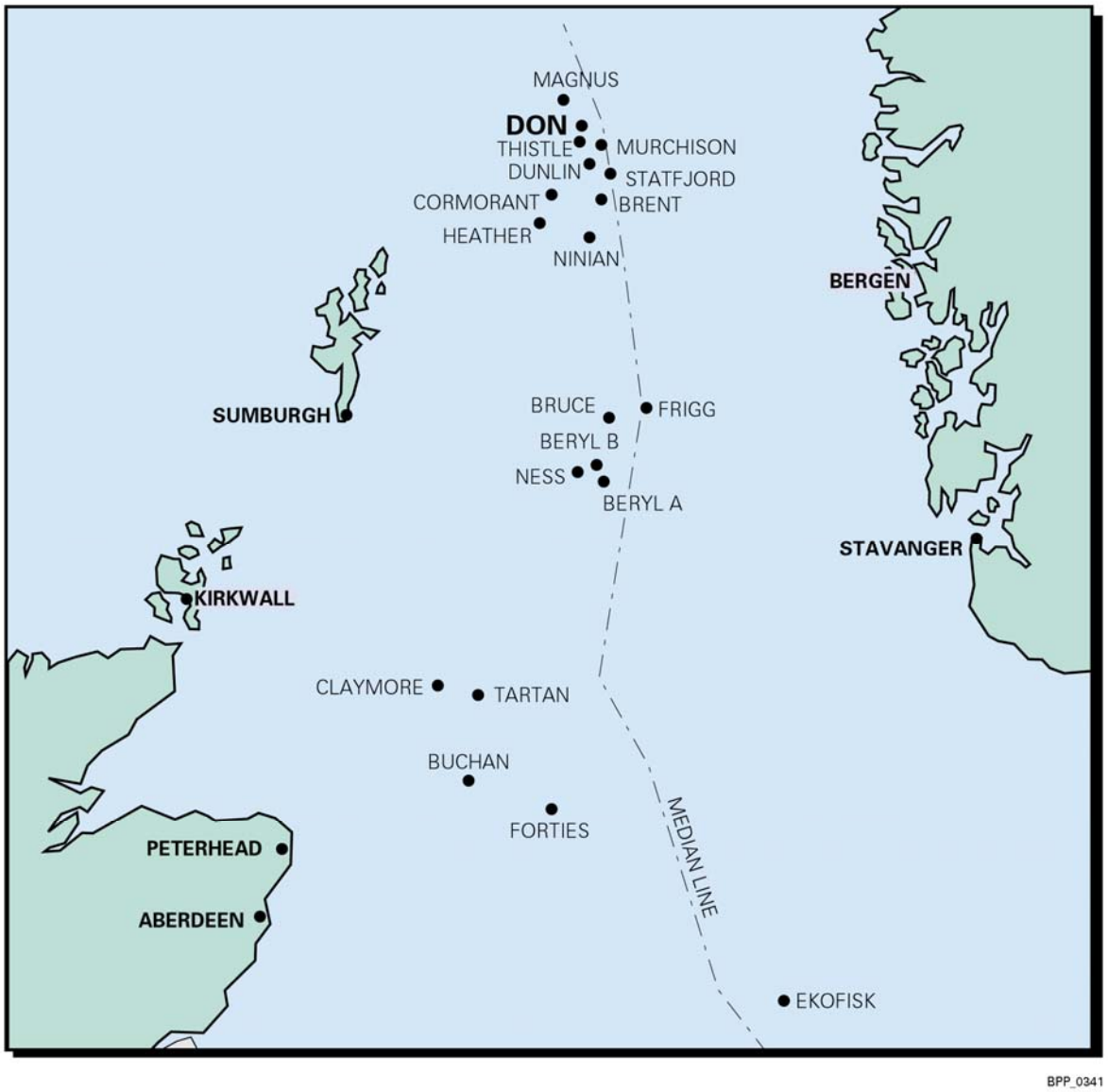


Figure 3.1 Don Field Location

2 Adjacent Facilities

The location of other structures and facilities in the surrounding area of the Don Field are shown in Figure 3.2.

Facilities adjacent to the Don Field are listed in Table 3.1.

Installation	Operator	Distance from Don Manifold
Thistle	Lundin Britain	17km south
Murchison	Canadian Natural Resources (UK) Ltd (CNR)	8.14km south-east
Dunlin	Shell	25km south
Magnus	BP	18km north-west

Table 3.1 Adjacent Facilities to the Don Field

The 20in Northern Leg Gas Pipeline (NLGP) between the Brent Alpha and Magnus Installations is crossed by the Don production and water injection pipelines and umbilicals approximately 2km from the Don manifold.

3 Meteorological Conditions

3.1 Wind Pattern

Although winds in the vicinity of the Don Field are highly variable, there are clear trends in both direction and speed. The predominant wind direction is from the south and west, as shown in Figure 3.3 (sourced from the Meteorological Office, Marine Consultancy Service, Bracknell), with easterly winds being least frequent.

Calm periods are relatively infrequent with the majority of winds during summer ranging between Beaufort Force 4 and 5, which translates to wind speeds of between 20 and 40kph respectively.

Winds during winter months (November to March) may occur from any direction and are frequently greater than Force 7 with maximum wind speeds reaching 160kph.

3.2 Water Depth and Wave Heights

The Don Field seabed gradually deepens to the west. A minimum depth of 163.5m Lowest Astronomical Tide (LAT) occurs in the south-east and deepens to a maximum depth of 166.3m LAT in the west.

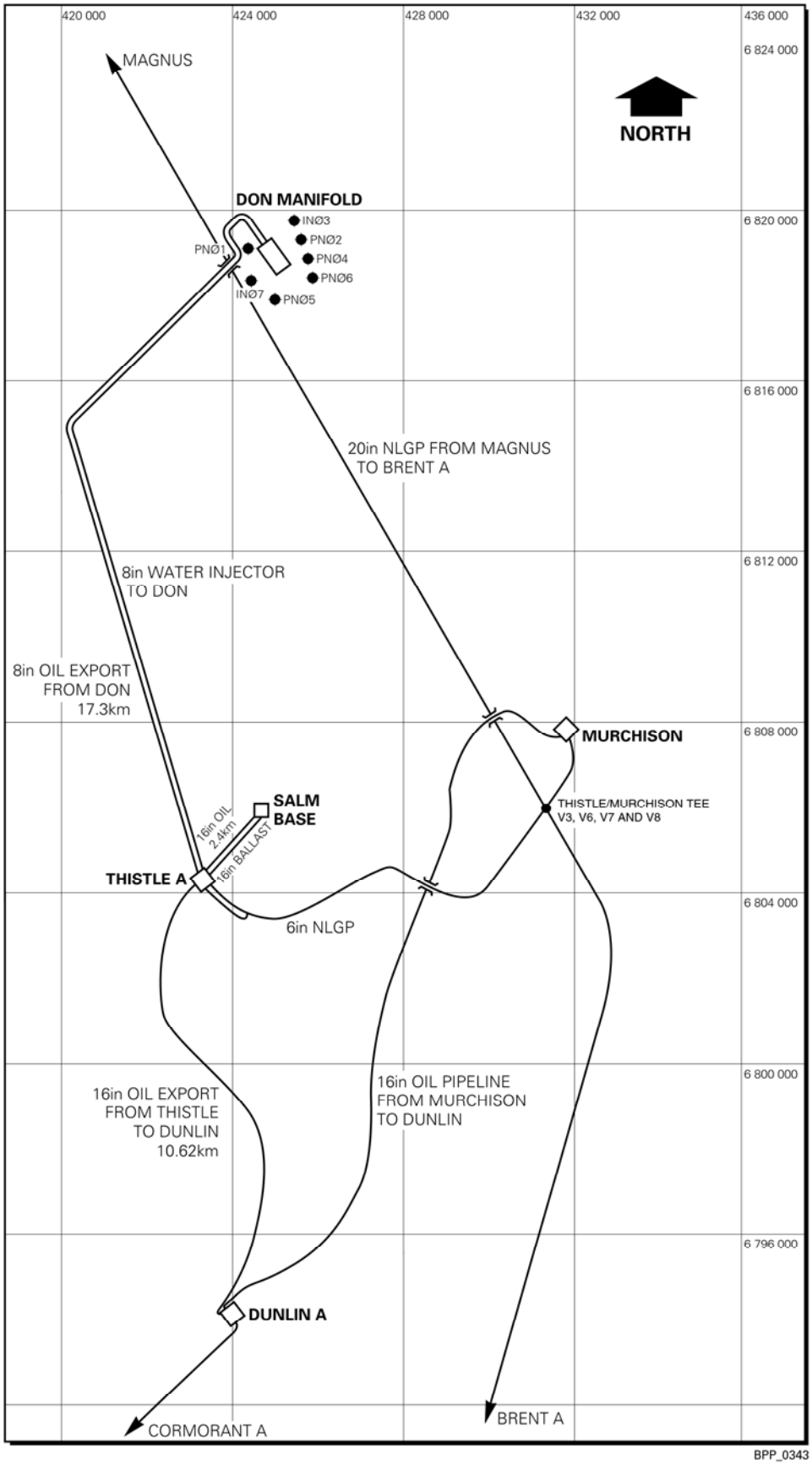


Figure 3.2 Don Field Facilities in relation to Thistle and Other Adjacent Facilities

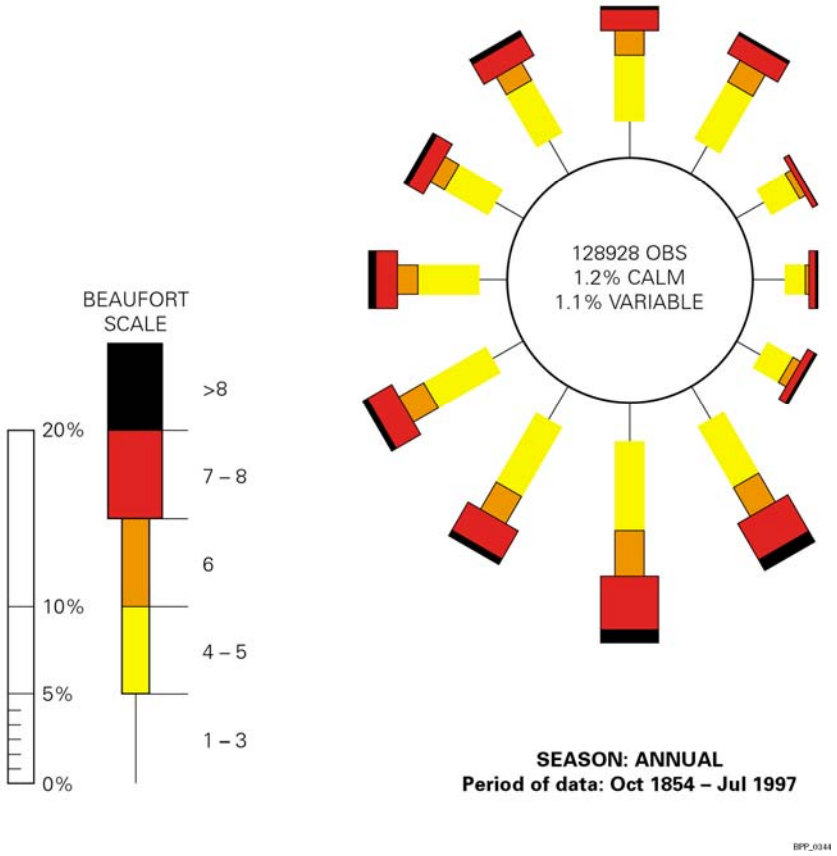


Figure 3.3 Wind Rose for Don Field

Wave heights vary with season and wind speeds. Monthly mean significant wave heights are between 3.0 and 4.0m in winter (November to March), and between 1.5 and 2.0m in summer (June to August). Maximum wave heights during storms may reach between 25 and 30m. Significant wave heights of 2m are exceeded for 75% of the year.

3.3 Sea Temperature

Sea surface temperature ranges from 7.5°C in winter to 13.5°C in summer, whereas temperatures at the seabed are relatively constant throughout the year at between 7 and 8°C.

3.4 Currents

As in most areas of the North Sea, surface currents are normally aligned with the wind and are about 3% of wind speed. At depth, the currents are dominated by the flow of water to the north of Shetland and into the North Sea, along with a weak tidal factor. Surface water speeds in this area of the North Sea are generally less than 0.8m/s and residual water movement at the sea surface is generally south-easterly.

Tidal currents are relatively weak and range from 0.25 to 0.4m/s with seabed currents reaching a maximum speed of 0.5m/s. Overall, the area is dominated by variable wind-driven surface currents and oscillatory currents at the seabed. Water quality is generally very good.

3.5 Seabed Conditions

General soil conditions of the seabed at the site indicate that the superficial soils are post-glacial sands underlain by strong over-consolidated clays of the Pleistocene epoch. These clays have all experienced glaciation and are therefore of very stiff to hard consistency. Test borings have disclosed that the soil strata of Block 211/18 is relatively uniform and consists of alternating strata of strong clays and sands.

During the Don Field cuttings survey [3.1], the seabed around the Don manifold was found to display low to moderate reflectivity, interpreted as representing a low relief cuttings comprising very poorly sorted coarse sands and silt. The immediate area of the manifold was characterised by more highly reflective sediments comprising a superficial cover of coarse sands with exposures of the underlying stiff clays of the Tampen Formation, together with boulders and a number of depressions.

The Don Field was subject to a comprehensive environmental survey in July 1999 [3.1]. It is believed that 14,000m^3 of cuttings were originally generated through drilling the seven wells. However, due to natural dispersion since the last drilling was performed in 1996, it was found that only 1763m^3 remained, which is approximately 12% of the original Don cuttings. The survey work also reported a 1.4m high drill mound in the Don manifold area, but diving work performed in 2006 could not find evidence of any discernable drill cutting mound.

Refer to Section 8 for further details.

4 Fishing, Shipping and Commercial Activity

4.1 Fishing

The International Council for the Exploration of the Sea (ICES) has divided the North Sea into sea areas. Each area is subdivided into rectangles which each cover 15 licence blocks. The Don Field is located within ICES subdivision IVa, Rectangle 51F1.

The majority of fishing is undertaken using light otter trawls and the most important species landed, by weight, are haddock, herring, and mackerel [3.2]. The annual fishing effort for UK-registered vessels over 10m landing in Scotland in 2006 from the whole of ICES subdivision IVa was 47,094 days, making it a relatively important fishing region (Scottish Government, 2007). However, the annual fishing effort for UK-registered vessels landing in Scotland in 1999, 2000 and 2001 from ICES Rectangle 51F1, where Don is located, was 2806, 4203 and 3458 hours respectively. Therefore, the overall UK fishing effort in Rectangle 51F1 is low in comparison to other ICES rectangles in the North Sea.

The periods for peak fisheries vary with species. Saithe are mostly caught between November and February, herring and whiting between June and August, and mackerel between October and March. Fishing is undertaken in all months, but there is generally a peak of activity between February and July.

This data is for UK-registered vessels landing in Scotland only and does not account for any fishing effort or landings made from this rectangle by European vessels. Consequently, the data may provide an underestimation of the actual fishing effort or fish landed from ICES Rectangle 51F1. The total annual landings to Scotland from ICES Rectangle 51F1 by UK-registered vessels increased from 2094 tonnes in 1999 to 7224 tonnes in 2001.

The pelagic species, mackerel and herring, dominated the total annual landings. Pelagic landings increased from 64% of the total annual landings in 1999 to 82% of the total annual landings in 2001. Pelagic landings occurred predominantly between October and December, with occasional landings in May, June, July and September. There has been a corresponding decrease in demersal catches, which have declined from 36% of the total landings in 1999 to 18% in 2001. The peak demersal landings from ICES Rectangle 51F1 occurred between February and July, and the main species landed were haddock, cod, whiting, saithe and ling.

No significant amounts of shellfish are caught within this area.

Seasonal sensitivities associated with commercial fishing in the Don Field are shown in Table 3.2.

	Month											
Type	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Commercial Fishing												

Legend:

– No Data | Low | Moderate | High | Very High

Note: Environmental sensitivity is conventionally classified as Low, Moderate, High and Very High. However, no seasonal environmental sensitivities are identified as High or Very High in the Don Field.

Table 3.2 Seasonal Environmental Sensitivities Associated with Commercial Fishing in the Don Field

4.2 Shipwrecks

The nearest charted shipwreck is located in the vicinity of the Thistle Installation at a depth, reduced to Chart Datum, of 145m, which is approximately the level of LAT. The shipwreck is located at 61° 21.3'N and 1° 29.6'E, approximately 4.8km to the west-south-west of Thistle.

4.3 Military Activity

No routine military activities are known to occur in the vicinity of the Don Field.

4.4 Submarine Cables

There are no known submarine telecommunications or power cables in the vicinity of the Don Facilities.

5 Other Features

There are no outstanding or unusual benthic or water column features (eg sessile species, local seasonal blooms, geological or archaeological features) in the Don Field.

6 References

[3.1] Don Cuttings Environmental Survey UKCS 211/18, Gardline Surveys, 5353.01, July 1999.

[3.2] Scottish Government, 2007, Scottish Sea Fisheries Statistics 2006.

Section 4
Descriptions of Items to be Decommissioned

1 Introduction

This section provides a description of the Don Field facilities and seabed materials for which the Decommissioning Programmes, described in Section 1, provide decommissioning solutions.

The structures and materials included in this Decommissioning Programme are shown in Figure 4.1 and comprise:

- Don Manifold
- Five production wells
- Two water injection wells
- 8in production pipeline
- 8in water injection pipeline
- 3in chemical injection umbilical
- 4in control umbilical
- Seven infield flowlines and umbilicals

Figure 4.2 illustrates the routing of the lines between the Don manifold and the Thistle Installation. It should be noted that Don topsides equipment at Thistle, the pipebridge and pipeline sections within the Thistle 500m zone are not addressed in this Section as these items will be deferred until the Thistle installation is decommissioned.

Quantitative information about the different types of material contained within these items is given in Section 5.

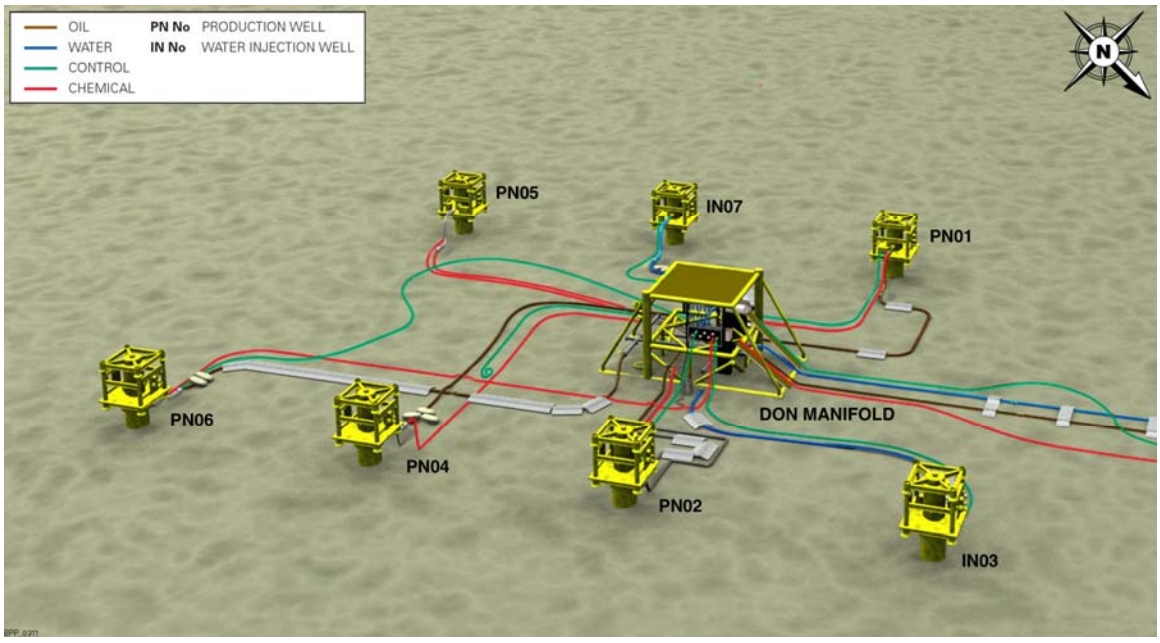
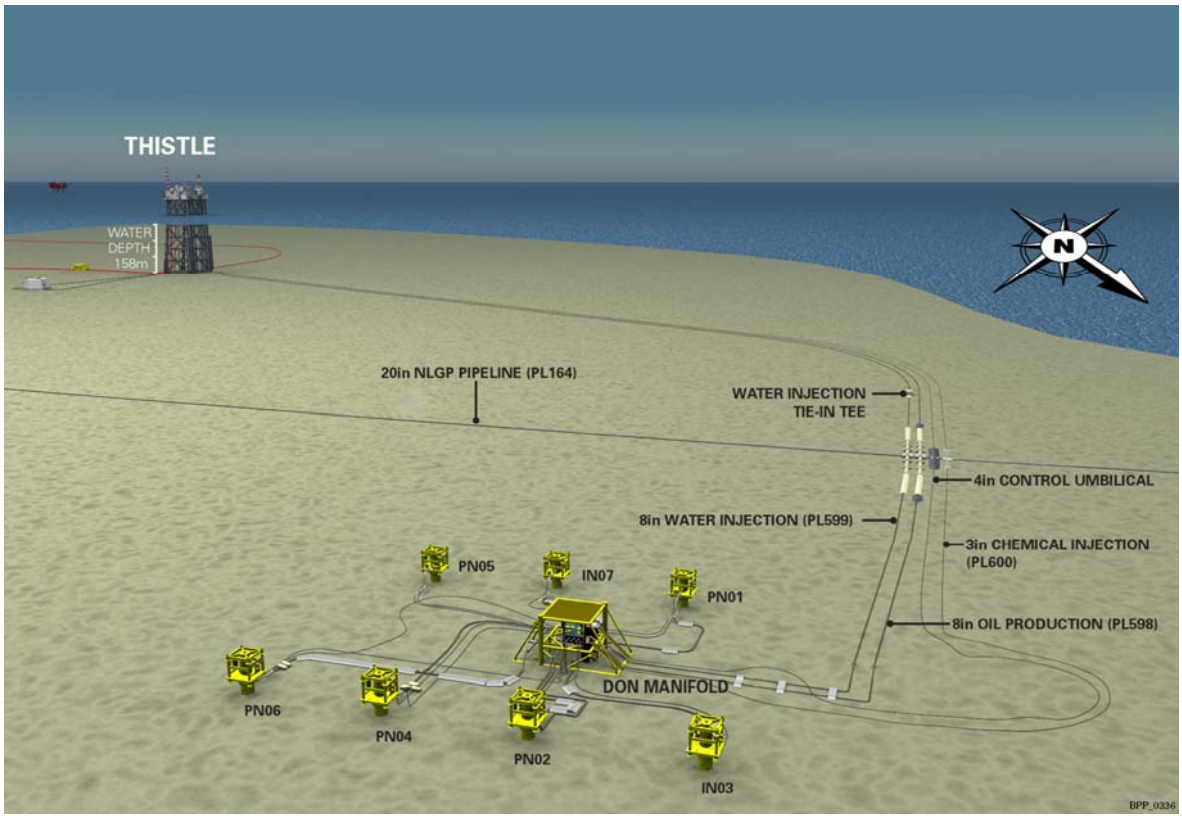


Figure 4.1 Don Field Layout



Note: Pipelines and umbilicals are shown untrenched for clarity.

Figure 4.2 Don Field Pipeline Routing to Thistle

2 Installations

2.1 Wells

The current status of the wells is shown in Figure 4.1 and Table 4.1.

The original objective of drilling in the Don Field was to complete oil producer and water injector wells in the Brent sandstone reservoir at a depth below 11,000ft True Vertical Depth Subsea (TVDSS). The oil/water contact is at circa 11,450ft TVDSS.

Typical schematics of a Don production well and a water injection well are shown in Figures 4.3 and 4.4 respectively.

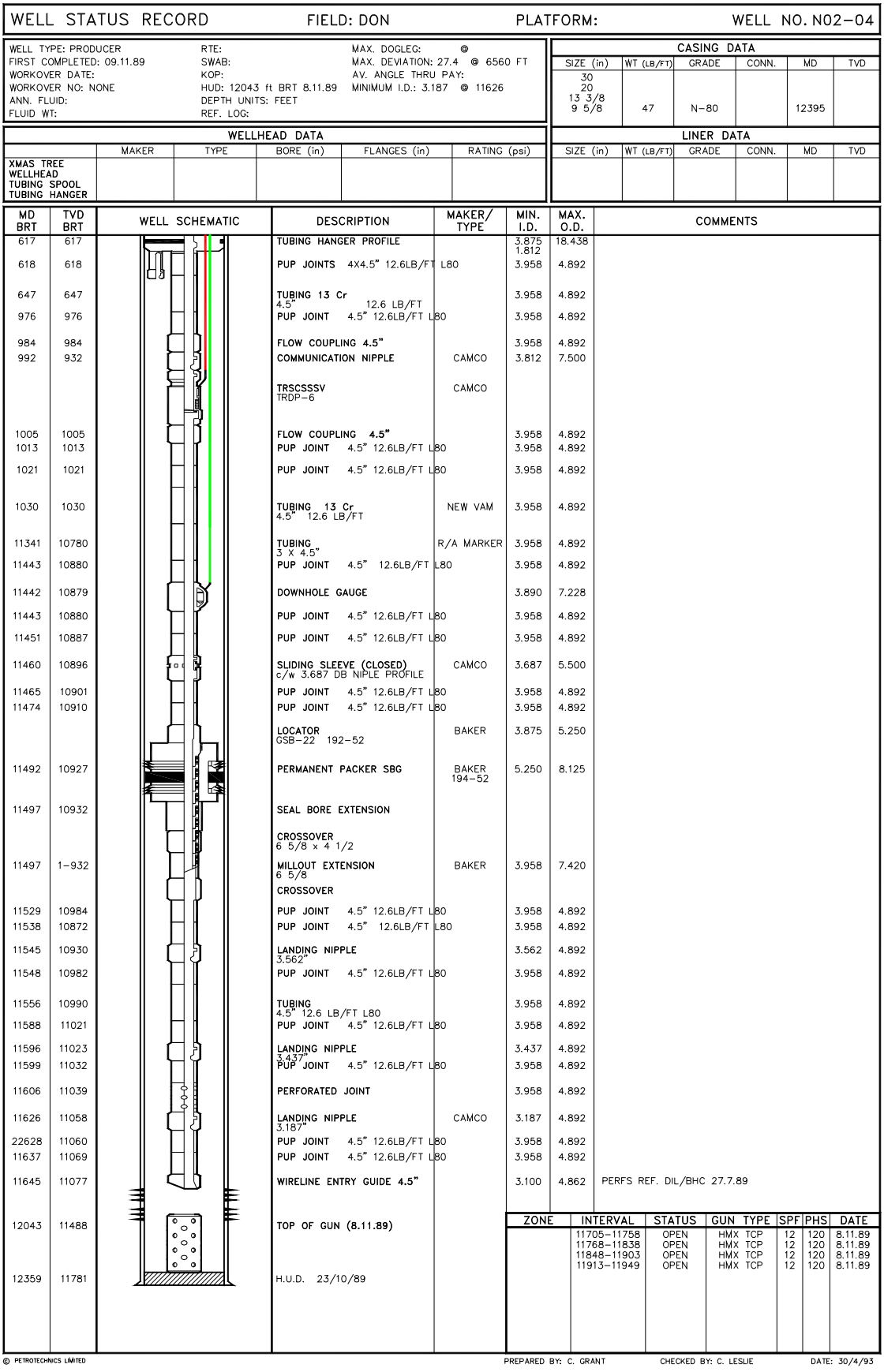
Table 4.1 Current Status of Pipelines (sheet 1 of 2)

Pipelines and Umbilical between Thistle and the Don Manifold			Comments
DECC No	**Type**	**Status**	
PL-598	Production	Connected	Would require to be intelligently pigged to determine condition if further use was found. Filled with inhibited seawater and isolated at the Thistle topsides and wells.
PL-599	Water Injection	Connected	Internal corrosion. Filled with inhibited seawater and isolated at the Thistle topsides and wells.
PL-600	Chemical Injection Umbilical	Connected	Not fit for purpose - umbilical blocked.
—	Control Umbilical	Connected	Not fit for purpose - known problems with control lines. Disconnected at the Thistle topsides.

Jumpers between Don Manifold and Wells								Comments
Well	**Type**	**Locat**	**Drilled**	**Susp'd**	**Jumpers**			
					DECC No	**Type**	**Status**	
PN01	Prod	Don NE	May 1989	1999	PL845	Flowline	Disconnected	Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	
					—	Chem Umb	Disconnected	
PN02	Prod	Don NE	July 1989	1995	PL598	Flowline	Isolated	SCM removed and flowline disconnected at manifold.
					—	Cont Umb	Recovered	
					—	Chem Umb	Disconnected	
IN03	WI	Don NE	Sept 1990	1995	PL599	Flowline	Disconnected	SCM removed and flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	
PN04	Prod	Don NE	Nov 1990	1996	PL821	Flowline	Disconnected	Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	
					—	Chem Umb	Disconnected	

Table 4.1 Current Status of Pipelines (sheet 2 of 2)

Jumpers between Don Manifold and Wells								Comments
Well	Type	Locat	Drilled	Susp'd	Jumpers			
					DECC No	Type	Status	
PN05	Prod	Don SW	Sept 1993	2000	PL981	Flowline	Removed	Decommissioned SCM removed. Serviceable flexible flowline connected to PN06 and became known as PL1073. Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Removed	Reconnected to PN06.
					—	Chem Umb	Disconnected	
PN06	Prod	Don SW	Nov 1994	2002	PL1073	Flowline	Disconnected	PN05 flexible flowline and control umbilical connected and replacement SCM fitted (2000) following fishing damage. Mothballing operations in May 2003 suspended due to lack of controls to subsea facilities. Pipeline isolated and depressurised at Thistle. No PBU in flowline from PN06. Controls isolated. Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	Original recovered and replaced by umbilical to PN05.
					PL1073A	Chem Umb	Disconnected	
IN07	WI	Don SW	June 1996	2002	PL1338	Flowline	Disconnected	Leak tested and recommissioned (2000) following fishing activity. Mothballing operations in May 2003 suspended due to lack of controls to subsea facilities. Pipeline isolated and depressurised at Thistle. No PBU in flowline from IN07. Controls isolated. Flowline filled with inhibited seawater and isolated at the xmas tree.
					—	Cont Umb	Disconnected	



WELL STATUS RECORD — FIELD: DON — PLATFORM: — WELL NO. N02–04

WELL TYPE: PRODUCER
FIRST COMPLETED: 09.11.89
WORKOVER DATE:
WORKOVER NO: NONE
ANN. FLUID:
FLUID WT:

RTE:
SWAB:
KOP:
HUD: 12043 ft BRT 8.11.89
DEPTH UNITS: FEET
REF. LOG:

MAX. DOGLEG: @
MAX. DEVIATION: 27.4 @ 6560 FT
AV. ANGLE THRU PAY:
MINIMUM I.D.: 3.187 @ 11626

CASING DATA

SIZE (in)	WT (LB/FT)	GRADE	CONN.	MD	TVD
30					
20					
13 3/8					
9 5/8	47	N–80		12395	

WELLHEAD DATA

	MAKER	TYPE	BORE (in)	FLANGES (in)	RATING (psi)
XMAS TREE					
WELLHEAD					
TUBING SPOOL					
TUBING HANGER					

LINER DATA

SIZE (in)	WT (LB/FT)	GRADE	CONN.	MD	TVD

MD BRT	TVD BRT	DESCRIPTION	MAKER/ TYPE	MIN. I.D.	MAX. O.D.	COMMENTS
617	617	TUBING HANGER PROFILE		3.875 1.812	18.438	
618	618	PUP JOINTS 4X4.5" 12.6LB/FT L80		3.958	4.892	
647	647	TUBING 13 Cr 4.5" 12.6 LB/FT		3.958	4.892	
976	976	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
984	984	FLOW COUPLING 4.5"		3.958	4.892	
992	932	COMMUNICATION NIPPLE	CAMCO	3.812	7.500	
		TRSCSSSV TRDP–6	CAMCO			
1005	1005	FLOW COUPLING 4.5"		3.958	4.892	
1013	1013	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
1021	1021	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
1030	1030	TUBING 13 Cr 4.5" 12.6 LB/FT	NEW VAM	3.958	4.892	
11341	10780	TUBING 3 X 4.5"	R/A MARKER	3.958	4.892	
11443	10880	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11442	10879	DOWNHOLE GAUGE		3.890	7.228	
11443	10880	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11451	10887	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11460	10896	SLIDING SLEEVE (CLOSED) c/w 3.687 DB NIPLE PROFILE	CAMCO	3.687	5.500	
11465	10901	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11474	10910	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
		LOCATOR GSB–22 192–52	BAKER	3.875	5.250	
11492	10927	PERMANENT PACKER SBG	BAKER 194–52	5.250	8.125	
11497	10932	SEAL BORE EXTENSION				
		CROSSOVER 6 5/8 x 4 1/2				
11497	1–932	MILLOUT EXTENSION 6 5/8 CROSSOVER	BAKER	3.958	7.420	
11529	10984	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11538	10872	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11545	10930	LANDING NIPPLE 3.562"		3.562	4.892	
11548	10982	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11556	10990	TUBING 4.5" 12.6 LB/FT L80		3.958	4.892	
11588	11021	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11596	11023	LANDING NIPPLE 3.437"		3.437	4.892	
11599	11032	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11606	11039	PERFORATED JOINT		3.958	4.892	
11626	11058	LANDING NIPPLE 3.187"	CAMCO	3.187	4.892	
22628	11060	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11637	11069	PUP JOINT 4.5" 12.6LB/FT L80		3.958	4.892	
11645	11077	WIRELINE ENTRY GUIDE 4.5"		3.100	4.862	PERFS REF. DIL/BHC 27.7.89
12043	11488	TOP OF GUN (8.11.89)				
12359	11781	H.U.D. 23/10/89				

ZONE	INTERVAL	STATUS	GUN TYPE	SPF	PHS	DATE
	11705–11758	OPEN	HMX TCP	12	120	8.11.89
	11768–11838	OPEN	HMX TCP	12	120	8.11.89
	11848–11903	OPEN	HMX TCP	12	120	8.11.89
	11913–11949	OPEN	HMX TCP	12	120	8.11.89

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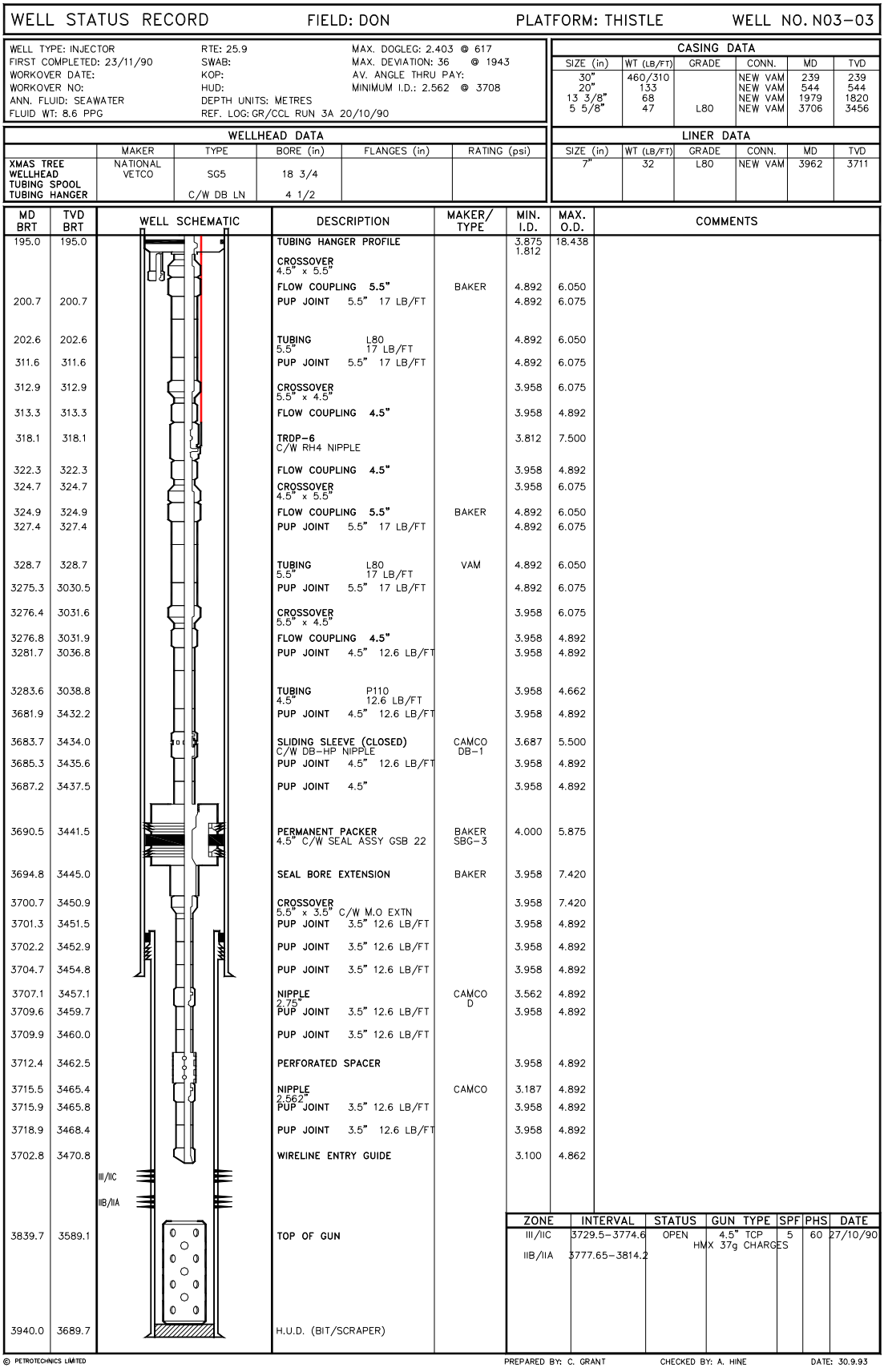
PREPARED BY: C. GRANT CHECKED BY: C. LESLIE DATE: 30/4/93

Figure 4.3 Typical Production Well Schematic



WELL STATUS RECORD — FIELD: DON — PLATFORM: THISTLE — WELL NO. N03–03

WELL TYPE: INJECTOR
FIRST COMPLETED: 23/11/90
WORKOVER DATE:
WORKOVER NO:
ANN. FLUID: SEAWATER
FLUID WT: 8.6 PPG
RTE: 25.9
SWAB:
KOP:
HUD:
DEPTH UNITS: METRES
REF. LOG: GR/CCL RUN 3A 20/10/90
MAX. DOGLEG: 2.403 @ 617
MAX. DEVIATION: 36 @ 1943
AV. ANGLE THRU PAY:
MINIMUM I.D.: 2.562 @ 3708

CASING DATA

SIZE (in)	WT (LB/FT)	GRADE	CONN.	MD	TVD
30"	460/310		NEW VAM	239	239
20"	133		NEW VAM	544	544
13 3/8"	68		NEW VAM	1979	1820
5 5/8"	47	L80	NEW VAM	3706	3456

WELLHEAD DATA

	MAKER	TYPE	BORE (in)	FLANGES (in)	RATING (psi)
XMAS TREE	NATIONAL VETCO				
WELLHEAD		SG5	18 3/4		
TUBING SPOOL					
TUBING HANGER		C/W DB LN	4 1/2		

LINER DATA

SIZE (in)	WT (LB/FT)	GRADE	CONN.	MD	TVD
7"	32	L80	NEW VAM	3962	3711

MD BRT	TVD BRT	DESCRIPTION	MAKER/ TYPE	MIN. I.D.	MAX. O.D.	COMMENTS
195.0	195.0	TUBING HANGER PROFILE		3.875	18.438	
		CROSSOVER 4.5" x 5.5"		1.812		
		FLOW COUPLING 5.5"	BAKER	4.892	6.050	
200.7	200.7	PUP JOINT 5.5" 17 LB/FT		4.892	6.075	
202.6	202.6	TUBING 5.5" L80 17 LB/FT		4.892	6.050	
311.6	311.6	PUP JOINT 5.5" 17 LB/FT		4.892	6.075	
312.9	312.9	CROSSOVER 5.5" x 4.5"		3.958	6.075	
313.3	313.3	FLOW COUPLING 4.5"		3.958	4.892	
318.1	318.1	TRDP-6 C/W RH4 NIPPLE		3.812	7.500	
322.3	322.3	FLOW COUPLING 4.5"		3.958	4.892	
324.7	324.7	CROSSOVER 4.5" x 5.5"		3.958	6.075	
324.9	324.9	FLOW COUPLING 5.5"	BAKER	4.892	6.050	
327.4	327.4	PUP JOINT 5.5" 17 LB/FT		4.892	6.075	
328.7	328.7	TUBING 5.5" L80 17 LB/FT	VAM	4.892	6.050	
3275.3	3030.5	PUP JOINT 5.5" 17 LB/FT		4.892	6.075	
3276.4	3031.6	CROSSOVER 5.5" x 4.5"		3.958	6.075	
3276.8	3031.9	FLOW COUPLING 4.5"		3.958	4.892	
3281.7	3036.8	PUP JOINT 4.5" 12.6 LB/FT		3.958	4.892	
3283.6	3038.8	TUBING 4.5" P110 12.6 LB/FT		3.958	4.662	
3681.9	3432.2	PUP JOINT 4.5" 12.6 LB/FT		3.958	4.892	
3683.7	3434.0	SLIDING SLEEVE (CLOSED) C/W DB-HP NIPPLE	CAMCO DB-1	3.687	5.500	
3685.3	3435.6	PUP JOINT 4.5" 12.6 LB/FT		3.958	4.892	
3687.2	3437.5	PUP JOINT 4.5"		3.958	4.892	
3690.5	3441.5	PERMANENT PACKER 4.5" C/W SEAL ASSY GSB 22	BAKER SBG-3	4.000	5.875	
3694.8	3445.0	SEAL BORE EXTENSION	BAKER	3.958	7.420	
3700.7	3450.9	CROSSOVER 5.5" x 3.5" C/W M.O EXTN		3.958	7.420	
3701.3	3451.5	PUP JOINT 3.5" 12.6 LB/FT		3.958	4.892	
3702.2	3452.9	PUP JOINT 3.5" 12.6 LB/FT		3.958	4.892	
3704.7	3454.8	PUP JOINT 3.5" 12.6 LB/FT		3.958	4.892	
3707.1	3457.1	NIPPLE 2.75"	CAMCO D	3.562	4.892	
3709.6	3459.7	PUP JOINT 3.5" 12.6 LB/FT		3.958	4.892	
3709.9	3460.0	PUP JOINT 3.5" 12.6 LB/FT				
3712.4	3462.5	PERFORATED SPACER		3.958	4.892	
3715.5	3465.4	NIPPLE 2.562"	CAMCO	3.187	4.892	
3715.9	3465.8	PUP JOINT 3.5" 12.6 LB/FT		3.958	4.892	
3718.9	3468.4	PUP JOINT 3.5" 12.6 LB/FT		3.958	4.892	
3702.8	3470.8	WIRELINE ENTRY GUIDE		3.100	4.862	
3839.7	3589.1	TOP OF GUN				
3940.0	3689.7	H.U.D. (BIT/SCRAPER)				

ZONE	INTERVAL	STATUS	GUN TYPE	SPF	PHS	DATE
III/IIC	3729.5–3774.6	OPEN	4.5" TCP HMX 37g CHARGES	5	60	27/10/90
IIB/IIA	3777.65–3814.2					

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PREPARED BY: C. GRANT CHECKED BY: A. HINE DATE: 30.9.93

Figure 4.4 Typical Water Injection Well Schematic

A typical casing programme was as follows:

(1) After setting a 30in conductor and a 20in casing in a vertical hole at 1600ft TVDSS, a 17 1/2in hole was drilled (deviated as necessary) to circa 5000ft TVDSS, where a 13 3/8in casing was set in the Palaeocene.

(2) A 12 1/4in hole was then drilled to 9500ft TVDSS where a 9 5/8in casing was set in the Shetland Group.

(3) Finally, an 8 1/2in hole was drilled through the Brent target and into the Dunlin, to a target depth of 11,700ft TVDSS, and a 7in liner run as the completion string. (In some instances the well could be deepened another 300ft to penetrate the Statfjord.)

The effective reservoir is a 150 to 180ft thick (vertical) section of sandstone. For both producers and injectors, this section was perforated uniformly from top to bottom. 13 chrome steel was recommended for the completion tubulars and related equipment.

The final programme for plugging and abandoning the wells will be produced in liaison with the chosen wells contractor. Work will be performed under the Design and Construction Regulations (DCR) Part IV (Wells) [4.4].

2.2 Subsea Equipment

2.2.1 Wellheads

National Oilwell xmas trees (refer to Figure 4.5) are installed on the seven wells.

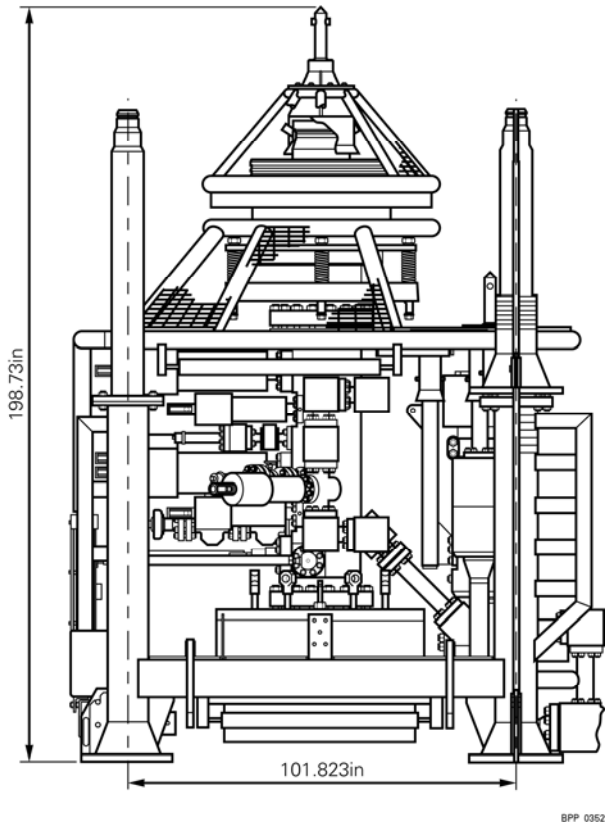


Figure 4.5 Typical National Oilwell Xmas Tree

Each xmas tree incorporates the following main elements:

- Xmas tree block and valve assembly
- Retrievable valve package
- Completion equipment
- Associated flowlines and fittings
- Subsea choke
- Debris cap

The Subsea Control Module (SCM) is supplied separately, but forms part of the retrievable valve package that is cantilevered off the main xmas tree frame.

Xmas tree physical data is as follows:

- Weight – 34.5 tonnes
- Height above seabed – 5029mm
- Footprint – 2565mm x 2565mm
- Construction – Carbon steel

2.2.2 Don Manifold

The Don manifold (refer to Figure 4.6) was designed in 1988 by John Brown Engineers & Constructors Ltd and built by Peterhead Engineering Company Ltd. The manifold was designed as a compact structure, capable of being installed and retrieved from either a Mobile Offshore Drilling Unit (MODU) (via the moonpool) or by crane on a conventional Diving Support Vessel (DSV).

The Don manifold, which is secured to the seabed by two 20in steel piles to a depth of approximately 10m, was the connecting point between the Don Field and Thistle for:

- Collecting oil from the wells into the 8in production pipeline
- Distributing water from the 8in water injection pipeline to the water injection wells
- Distributing chemicals to the production wells
- Receiving and distributing control signals from Thistle to the wells
- Receiving and distributing data signals from the wells to Thistle

Infield flowline and umbilical jumpers connected the manifold to individual wells. An SCM was mounted on each xmas tree to control its valves (some SCMs have since been removed). Manifold valves were controlled from an SCM mounted on the well PN01 xmas tree.

The manifold structure provides protection for the following items:

- Control umbilical termination box
- Chemical injection umbilical termination box
- Valves and associated pipework
- Instrumentation

Don manifold physical data is as follows:

- Weight – 52 tonnes
- Height above seabed – 6000mm
- Footprint – 6400mm x 10,700mm
- Construction – Carbon steel

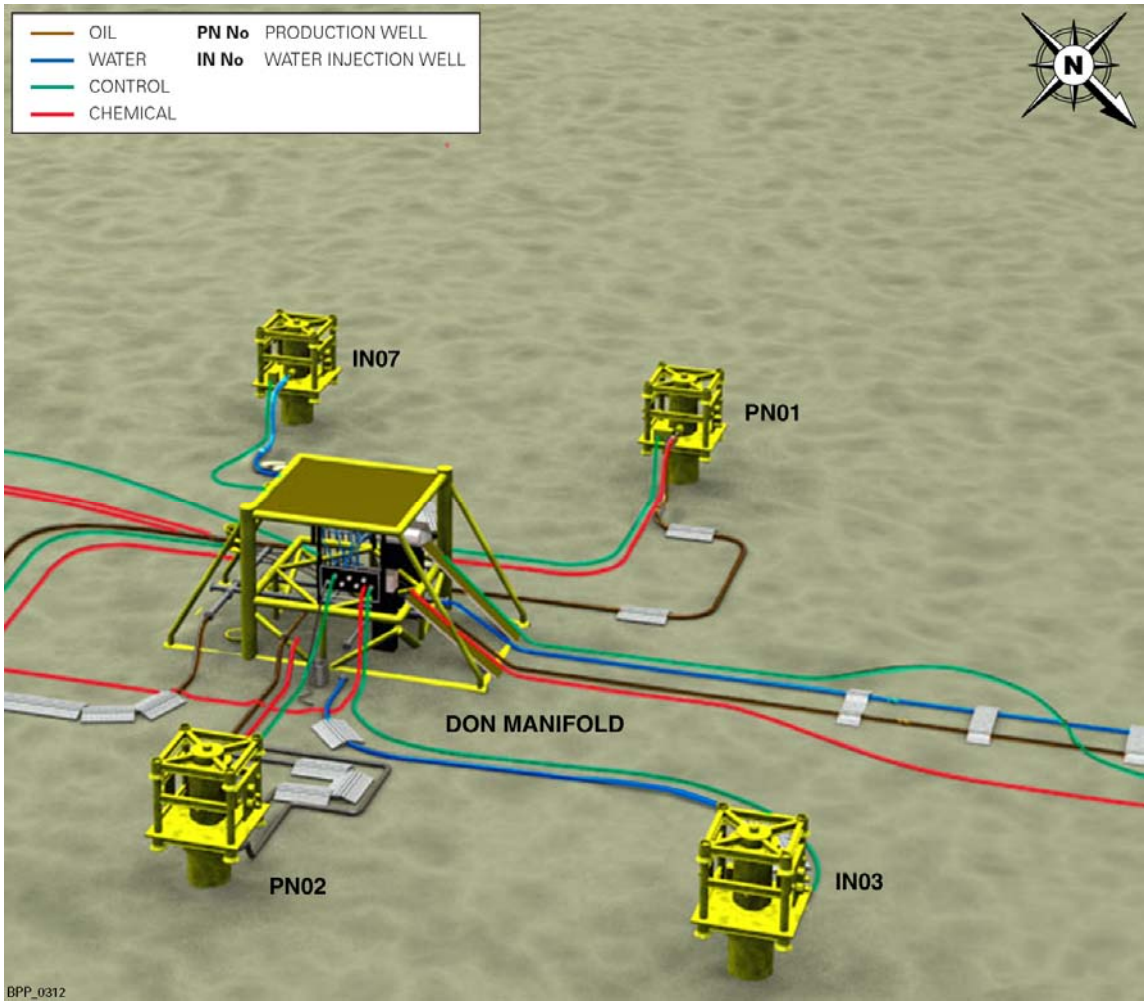
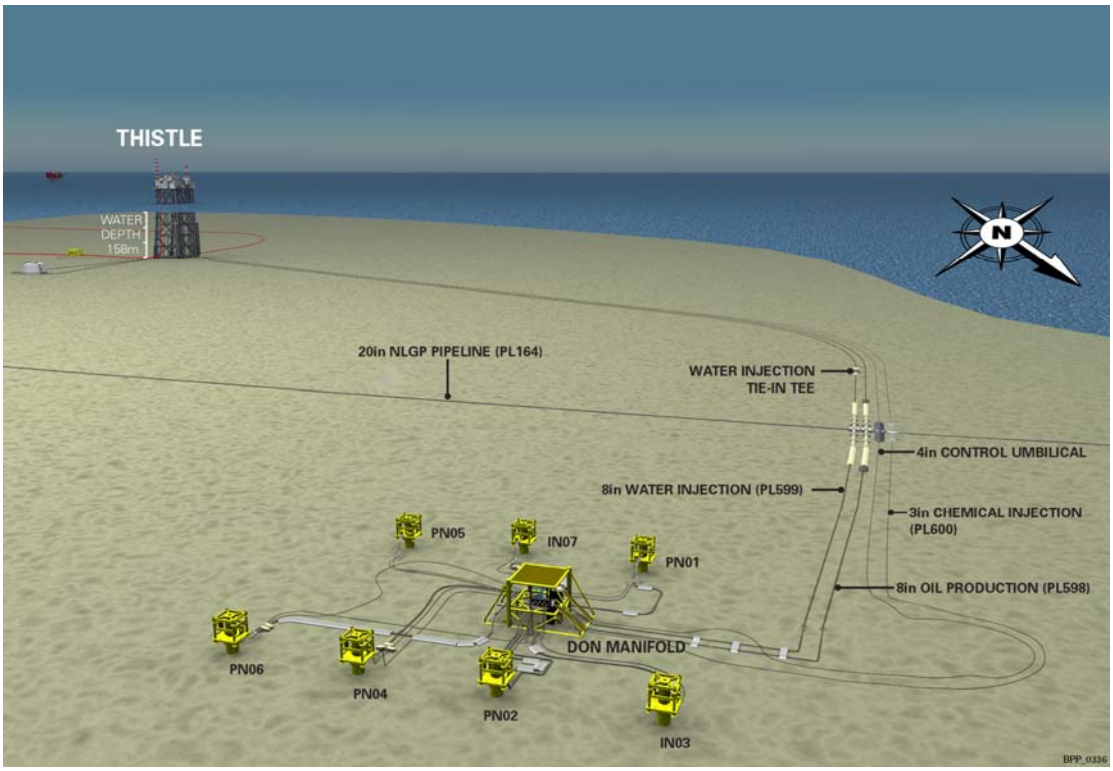


Figure 4.6 Don Manifold

3 Pipelines, Flowlines and Umbilicals

Fluid from each of the five Don subsea production wells was routed to the Don manifold through 4in flowline jumpers. At the manifold, the fluids were commingled and flowed 17.3km south through an 8in production pipeline (PL598) to Thistle, where the fluids were processed. (Refer to Figure 4.7.)



Note: Pipelines and umbilicals are shown untrenched for clarity.

Figure 4.7 Don Field Pipeline System Layout

An 8in water injection pipeline (PL599), which runs parallel to the production pipeline, supplied treated seawater from Thistle to the Don manifold. From the manifold, flowline jumpers supplied treated seawater to the two water injection wells. A tie-in tee-piece and protection frame are located 13.1km from Thistle.

Both 8in production and water injection pipelines are insulated with a 13mm layer of Ethylene Propylene Diene Monomer (EPDM) and buried to reduce heat loss from the lines. Exposed sections of the pipelines are protected by flexiweight mattresses, grout formwork or rock dumping.

A 4in electro-hydraulic control and monitoring umbilical (no DECC pipeline number allocated), and a 3in chemical injection umbilical (PL600) follow a similar route from Thistle to the Don manifold. From the manifold, umbilical jumpers connected to the individual wells. The chemical injection umbilical is blocked and was isolated in 1995.

Figure 4.8 shows the final approaches of the pipelines and umbilicals at the Don manifold. Each 8in pipeline connects to the manifold via a double spoolpiece.

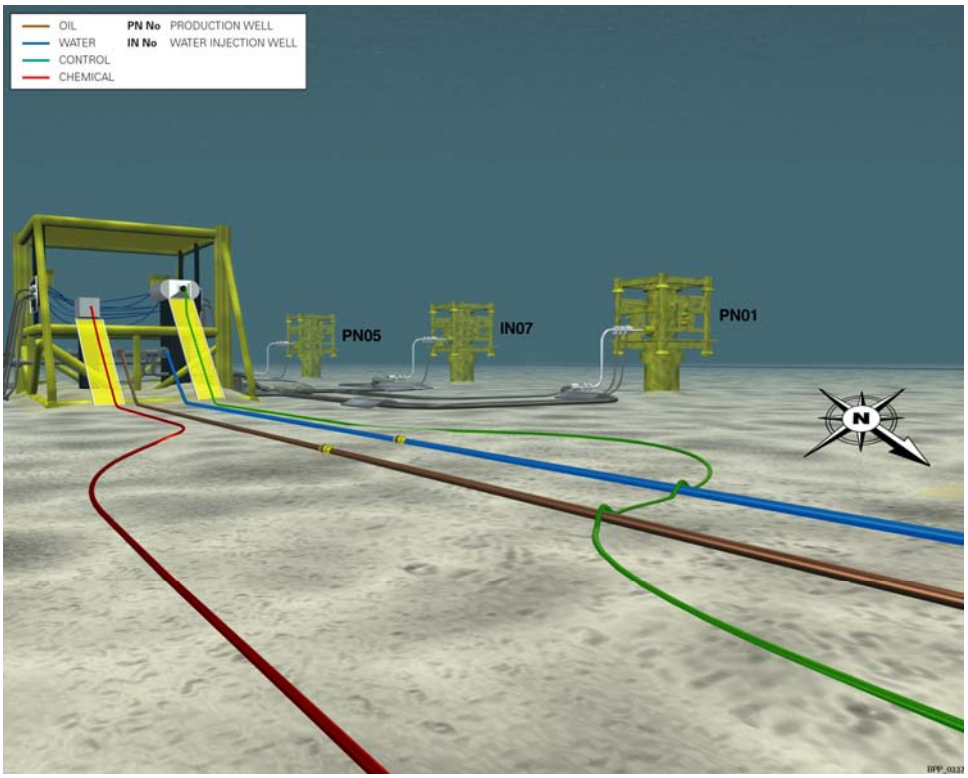


Figure 4.8 Pipelines at Don Manifold

At Thistle, a double spoolpiece connects each pipeline to the respective risers. Pipes and umbilicals are supported by a pipebridge leading to the caisson (refer to Figure 4.9).

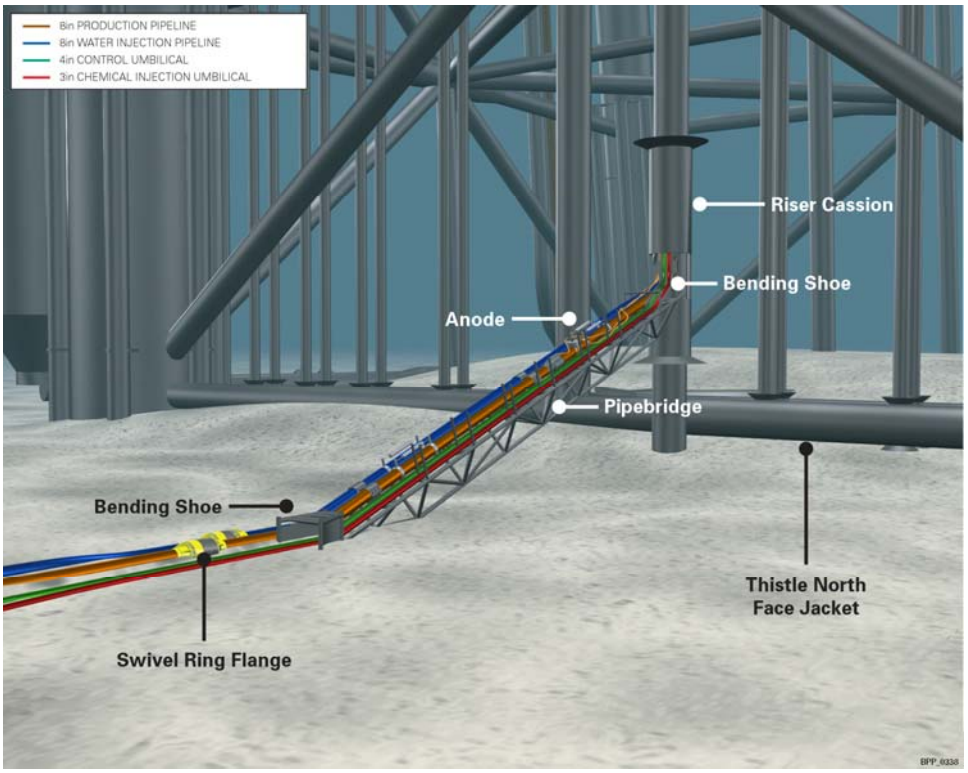


Figure 4.9 Pipebridge at Thistle

Risers and umbilicals run to the Thistle topsides through an opening in the 30in concrete-filled caisson, which is fixed to the seabed.

Approximately 2km from the Don manifold, the four lines cross over the Northern Leg Gas Pipeline (NLGP).

Further details on these lines are provided in Section 10, which should be referred to for details of pipeline construction and stabilisation, current status, decommissioning options and selected decommissioning methods.

4 Materials on the Seabed

4.1 Drill Cuttings

4.1.1 Introduction

Drill cuttings are small pieces of rock that are broken up by the drill bit as it penetrates the rock during drilling of wells. The cuttings are carried back to the surface by 'drilling muds', which are special fluids used to cool and lubricate the drill bit, transport the cuttings and contain the downhole pressure in the well.

Drilling mud consists of a base fluid, such as water, oil or synthetic oil, plus other components, which are added to improve performance.

4.1.2 Don Field Drill Cuttings History

Drilling of the Don Field wells, as detailed in Table 4.1, commenced in July 1989 and continued through to June 1996.

Wells were drilled from a MODU that relocated to above each well being drilled. This resulted in minor drill cutting accumulations in proximity to each well.

4.1.3 Total and Distribution

From information in the reports of wells drilled between 1989 and 1991, the overall volume of cuttings discharged was 14,000m^3.

A full quantitative and qualitative survey, performed in 1999 [4.5], estimated that the remaining volume of cuttings at the Don manifold area was 1763m^3 spread over a large area (47,745m^2). This would indicate that the cuttings accumulation has diminished through time owing to natural forces. There is no physical cuttings pile.

Prior to the commencement of decommissioning work, a photographic survey and study of the area will be conducted. On completion of decommissioning work, a further survey will be carried out.

4.1.4 Composition

The seabed around the Don manifold displayed low to moderate reflectivity during the July 1999 survey, interpreted as representing a low relief cuttings comprising very poorly sorted coarse sands and silt.

The immediate area of the Don manifold was characterised by more highly reflective sediments comprising a superficial cover of coarse sands with exposures of the underlying stiff clays of the Tampen Formation, together with boulders and a number of depressions. Grab samples indicated the sediment to be poorly to very poorly sorted sand and silt. Particle sizes taken in grab samples were indicative of the distribution of cuttings over the seabed.

Refer to Section 8 for further details.

4.2 Other Materials

Any oilfield-related material, not covered by permit, remaining on the seabed following decommission will be so identified and removed during the final site clearance activities (refer to Section 16 for further details).

5 References

[4.1] Don Field Trawl Damage Repair As-built Report, Stolt Offshore Limited, Doc No RE-ENG-397-303. (Also available in BP Don Field Design, Fabrication and Installation Resume, J P Kenny Doc No 06-1891-01-U-3-003-REV A, Appendix C.

[4.2] 'Don Field: Decommissioning of Pipeline PL981' letter from the DECC (BERR) to BP, ABE/20/4/13, 20 September 2000.

[4.3] Don Field As-built Video, Stolt Offshore Limited, BP/DON/00/019-R.

[4.4] The Offshore Installation and Wells Design and Construction Regulations (DCR), SI 1996/No 913, http://www.opsi.gov.uk.

[4.5] Don Cuttings Environmental Survey UKCS 211/18, Gardline Surveys, 5353.01, July 1999.

Section 5
Inventory of Materials

1 Introduction

This section lists the type and quantity of materials for the items to be decommissioned.

This material inventory does not include the following items, which will be deferred until the Thistle Installation is decommissioned:

- The 30in caisson at the Thistle Installation, containing an 8in production riser (PL598), 8in water injection riser (PL599), two 7in and one 2 3/4in conduits
- Don topsides equipment and piping on Thistle (eg Emergency Shutdown Valves (ESDVs), pigging facilities, control and chemical injection systems)
- The pipebridge leading from the caisson
- Pipeline and umbilical systems leading from the pipebridge to the platform 500m zone

Note: Pipeline inventories do not include stabilisation items at the Northern Leg Gas Pipeline (NLGP) crossings. These are discussed and itemised separately in Paragraph 3.3.

Refer to the Don Pipeline System Decommissioning Technical Report [5.1], produced by Lloyd's Register, for additional pipeline and umbilical information.

2 Subsea Equipment

2.1 Wells

A planning estimate of the material to be recovered from the Don Field wells is listed in Table 5.1. In addition, there is a limited quantity of contaminated fluid contained in the well annuli.

Item	Material	Weight in Air (tonnes)
Subsea xmas trees and guide bases	Steel	252.0
Tubing	Steel	645.0
Casings	Steel	220.0
	Total Weight	**1117.0**

Table 5.1 Don Wells Material Inventory

2.2 Don Manifold

The Don manifold was designed so that it may be disconnected and retrieved using a Mobile Offshore Drilling Unit (MODU) or similar. The manifold is clamped to two piles hammered into the seabed to a depth of approximately 10m. The material inventory is listed in Table 5.2.

Item	Material	Weight in Air (tonnes)
Manifold	Steel	48.6
	Aluminium-zinc-indium anodes	1.3
Flowline Spoolpieces	Steel	1.3
	Equipment Total Weight	**51.2**
Displaced Flexiweight Mattresses on/around Manifold		13.2
	Stabilisation Total Weight	**13.2**

Table 5.2 Don Manifold Material Inventory

3 Pipelines, Umbilicals and Jumpers

3.1 Pipelines and Umbilicals

The material inventories for the 8in production and water injection pipelines, and chemical injection and control umbilicals are listed in Table 5.3.

Item	Material	Weight in Air (tonnes)
Subsea Pipeline/Spoolpieces/ Valves/WI Tee	Steel	2766.0
	Aluminium-zinc-indium anodes	27.0
	Galvallum III anodes	28.0
	EPDM coating	373.0
	Concrete weight coat	43.0
3in Chemical umbilical and 4in control umbilical	Composite materials	440.0
	Equipment Total Weight	**3677.0**
Stabilisation (excluding NLGP crossing)	Grout formwork/flexiweight mattresses	823.2
	Grout bags	34.3
	Rock dump	4621.0
	Stabilisation Total Weight	**5478.5**

Table 5.3 8in Production and Water Injection Pipelines, and Chemical Injection and Control Umbilicals Material Inventory

3.2 NLGP Crossings

The two 8in pipelines and the two umbilicals that run between Thistle and the Don manifold, cross the 20in NLGP pipeline approximately 15km from Thistle. Table 5.4 lists the stabilisation inventory at this location.

Item	Material	Weight in Air (tonnes)
Pipelines and umbilicals crossing stabilisation	Flexiweight mattresses	65.0
	Grout formwork	459.0
	Grout bags	1368.0
	Rock dump	2051.0
	Stabilisation Total Weight	**3943.0**

Table 5.4 NLGP Crossings Stabilisation Material Inventory

3.3 Jumpers

The material inventories for the flowline and umbilical jumpers connected to the Don manifold are listed in Table 5.5.

Item	Material	Weight in Air (tonnes)
Flowline Jumpers	Steel	2.73
	Composite	9.88
Chemical and control jumpers	Composite	3.87
	Equipment Total Weight	**16.48**
Stabilisation	Flexiweight mattresses	42.3
	Grout bags	4.2
	Tarpaulin	0.2
	Stabilisation Total Weight	**46.7**

Table 5.5 Flowline and Umbilical Jumpers Material Inventory

Notes: (1) PN01 was originally connected to the Don manifold using a 4in rigid flowline jumper, which was replaced by a 4in flexible flowline jumper in 1991. Vertical sections of the rigid flowline were recovered and the horizontal section covered by a flexiweight mattress. The remaining horizontal section, flexible and rigid tie-in pipes, and flexiweight mattresses will be removed.

The replacement flexible flowline is connected to a short rigid spoolpiece at the wellhead.

(2) IN03 was originally connected to the Don manifold using a 4in rigid flowline jumper, which was replaced by a 4in flexible flowline jumper in 1993. Vertical sections of the rigid flowline were recovered and the horizontal section covered by flexiweight mattresses. The remaining horizontal section, flexible and rigid tie-in pipes, and flexiweight mattresses will be removed.

The replacement 4in flexible flowline jumper is disconnected at the wellhead and at the manifold.

(3) Following trawler damage in 2000 [5.2], the serviceable PN05 4in production flowline jumper was disconnected from the shut-in well PN05 and connected to PN06 from the Don manifold and became known as PL1073. The original damaged 4in production flowline jumper PL1073 became known as PL981 and was removed to shore for disposal.

4 Materials on the Seabed

Cuttings were originally generated through drilling. A full quantitative and qualitative survey, performed in 1999 [5.3], estimated that the total drill cuttings volume was 1763m^3 spread over a large area (47,745m^2).

5 References

[5.1] Don Pipeline System Decommissioning Technical Report, Lloyd's Register EMEA, Ref No R-658-40621-1B, July 2005.

[5.2] Don Field Trawl Damage Repair As-built Report, Stolt Offshore, Ref No RE-ENG-397-303.

[5.3] Don Cuttings Environmental Survey UKCS 211/18, Gardline Surveys, 5353.01, July 1999.

Section 6
Removal and Disposal Options

1 Introduction

This document presents the following two Decommissioning Programmes as one, which is permitted by the Department of Energy and Climate Change (DECC) Decommissioning Guidance Notes [6.1] guidelines:

1. Subsea Equipment (Don Field manifold, wellheads and xmas trees).
2. Pipelines, Flowlines and Umbilicals.

Selection of the most suitable decommissioning option for the Don facilities was based on thorough and comprehensive evaluations of the relevant decommissioning options, with particular consideration given to the following selection criteria:

- Technical (feasibility, complexity and risk)
- Safety (offshore and onshore hazards/risks)
- Environmental (ecosystem impacts, energy and waste)
- Social (effects on other users of the sea, eg shipping and fishing)
- Economics (costs and economic impact)

Shortlisting and final selection of the best overall option were guided by an evaluation of these selection criteria, always with due regard to the OSPAR Decision 98/3 [6.2].

Initially, a list of all feasible decommissioning options was compiled for each main facility. As the decommissioning studies progressed and more information was made available for evaluation, the number of options was reduced to a shortlist from which the best decommissioning option for the facility was selected. Where more than one decommissioning option was shortlisted (ie pipelines and umbilicals), they were evaluated on a systematic, qualitative and quantitative basis.

The option selection for each main element of the Don facilities is described in Paragraphs 2 and 3.

2 Decommissioning Programme 1 - Subsea Equipment

The following equipment will be removed to meet clean seabed requirements:

- All wellheads and xmas trees
- The Don manifold

3 Decommissioning Programme 2 - Pipelines, Flowlines and Umbilicals

3.1 General

Primary Scope Activities associated with these lines will be performed irrespective of the final options selected for the pipelines and umbilicals.

These activities, shown in Figures 6.1 and 6.2, include disconnecting and recovering onshore:

- Production and water injection pipeline subsea tie-in double spoolpieces and associated subsea isolation valves at Don manifold
- Untrenched sections of umbilicals at the approaches to the Don manifold
- Flowline and umbilical jumpers between the Don manifold and wells

At the Thistle Installation topsides, the production and water injection pipelines, and umbilicals will be disconnected and blanked off.

The options evaluated for the two 8in pipelines from the Don Field to the Thistle Installation were as follows:

- Leave in situ (three methods)
- Leave in situ with selective recovery (recovery of pipeline ends and NLGP crossing)
- Full recovery (two methods)

The options evaluated for the 3in chemical injection and 4in control umbilicals from the Don Field to the Thistle Installation were as follows:

- Leave in situ (three methods)
- Leave in situ with selective recovery
- Full recovery (two methods)

Leave in situ with selected recovery was the recommended option for both the 8in pipelines and umbilicals, and includes:

- Cutting and recovering exposed sections of pipe (including isolation valves and water injection tee-piece) and umbilical at the Don manifold and Thistle approach for disposal

  Note: The NLGP crossing will be left in place until the permanent decommissioning of the NLGP pipeline and the materials within the Thistle 500m zone will be deferred until the Thistle is decommissioned

- Burying cut ends of pipe (cut back to stable buried pipe) and umbilical, so that there is no possibility of a snagging hazard

Refer to Section 10 for further details.

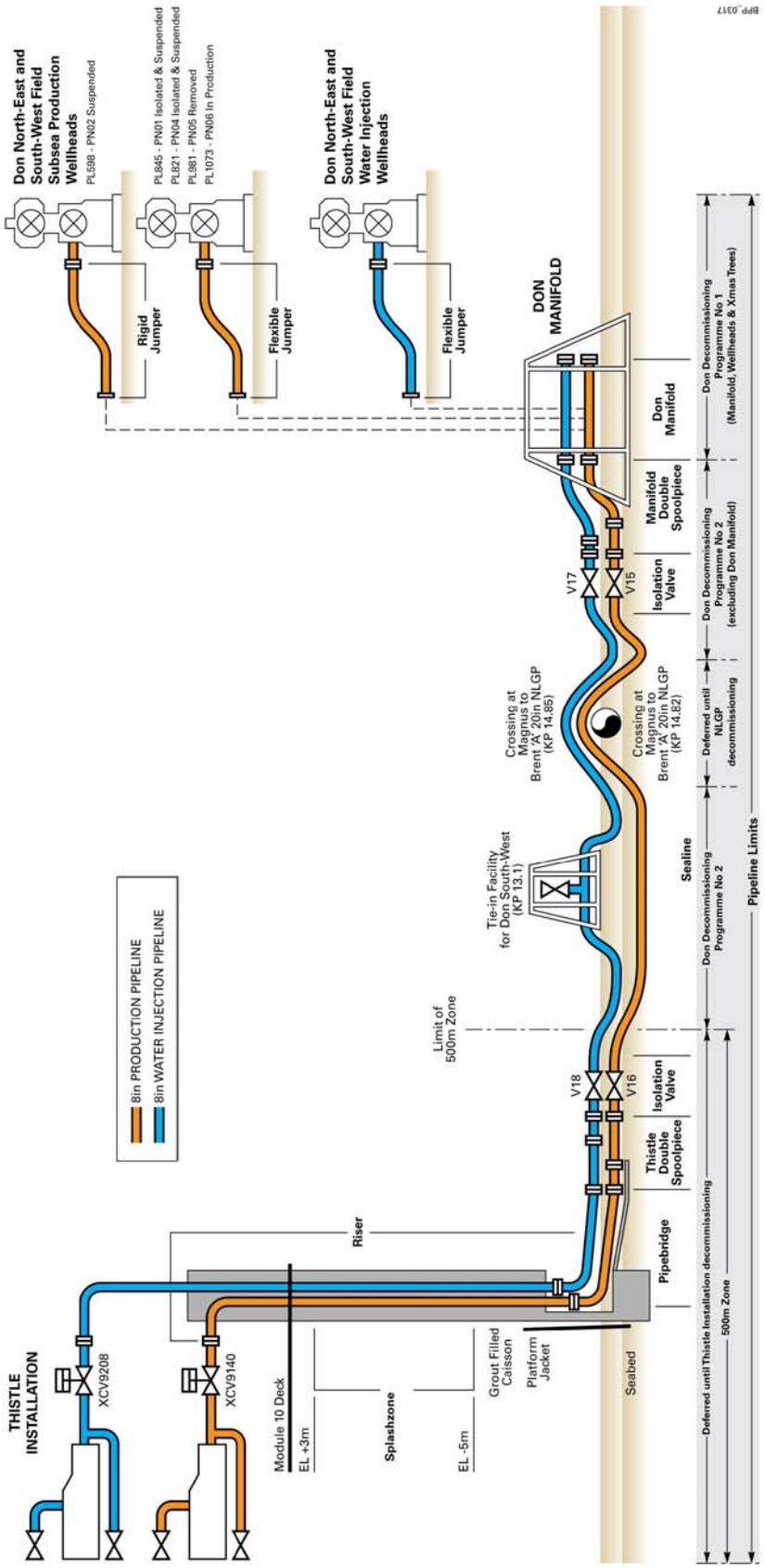


Figure 6.1 Decommissioning Programme Limits – Production and Water Injection Pipelines

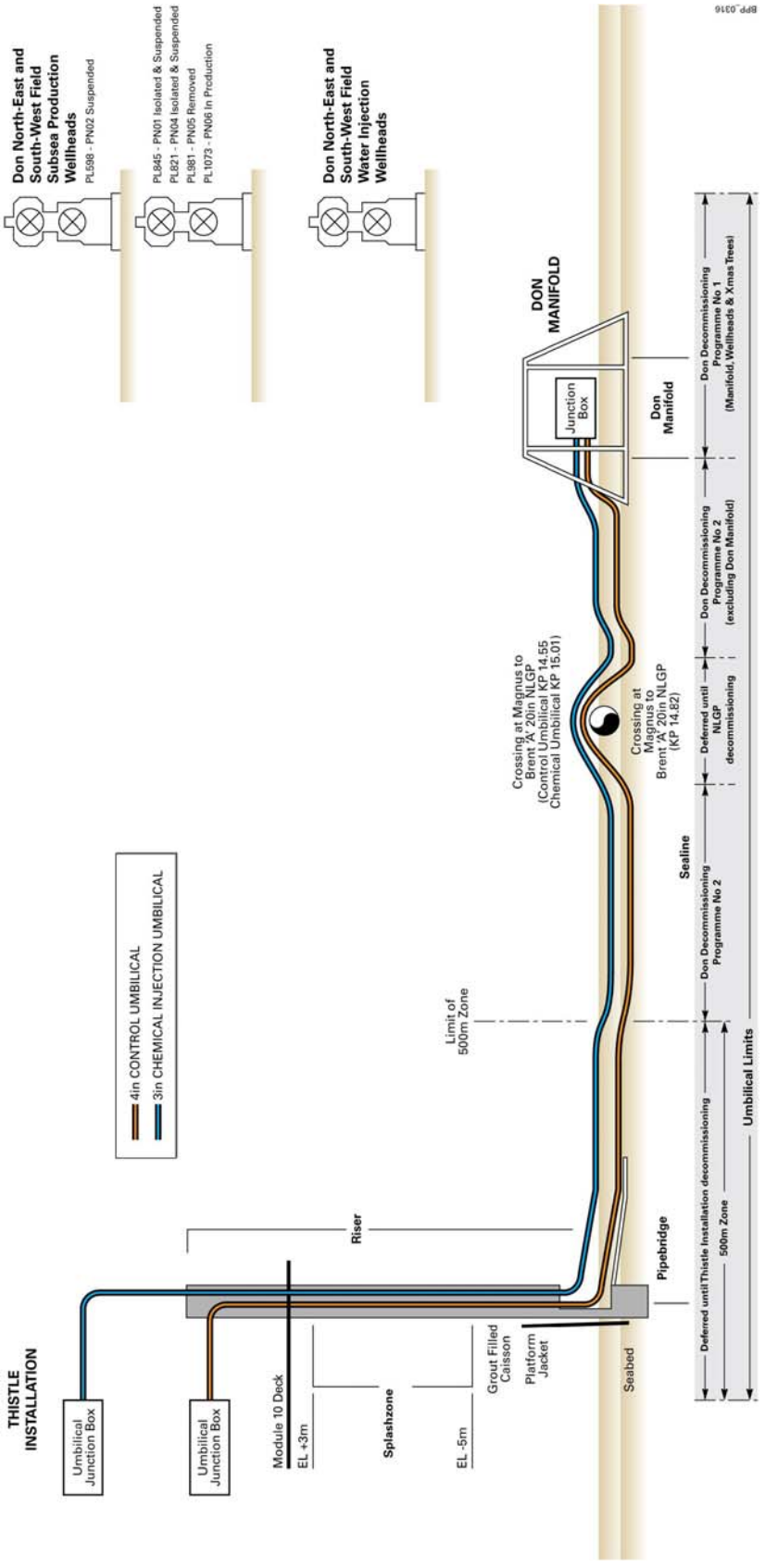


Figure 6.2 Decommissioning Programme Limits – Control / Chemical Injection Umbilicals

3.2 Protection Features

The Don pipeline system has distinct types of protection features installed which are flexiweight mattresses, grout formworks and grout bags. The majority of these are on the NLGP crossing and at the Don Manifold area, as described in Section 10, Paragraph 3.9.

Note: The NLGP crossing will be left in place until the permanent decommissioning of the NLGP pipeline and the materials within the Thistle 500m zone will be deferred until the Thistle is decommissioned.

With reference to the areas indicated in Figure 6.3 and quantities listed in Table 6.1, it is proposed that the following features are removed and disposed of onshore [6.3]:

- All features located within the immediate vicinity of the Don manifold (Area 1)
- All features located on the 3in Chemical Injection umbilical (Area 2)
- All features located on the 4in control umbilical (Area 3)
- All grout bags and mattresses in Areas 4 and 5
- Grout bags positioned over the WI Tee location to allow removal of the Tie-in Tee structure (Area 6)
- Grout bags under the water injection pipeline end, at the spool in the vicinity of the Thistle platform (Area 10). Removal will be deferred until the Thistle platform is decommissioned

Grout formworks (Areas 4 to 9) located on the Don 8in pipelines will be left in situ and their over-trawlability confirmed by trials.

Pipeline	Pre-Decommissioning Existing Features			Post-Decommissioning Remaining In situ Features		
	Mats (qty)	Bags (qty)	Formwork (linear m)	Mats (qty)	Bags (qty)	Formwork (linear m)
3in CI Umbilical	2	12	0	0	0	0
4in Control Umbilical	8	0	0	0	0	0
8in Oil Pipeline	18	0	109	0	0	109
8in WI Pipeline	14	90	192	0	0	192
Don Manifold	14	20	0	0	0	0

Table 6.1 Protection Features Pre and Post Decommissioning Status

4 Drill Cuttings

The recommendation to leave the Don Field drill cuttings in place is fit for purpose and appropriate given the current scale of the cuttings accumulation at the field.

Refer to Section 8 for further details.

5 References

[6.1] DECC Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, http://www.decc.gov.uk/.

[6.2] The Convention for the Protection of the Marine Environment of the North-east Atlantic OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations, http://www.ospar.org.

[6.3] Don Pipeline Features Technical Note, D Johnston 27/05/08.

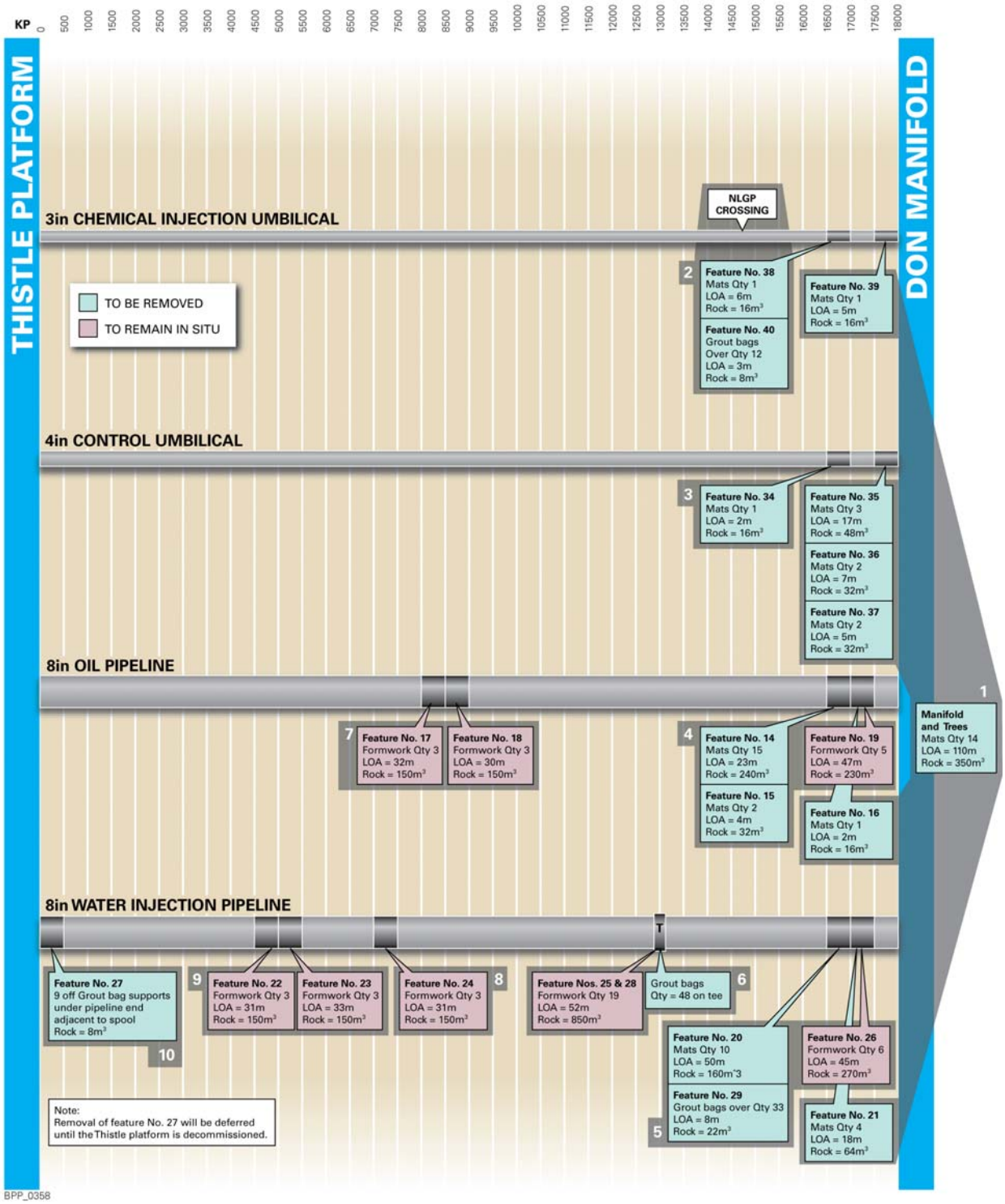


Figure 6.3 Protection Features Recommended Decommissioning Option

Section 7
Selected Removal and Disposal Options

1 Overview

This section provides a description of the selected decommissioning options for the Don Field subsea facilities and pipelines. These items include:

- All wellheads and xmas trees
- The Don manifold
- Production and water injection pipeline subsea tie-in double spoolpieces and associated isolation valves at the Don manifold
- Untrenched sections of umbilicals at the approaches to the Don manifold
- Flowline and umbilical jumpers between the Don manifold and wells

Shortlisted options for the remaining items, ie the pipelines and umbilicals between the Don Field and Thistle, were subject to a comparative assessment for selection of the preferred option.

2 Installations

2.1 Wells

2.1.1 Don Well Categories

Don subsea wells are categorised under the Oil & Gas UK (OGUK) Guidelines [7.1] as detailed in Table 7.1.

2.1.2 Methodology and Recommendations for Plugging

In July 2005, OGUK issued revised Guidelines for the Suspension and Abandonment of Wells [7.1]. This provides Operators with a minimum standard for the isolation of permeable zones when a well is abandoned or suspended with a view to re-entry or later abandonment. A revision of this Guidance was issued in 2009, which the Project Team will comply with.

BP issued the Drilling and Well Operations Policy [7.2] in May 2003. This was to ensure that wells are designed, drilled, maintained and abandoned to high, minimum acceptable and consistent standards.

Both the Drilling and Well Operations Policy and the OGUK Guidelines agree that:

- All wells shall be left in a condition such that leakage of formation fluid to surface will be adequately prevented
- Cement is the prime material for abandonment purposes

Using these guidelines and policy, a suitable plugging strategy is proposed.

Well No	Categorisation	Comment
PN01	SS3	Deep-set downhole gauge cable should not form part of the permanent barriers as per OGUK Section 7. It is anticipated that a rig will be required to partially abandon this well if technology cannot be developed to enable LWIV abandonment.
PN02	SS3	Deep-set downhole gauge cable should not form part of the permanent barriers as per OGUK Section 7. It is anticipated that a rig will be required to partially abandon this well if technology cannot be developed to enable LWIV abandonment.
IN03	SS2.2	LWIV candidate for partial abandonment with cement.
PN04	SS3	Deep-set downhole gauge cable should not form part of the permanent barriers as per OGUK Section 7. It is anticipated that a rig will be required to partially abandon this well if technology cannot be developed to enable LWIV abandonment.
PN05	SS3	Deep-set downhole gauge cable should not form part of the permanent barriers as per OGUK Section 7. LWIV candidate for partial abandonment with cement.
PN06	SS3	Deep-set downhole gauge cable should not form part of the permanent barriers as per OGUK Section 7. LWIV candidate for partial abandonment with cement.
IN07	SS2.2	LWIV candidate for partial abandonment with cement.

Table 7.1 Don Wells Categorisation

Barrier philosophy for isolating permeable hydrocarbon-bearing intervals will follow OGUK guidelines [7.1].

2.1.3 Abandonment Methodology

Abandonment of the Don wells will be divided into phases to maximise efficiency and minimise operational risk in execution. The final phase of execution will be dependent on the well specific abandonment requirements and technical endorsement.

The indicative Don wells abandonment phases are as follows:

- **Phase 1**

  Preparation of the wells by a Light Well Intervention Vessel (LWIV) to assess and carry out preparatory works. If results are favourable, this may allow abandonment of the water injection wells (IN03, IN07) from the LWIV.

- **Phase 2**

  Potential abandonment of the reservoir and upper plugs by a LWIV, and final rig preparatory work (setting of barriers).

- **Phase 3**

  Subsea xmas tree removal by a construction vessel.

- **Phase 4**

  Rig workscope, pulling tubing and placement of remaining reservoir abandonment and any intermediate plugs.

- **Phase 5**

  Batch swat final cement plugs by a construction vessel or a LWIV, followed by batch wellhead removal and seabed clearance.

The techniques listed in Table 7.2 have been identified for use in Don abandonment operations.

Technique	Comment
Bullheading through tubing	This technique will be considered for suitable wells where isolation is required between reservoir sands (currently applicable to well PN06 only). Wireline perforating guns would be used to provide communication between tubing and annuli, and cement would be bullheaded or circulated in place.
Conventional abandonment	Involves a full workover, plugging wells, removing the subsea xmas tree and utilising BOPs.
Coiled tubing	Through tubing technology, using conventional coiled tubing to accurately place cement. This technique has previously been utilised for a number of well abandonments where tubing integrity has been lost. Coiled tubing will not be used for the primary abandonment unless, on investigation, it is found that there is a lack of integrity in the tubing.
Cutting of the conductor	The preferred method will be to use abrasive cutting tools to sever and recover each string 3m below the mud line. The guide base will be recovered with the 30in string if bonded. If it is not possible to abrasive cut and recover the guide base at this time, the contingency explosive charge may be used, if a permit is granted.
Through tubing abandonment	This technique involves the placement of cement through the existing tubing. This option is being evaluated as a LWIV option and could be used for placement of the reservoir and some intermediate plugs.

Table 7.2 Don Wells Abandonment Techniques

2.2 Subsea Wells Recovery

On completion of well plugging operations, the xmas trees will be recovered and the near-surface tubing and casing strings plugged and removed. The conductor strings will be severed approximately 3m below the seabed. Xmas trees and guide bases will be recovered.

All recovered materials will be transported to shore for recycling.

2.3 Don Manifold Recovery

In line with the OSPAR Decision 98/3 [7.3] the Don manifold will be recovered in the following stages:

(1) Make the manifold hydrocarbon free.

(2) Attach recovery rigging to the manifold and cut the two piles 3m below the existing seabed level.

(3) Recover the manifold by mobile drilling rig or DSV (exact details of the manifold recovery shall be provided by the removal contractor).

3 Pipelines, Flowlines and Umbilicals

The recommended option for the 8in production and water injection pipelines, and the 3in chemical injection and 4in control umbilicals between Thistle and the Don manifold is 'leave in situ with selected recovery' as these lines are trenched and fully buried.

Pipeline and umbilical Northern Leg Gas Pipeline (NLGP) crossings will be deferred until the NLGP is decommissioned and the materials within the Thistle 500m zone will be deferred until the Thistle is decommissioned.

All flowlines and jumpers between the Don manifold and the wellheads will be recovered.

Refer to Section 10 for further details of the selected removal and disposal option chosen for the pipelines, flowlines and umbilicals.

4 Protection Features

It is proposed that the following features are removed and disposed of onshore [7.4]:

- All features located within the immediate vicinity of the Don manifold
- All features located on the 3in chemical Injection umbilical
- All features located on the 4in control umbilical
- All grout bags and flexiweight mattresses on the 8in pipelines near the Don manifold (refer to Section 6 Figure 6.3, Areas 4 and 5)

- Grout bags positioned over the WI Tee location to allow removal of the Tie-in Tee structure
- All the materials within the Thistle 500m zone will be deferred until the Thistle is decommissioned

Grout formworks located on the Don 8in pipelines will be left in situ and their over-trawlability confirmed by trials.

Refer to Section 6 Paragraph 4 for further details.

5 Materials on the Seabed

A full debris survey of the area will be undertaken and any identified oilfield-related items, not covered by permit, removed. The results of the debris clearance shall be independently verified.

Refer to Section 16 for further details.

6 Disposal

All materials returned to shore will be reused or recycled, where possible. The current market for scrap metals, in particular, would result in the majority of the equipment being dismantled into its component materials rather than being reused. However, this will result in nearly 100% of the recovered materials being recycled.

All disposal work will be done by a federal disposal contractor.

BP, in parallel with work on Don decommissioning, will continue to explore other commercial options for both the infrastructure and the fields.

7 References

[7.1] Oil & Gas UK's Guidelines for Suspension and Abandonment of Wells, 2009, Issue 3, http://www.oilandgas.org.uk/.

[7.2] BP Drilling and Well Operations Policy (BPA-D-001).

[7.3] The Convention for the Protection of the Marine Environment of the North-east Atlantic OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations, http://www.ospar.org/).

[7.4] Don Pipeline Features Technical Note, D Johnston 27/05/08.

Section 8
Drill Cuttings

1 Introduction

This section describes the historical and current status of the Don Field cuttings and outlines the option chosen for dealing with the Don Field cuttings as a discrete entity.

The Don Field was subject to a comprehensive environmental survey in July 1999 [8.1]. It is believed that 14,000m^3 of cuttings were originally generated through drilling the seven wells. However, due to natural dispersion since the last drilling was performed in 1996, it was found that only 1763m^3 remained, which is approximately 12% of the original Don cuttings. The survey work also reported a 1.4m high drill mound in the Don manifold area, but diving work performed in 2006 could not find evidence of any discernable drill cutting mound.

Figure 8.1 is the July 1999 survey side-scan sonar interpretation of the Don Field cuttings, with the area equivalent to a circle radius of 123m.

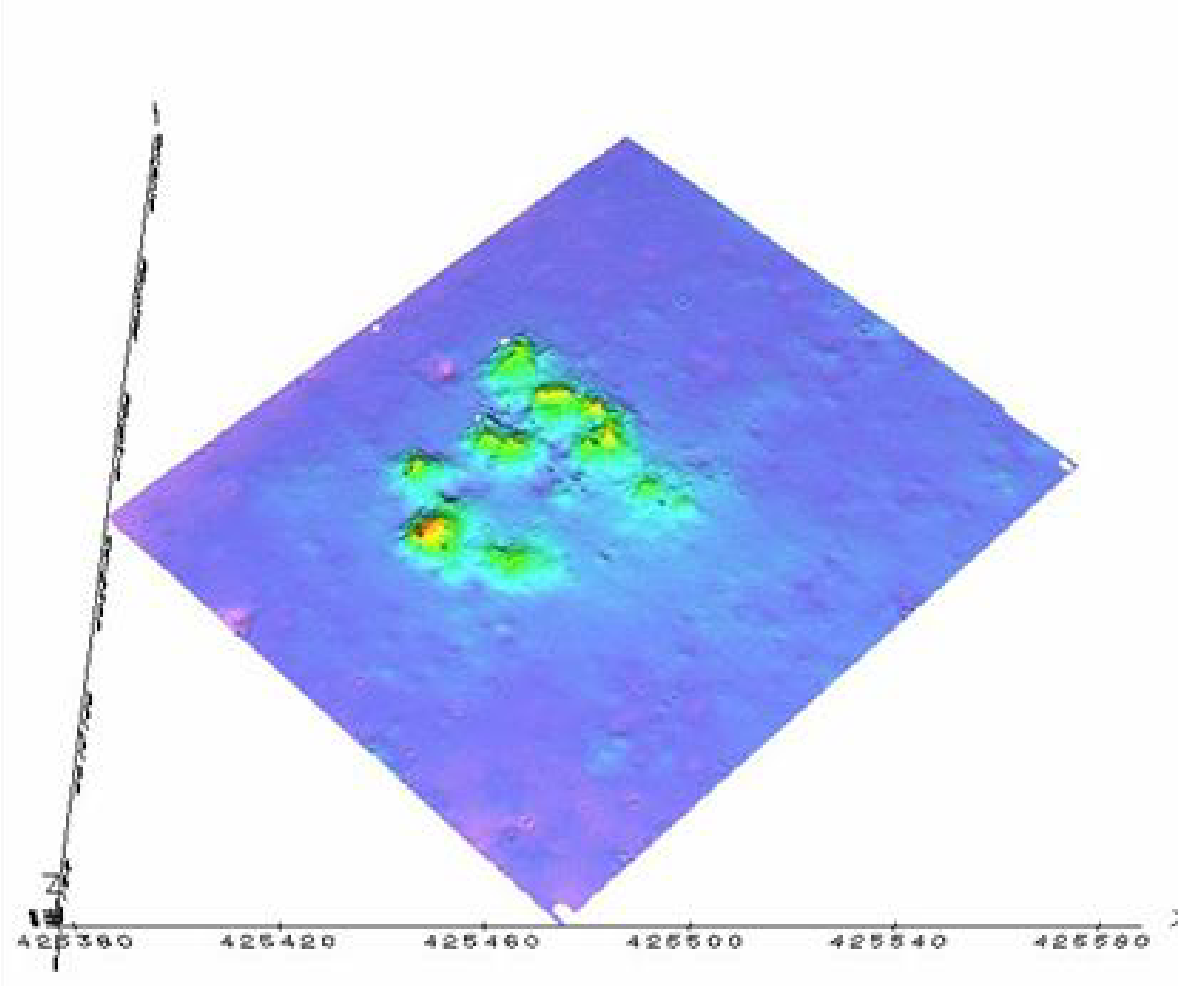


Figure 8.1 Drill Field Cuttings – July 1999 Survey Side-Scan Sonar Interpretation

A debris survey was carried out in 2004 [8.2] which confirmed that there is no significant cuttings pile and that cuttings do not obscure any seabed features such as small boulders and seabed scars.

2 Cuttings Composition

2.1 Environmental Cuttings Survey

In July 1999, an environmental cuttings survey [8.1] was undertaken in the vicinity of the Don manifold to:

- Define the size and shape of the drill cuttings
- Obtain seabed samples to determine the physio-chemical and biological conditions of the seabed

Two survey lines were run at an offset of 50m and 150m from each face of the manifold using sidescan sonar and swathe bathymetry. A line at an offset of 50m was also run diagonally past each corner of the manifold. In 2004, a photographic seabed assessment was performed at various locations within the Don Manifold area to:

- Identify seabed conditions
- Check for presence of Lophelia and any other protected species

2.2 Particle Size

The seabed around the Don manifold displayed low to moderate reflectivity during the July 1999 survey interpreted as representing a low relief cuttings comprising very poorly sorted coarse sands and silt. The immediate area of the Don manifold was characterised by more highly reflective sediments, comprising a superficial cover of coarse sands with exposures of the underlying stiff clays of the Tampen Formation together with boulders and a number of depressions. Grab samples indicated the sediment to be poorly to very poorly sorted sand and silt. Particle sizes taken in grab samples were indicative of the distribution of cuttings over the seabed.

2.3 Sediment Organics

The spatial distribution of sediment organics and organic carbon was consistent with the spread of cuttings in that the cuttings pile area exhibited a greater percentage of carbon content as organic carbon.

2.4 Total Oils

Total oils were above the North Sea background level of 5µg.g^{-1} (Gardline unpublished) at all but three of the survey sites indicating localised contamination between 100m and 500m radius from drill-related activity, with some spread at distances >100m along the line of the dominant current flow to the south-east. Both total oils and n-alkanes were elevated with a petrogenic/biogenic bias at certain sample stations.

The samples showed large variation (by a factor of over 9000) across the survey sites, ranging from 1.3µg.g-1 at 500m south-west to 11,766µg.g-1 at 100m south-east. This latter survey location (number 1007) shows high levels of other pollutants but, as the high levels are only found at this single station, is not considered representative. Note however that this station lies downstream of the cuttings.

2.5 Polycyclic Aromatic Hydrocarbons

Polycyclic Aromatic Hydrocarbons (PAHs) were recorded in concentrations above the North Sea baseline (240ng.g^{-1} North Sea Task Force (NSTF) 1993) with a bias toward the lighter volatile Nitro-o-PhenyleneDiamine (NPD) fraction at certain sample stations. PAH concentration exhibited a strong positive correlation with total oil concentration within the cuttings pile sediments.

2.6 Metals

The spatial pattern for metal concentrations was a reduction with distance from the Don manifold. Most of the metals surveyed were higher in concentration at the locations 100m south-east and south-west of the manifold. However, as shown in Table 8.1, at 500m from the manifold, total levels of Barium (Ba), Chromium (Cr), Lead (Pb) and Vanadium (V) exceeded the baseline for the North Sea, indicative of a veneer of drill-related material.

Metal	North Sea Baseline	Highest Concentration found near Don Manifold
Barium	<500µg.g^{-1}	45,445µg.g^{-1} (south-west)
Chromium	<20µg.g^{-1}	131µg.g^{-1} (south-west)
Lead	11µg.g^{-1}	60.6µg.g^{-1} (south-west)
Copper	10µg.g^{-1}	70µg.g^{-1} (south-east)
Mercury	0.05µg.g^{-1}	0.43µg.g^{-1} (north-east)
Zinc	35µg.g^{-1}	179µg.g^{-1} (south-east)
Nickel	<20µg.g^{-1}	90µg.g^{-1} (south-east)
Vanadium	35µg.g^{-1}	264µg.g^{-1} (south-east)

Table 8.1 Metal Concentrations Near Don Manifold

2.7 Benthos

The benthos across the survey area was relatively diverse and largely polychaete, but of a community generally dominated by a few species. The fauna exhibited distinct changes in response to sedimentary contamination of hydrocarbons and metals. Increased contamination caused a change from a diverse, lower dominance fauna to a subsurface, deposit-feeding cirratulid-dominated, lower diversity community.

An analysis of seabed photographs [8.3] in 2005 concluded that the seabed shows good evidence that macro faunal species are present living and feeding. Some of the photographs appear to show unimpacted seabed, possibly due to a fine silt or sand veneer. There was no clear evidence of oil residue on any of the cuttings and no evidence of *Lophelia* or any other protected species that would be of concern under the Habitats Directive.

3 Drilling Mud

The drilling muds used on a typical Don well were as follows:

- 36in section - water based muds
- 26in section - water based muds
- 17 1/2in section - oil based muds
- 12 1/2in section - oil based muds
- 8 1/2in section - oil based muds

4 OSPAR Recommendation

In June 2006, OSPAR issued a recommendation on cuttings pile management [8.4], which divides the process into two stages - an initial assessment and screening, followed by a BAT/BEP assessment if the cuttings pile's rate of oil loss and/or persistence are above specified criteria.

The results for the Stage 1 screening for the Don cuttings are presented in Table 8.2.

	OSPAR Threshold	Don Cuttings
Rate of oil loss to water column	10tonnes/year	0.93(1) tonnes/year
Persistence of the area of seabed contaminated	500km^2/yr	55km^2/yr

Note (1) Calculated oil loss rate using UKOOA Phase 3 mesocosm data.

Table 8.2 Screening Results for Don Cuttings

Since the rate of oil loss and the persistence are well below the thresholds set by OSPAR, and no other discharges have contaminated the cuttings pile, no further action is required and the cuttings pile may be left in situ to degrade naturally.

5 Decommissioning Options

It is recommended that drill cuttings are left in place, with minimal disturbance being anticipated during any of the activities associated with the decommissioning of the Don Field. As the cuttings are minimal [8.1], it is proposed to wait until the subsea facilities have been removed before undertaking another full survey. This post-decommissioning study will have a design and sampling regime compatible with the July 1999 study, so that the July 1999 study can be used as a baseline.

The risks associated with general marine discharges and noise that may arise through the use of a survey vessel over the period of decommissioning studies would be localised, and of a small scale and duration. The energy used and atmospheric emissions generated would be because of fuel used by the survey vessels for ongoing monitoring.

The potential for spreading of the pile by natural forces over a wider area has been considered. Dispersion has already taken place since the cessation of drilling in 1991, with the 1999 survey [8.1] estimating that only 1763m^3 of the original 14,000m^3 of cuttings remain. The potential for leaching of hydrocarbons and/or other chemicals into seawater has also been considered with the cumulative impacts considered minimal, as the field (and so the cuttings volume) is small in comparison to many others. The effect of long-term persistence of cuttings on the seabed is considered minimal.

6 Conclusions

The Scientific Review Group of the Oil & Gas UK (OGUK) Drill Cuttings Initiative [8.5] concluded that, at present, effects of drill cuttings piles across the North Sea are found to be highly localised with the spatial extent of the areas affected being a small percentage of the total area of the North Sea.

Hydrocarbons within the piles are considered to be largely immobilised and are only being removed by erosion, degradation and leaching over several decades. Considering the wider environment, the rate of release is considered small in comparison to hydrocarbons entering the North Sea from other sources (in total 330 tonnes per year, which equates to less than 5% of the total annual hydrocarbons from other sources).

In addition, after 30 years of cuttings discharges the total area of seabed resulting in biological disturbance due to cuttings piles was estimated to be 1.605km^2 or 0.23% of the total area of the North Sea. In comparison, fishing, dredging and spoil dumping is reported to affect an area of 130,000km^2 to 369,000km^2 per year, which translates to up to 50% of the total area of the North Sea [8.5].

Due to the low volume of cuttings accumulation at the field, and the effect of natural erosion and degradation, the recommendation to leave the Don Field drill cuttings in place is both fit for purpose and sensible.

7 References

[8.1] Don Cuttings Environmental Survey UKCS 211/118, Gardline Surveys, 5353.01, July 1999.

[8.2] Don Debris Survey UKCS 211/18a, Gardline Surveys, 6259, October 2004.

[8.3] Assessment of Seabed Condition from Seabed Photography, Don Field, North Sea, RSKENSR 60113, February 2005.

[8.4] OSPAR Recommendation 2006/5 on a Management Regime for Offshore Cuttings Piles OSPA 06/23/1-E, Annex 16. Meeting of the Offshore Industry Committee (OIC), Stockholm: 26 - 30 June 2006.

[8.5] Oil & Gas UK Drill Cuttings Initiative, Final Report. OGUK Drills Cuttings Initiative Executive Committee, February 2002, http://www.oilandgas.org.uk.

Section 9
Environmental Impact Assessment

Section 9
Environmental Impact Assessment (cont'd)

1 Introduction

This section summarises the findings of the Environmental Impact Assessment (EIA) [9.1] undertaken in support of the Don Field Decommissioning Programme. The programme is being submitted under the Petroleum Act 1998, with the EIA being conducted in accordance with the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999, SI 1999 No 360 (as amended by the Offshore Petroleum Production and Pipelines (Assessment of Environmental Impacts) (Amendment) Regulations 2007, SI 2007 No 933).

2 Legislation

The Don decommissioning project will be subject to the requirements of UK and EU legislation in addition to other international treaties and agreements. The key pieces of legislation are:

- **Petroleum Act 1998**

  The Petroleum Act requires the Section 29 Notice Holders to produce a Decommissioning Programme through which permission to decommission may be granted. This is the primary legislation governing the project. The Decommissioning Programme must include a summary of the EIA.

- **OSPAR Decision 98/3** (the 'Sintra' agreement):

  The OSPAR Decision 98/3 prohibits the disposal of redundant installations at sea, but provides potential derogation from this requirement for a small number of more complicated circumstances.

  Note: Subsea installations are not separately identified in the Decision but fall within the definition of a steel installation or a concrete installation.

In addition, offshore aspects of the project will be regulated by UK environmental regulation, in particular the:

- Offshore Chemicals Regulations 2002, SI 2002 No 1355
- Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005, SI 2005 No 2055
- Food and Environment Protection Act 1985
- Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007, SI 2007 No 1842
- Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999, SI 1999 No 360 (as amended by the Offshore Petroleum Production and Pipelines (Assessment of Environmental Impacts) (Amendment) Regulations 2007 SI 2007 No 933)

3 Consultation

BP has undertaken informal consultation with the Scottish Fishermen's Federation (SFF) and outlined their plans for decommissioning.

Further consultation will be undertaken as part of the statutory decommissioning programme process.

4 Environmental Description

4.1 Physical Environment

The topography of the seabed around the Don subsea development is predominantly flat and of low relief.

The hydrographic regime in the location of the field is typical of the northern North Sea, being highly influenced by the inflow of Atlantic water around the north of Shetland. The Atlantic water follows the 200m contour to the north of Shetland before passing southwards along the western edge of the Norwegian trench. Sea surface temperatures range from 7.5°C in winter to 13.5°C in summer, with seabed temperatures being relatively constant throughout the year at 7-8°C.

Winds in the vicinity of the Don Field are highly variable. However, there are clear trends in both directions and wind speed, with the prevailing winds being from the south and west. Calm periods are relatively infrequent with the majority of winds during the summer months ranging between 5.5-10.7m/s and during the winter months frequently greater than 17m/s.

The permitted discharge of cleaned oil cuttings at Don has resulted in a small area of contamination and disturbance on the seabed (cuttings accumulation) as described in Section 8.

4.2 Biological Environment

Benthic fauna in the area of the Don Field are typical of the northern North Sea, generally biodiversity and communities are representative of the northern North Sea with the exception of the small area of cuttings accumulation where species diversity is likely to be reduced.

The most numerically dominant species in the area are polychaete worms, especially two species of *Exogone, Aonides paucibranchiata, Glycera lapidum* and *Aricidea wassi*. Molluscs were the next most abundant phylum, with the filter-feeding bivalves *Lima subauriculata* and *Thyasira sp.* being the most numerous. The crustaceans were dominated by *Tmetonyx cicada, Synchelidium maculatum* and *Uncola planipes*.

Sites closest to the Don manifold were the most species impoverished, being seen to be dominated by a community of capitellids, with *Capitella capitata* be particularly numerous.

The planktonic assemblage in the region of the Don area is mainly made up northern intermediate (mixed water) and neritic (coastal water) species. The dominant phytoplankton species in the North Sea is the dinoflagellate *Ceratia*, while zooplankton is dominated by the copepods *Calanus finmarchicus* and *C. helgolandicus*.

The Don Field lies within spawning grounds for haddock (February-May), saithe (January-April), mackerel (June-July), and Norway pout (January-April). Haddock, mackerel, sand eel, and blue whiting also use the area as a nursery ground. Although there is fish spawning and nursery activity in the vicinity of the Don Field at certain times of the year, these form part of larger offshore areas.

Within the vicinity of the Don area, seabird densities are low overall, with fulmar and guillemot being the most abundant species. The vulnerability of seabird species to surface pollution shows that the Don area does not exhibit very high seabird vulnerability at any time during the year, with only July showing high vulnerability when seabirds move offshore from coastal breeding areas.

The most abundant cetacean in the Don area is the harbour porpoise. However, this species appears to be widespread across the northern and central North Sea with more important populations found outside the Don area.

In view of the distribution of common and grey seals, it is not expected that these would be encountered in the Don area, although these animals have been sighted up to 150km offshore.

4.3 Commercial Fisheries and other Sea Users

The Don Field lies in an area of high commercial value with fishing effort occurring around the year, with demersal species dominating the landings from this area.

The northern North Sea is an area of extensive offshore oil and gas activity, with the closest fields being Magnus (BP), Thistle (Lundin) and Murchison (CNR).

Shipping activity in the area is primarily associated with oil and gas support vessels, tankers and merchant vessels.

No designated submarine exercise grounds or known areas of military activity lie in the vicinity of the Don Field.

4.4 Conservation Interests

There are no known habitats or species of conservation importance in close proximity to the Don Field. The closest offshore draft Special Area of Conservation (dSAC) to the Don Field is the Braemar pockmark, approximately 280km to the south.

5 EIA Process and Methodology

An Environmental Issues Identification (ENVID) workshop was used to identify and rank all potential environmental issues associated with the Don Field decommissioning. The issues that ranked as negligible or of minor significance were screened out. The remaining issues were carried over for further assessment. BP has aimed to remove or reduce the environmental risk of such issues through various identified mitigation and measurement measures in order to remove or reduce the environmental risk. The impacts identified for further assessment are discussed in the following paragraphs:

- Atmospheric emissions (Paragraph 6)
- Seabed disturbance (Paragraph 7)
- Discharges to sea (Paragraph 8)
- Underwater noise (Paragraph 9)
- Physical presence (Paragraph 10)

6 Atmospheric Emissions

6.1 Introduction

There has been a considerable increase in public attention on pollution of the atmosphere with consequent threats to both natural ecosystems and human well-being. This attention focuses on potential effects at local and national, transboundary (North Sea) and global levels.

The major sources of atmospheric emissions from offshore operations is the combustion of fuel in the generation of power, and in relation to the Don Field, these will arise from the use of a Light Well Intervention Vessel (LWIV), a Mobile Offshore Drilling Unit (MODU), and Diving Support Vessels (DSVs).

Throughout decommissioning activities there will be a guard vessel present, with a LWIV or MODU also present during well abandonment operations and a DSV during pipeline abandonment operations, which will give rise to localised elevated levels of atmospheric emissions. However, these elevated concentrations will be restricted to the duration of the activities and are unlikely to be detectable within a short distance of the vessel due to the dispersive nature of the winds in the area.

6.2 Quantification of Emissions

A total figure for atmospheric emissions (oil and gas industry and shipping industry amongst others) in UK waters does not exist. However, it is possible to estimate what these emissions are by combining oil and gas industry data (as submitted annually to the Department of Energy and Climate Change (DECC) and Oil & Gas UK (OGUK)) with data estimated from analysis of refuelling activity at shipping fuel bunkers within UK ports and harbours (Department for Environment, Food and Rural Affairs (DEFRA), 2007).

Although shipping emissions are not formally reported as part of UK submissions to the EU, the estimates of shipping emissions are included as a memo item in the national greenhouse gas inventory. Table 9.1 outlines the CO_2 emissions associated with the Don decommissioning programme relative to the total UK offshore emissions.

UK Offshore CO_2 Emissions (tonnes)	Don Decommissioning CO_2 Emissions (tonnes)
25,333,624	14,281 (0.053%)

Table 9.1 Don Decommissioning CO_2 Emissions Relative to Total UK Offshore CO_2 Emissions

Based on 2006 UK data, the total emissions associated with decommissioning the Don Field facilities contribute to 0.053% of total UK offshore emissions and are therefore not considered significant in either local or global terms.

7 Seabed Disturbance

7.1 Introduction

During the removal of the Don facilities, a large amount of work is required to be carried out at or near the seabed. Therefore, due to cutting operations, lifting operations and diver support, there is a potential of localised seabed disturbance.

7.2 Seabed Disturbance

Cutting operations will require the presence of either divers and/or Remotely Operated Vehicles (ROVs) near or at the seabed level. This will increase sediment movement and water column turbidity and subsequent re-deposition of fine/light sediment, although this effect will be short-term and localised.

Lifting objects from the seabed will disturb the surface layer of the sediment. It will also increase the turbidity, and to a lesser extent the mixing of the water column.

In addition, disturbance to the cuttings accumulation may disturb the contaminants (including heavy metals) within it and this could lead to resuspension and release of these contaminants into the surrounding water. This creates the possibility of contaminants entering the marine food chain. However, due to the small size of the cuttings accumulation, there is not expected to be any long-term impacts.

It is expected that although the effects of the seabed and any cuttings accumulation disturbance would be undesirable, these are likely to be minor impacts that would be short-lived and localised. In addition, impacts on benthic biota living in the Don Field are unlikely to be significant or long lasting.

Therefore, it is considered that the potential seabed disturbance represents only a minor risk. As there are no habitats of conservation interest in the vicinity of the Don Field, and due to the transient nature of the impacts, there are not expected to be significant cumulative impacts.

8 Discharges to Sea

8.1 Introduction

The two main sources of discharges to sea from Don decommissioning operations are:

- Cutting operations of the two umbilicals
- Well plugging and abandonment operations

Under the Offshore Chemicals Regulations 2002, operators require a permit to use and discharge chemicals. Operators need to assess the risks to the environment, which might arise from particular chemical use and discharge and are required to perform a formal risk assessment. BP will have all appropriate permits in place under the Offshore Chemicals Regulations prior to decommissioning operations taking place.

BP actively seeks to minimise chemical use wherever possible, and uses chemicals which pose little or no risk to the environment, where suitable.

8.2 Chemical Discharges

8.2.1 Production and Water Injection Pipelines

The oil production and water injection pipelines form a continuous pigging loop from the Thistle platform, to the Don manifold and back again. All chemicals used for flushing and cleaning operations, together with the current pipeline contents, were returned to the Thistle platform where they entered the production separators for treatment prior to discharge overboard with produced water. Any separated oil and chemicals in the oil phase were exported to Sullom Voe together with Thistle produced fluids.

A full chemical risk assessment was undertaken and appropriate permits put in place prior to the pipeline flushing and cleaning operations.

8.2.2 Umbilicals

When umbilicals are cut, chemicals remaining in the pipeline will be gradually discharged to sea over a longer period of time. Table 9.2 presents the current known umbilical inventories. Appropriate permits will be put in place prior to the umbilical decommissioning operation.

8.2.3 Well Plugging and Abandonment

There will be chemical discharges associated with well plugging and abandonment operations. Chemical releases will involve small discharges of completion fluids currently in the well annuli, and small discharges of the cementing chemicals used to plug and abandon the wells. Appropriate permits will be put in place prior to the well plugging and abandonment operation.

Umbilical	Product	Quantity (tonnes)
4in control umbilical	Oceanic HW540	6.9
3in chemical umbilical	Surflo SI677	1.8
3in chemical umbilical	Surflo 6422	1.3
3in chemical umbilical	Surflo H356	1.1
3in chemical umbilical	Methanol	1.3

Table 9.2 Umbilical Inventories

8.3 Oily Discharges

Production and water injection pipelines were cleaned of any hydrocarbon accumulation, within or adhering to the pipeline walls, as part of the pipeline cleaning and flushing operations. The pipelines were cleaned to an oil-in-water concentration of <10ppm.

The cleaning fluid, including the dispersed oil, was returned to the Thistle Platform where it was processed as described in Paragraph 8.2.1.

9 Underwater Noise

9.1 Introduction

In recent years, there has been increased concern about the effects of noise on cetaceans (whales and dolphins) and seals. Underwater noise will result from decommissioning operations from subsea cutting operations, and the potential use of explosives.

9.2 Noise

Operations to cut the Don manifold piles 3m below the existing seabed level will give rise to a temporary increase in levels of underwater noise, which has the potential to interfere with marine mammals. If the wellheads cannot be mechanically cut, explosive tools may be used if a permit is granted.

Explosives have the potential to interfere with marine mammals due to the nature of underwater sound propagation. As a contingency explosives may be needed, with a detailed risk assessment as required under the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) carried out prior to their use. Before deployment DECC will be consulted and approval sought.

The Don Field is not as important for marine mammals as other areas of the North Sea and it is considered unlikely that that there will be any significant impacts at the population level in the area.

10 Physical Presence

10.1 Introduction

Due to the increased vessel requirement associated with decommissioning operations, there is the potential to interfere with other sea users in the area.

10.2 Vessel Presence

Normal routes of communications will be used by statutory organisations to notify shipping of the presence of increased levels of vessel activity, usually through the issue of a Notice to Mariners.

In addition to these statutory requirements, BP has established lines of communication to inform other sea users, including fishermen, of their offshore activities. BP's existing fishery liaison process will be used to provide decommissioning activity and schedule information to fishing organisations so that the fishing industry is made aware of decommissioning activities at Don and along the pipeline routes to the Thistle platform.

10.3 Long-term Presence of Decommissioned Facilities

Excluding the Northern Leg Gas Pipeline (NLGP) crossing, pipelines and umbilicals between the Don Manifold and the Thistle platform are trenched and will be left in situ.

Note: The pipelines and umbilicals at the NLGP crossing will be left in place until the permanent decommissioning of the NLGP pipeline.

Leaving the pipelines and umbilicals in situ is considered the best environmental option, as the removal of these would result in disturbance to the surface layer of the seabed. Although the lines are not buried below the recommended 0.6m, due to the extremely stable seabed environment in the vicinity of the Don Field, it is not expected that there will be any impacts associated with leaving these lines in place.

Of the protection and stabilisation features being left in place, there are not expected to be any significant impacts due to the inert nature of the materials.

BP proposes to undertake over-trawlability tests to confirm that there will be no negative impacts associated with fishing gear interaction, with any remedial activities being carried out as necessary. BP have undertaken initial consultation with the SFF regarding their proposed decommissioning activities and further consultation will be undertaken as part of the statutory decommissioning programme consultation process.

11 Conclusions

During the EIA process, the potential impacts of the Don Field decommissioning project on the environment were identified and considered. Overall, it is considered that the project will not have any significant impacts on the environment.

All appropriate environmental permits and consents will be in place, and appropriate management and mitigation measures implemented to ensure impacts are minimised as far as reasonable.

No significant cumulative or trans-boundary impacts are expected with disturbance to the seabed, production of atmospheric emissions, or discharges of chemicals.

12 References

[9.1] Don Decommissioning Environmental Impact Assessment/Environmental Statement, Xodus AURORA, Ref No A-30171-S00-REPT-02-R01, October 2008.

Section 10
Pipelines

Section 10
Pipelines (cont'd)

Section 10
Pipelines (cont'd)

1 Introduction

This section describes the Decommissioning Programme 2 (as detailed in Section 1 Paragraph 4) for the Don Field oil production and water injection pipelines, and the control and chemical injection umbilicals, under the Petroleum Act 1998 [10.1]. The programme has been prepared in line with the Department of Energy and Climate Change (DECC) Decommissioning Guidance Notes [10.2].

The pipelines and umbilicals are no longer required, and no potential commercial use can be foreseen for them at their present locations. The 8in water injection pipeline (PL599) has known internal corrosion defects and the 8in production pipeline (PL598) would require to be intelligently pigged to determine its condition if further use could be found. The 3in chemical injection umbilical (PL600) is blocked and not fit for purpose and the 4in control umbilical has known electrical continuity problems.

The pipelines and umbilicals are discussed separately in this section, which also:

- Describes the techniques that could be used to decommission the pipelines and umbilicals
- Describes the pipelines and umbilicals, and their histories
- Describes the present condition of the pipelines and umbilicals, and any cleaning that may be required
- Identifies the potential decommissioning options
- Discusses the approach and method used to select the decommissioning options including a summary of the assessment of the various aspects based on which the recommended options were selected
- Recommends a decommissioning option for each item to be decommissioned

Based on the similarity of the two 8in steel pipelines and the two umbilicals respectively, the two 8in steel pipelines are discussed together in Paragraph 5 and the two umbilicals in Paragraph 6.

2 Applicable Techniques for Decommissioning the Pipelines and Umbilicals

2.1 Options for Leave In Situ

2.1.1 Leave In Situ with No Remedial Work

It may be acceptable to leave pipelines and umbilicals in situ without any remedial action, subject to suitable burial and environmental conditions. The assessment was carried out based on the inspection history to date, combined with stable soil and environmental conditions. This is to confirm that the burial status will remain and the pipelines give no further threat to other sea users after being decommissioned.

2.1.2 Leave In Situ with Trenching at Selected Sections

Selective trenching would be used to secure sections of pipelines or umbilicals that might present a snagging hazard, eg span or exposed sections, or sections susceptible to spanning or exposure due to currents and wave action.

Trenching would be achieved by ploughing, mechanical cutting or water jetting, depending on the type of soil and the required trench depth. The trench would then either be backfilled with the sediment removed during trenching, or left to backfill naturally as a result of currents and wave action.

2.1.3 Leave In Situ with Selective Removal

Partial removal of pipeline and umbilical sections may be considered as an option in conjunction with leaving the majority of a pipeline or umbilical in situ.

Sections of pipelines or umbilicals that emerge out of the seabed or have inadequate burial would be cut out and recovered. Cut ends would be removed back to stable buried pipe so that there is no possibility of a snagging hazard.

2.2 Options for Full Recovery

2.2.1 Full Recovery by Reverse Reeling

This process is shown in Figure 10.1.

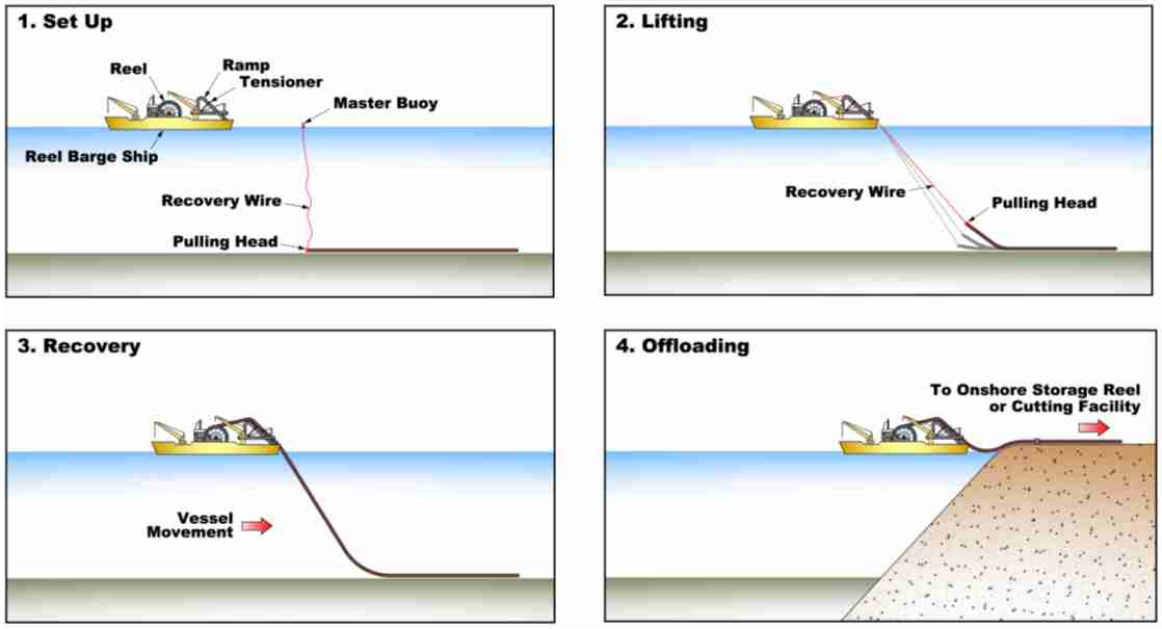


Figure 10.1 Reverse Reel Method

Reverse reeling offers the simplest form of pipeline and umbilical recovery. Depending on the line diameter, a purpose-built reel ship can carry several kilometres of either flexible or rigid pipeline, and offers rapid recovery of small-diameter line in particular.

A pulling head is attached to the end of the pipeline or umbilical for attachment of the abandonment and recovery cable. As the vessel moves backwards, the pipeline or umbilical is fed back and reeled on to the main reel. Once a line is fully recovered onto the reel, or the maximum reel capacity is reached, the vessel may proceed to shore where the line can be reeled off and cut into convenient lengths for recycling.

2.2.2 Full Recovery by Reverse S-lay or J-lay

The reverse S-lay and J-lay processes are shown in Figures 10.2 and 10.3, respectively.

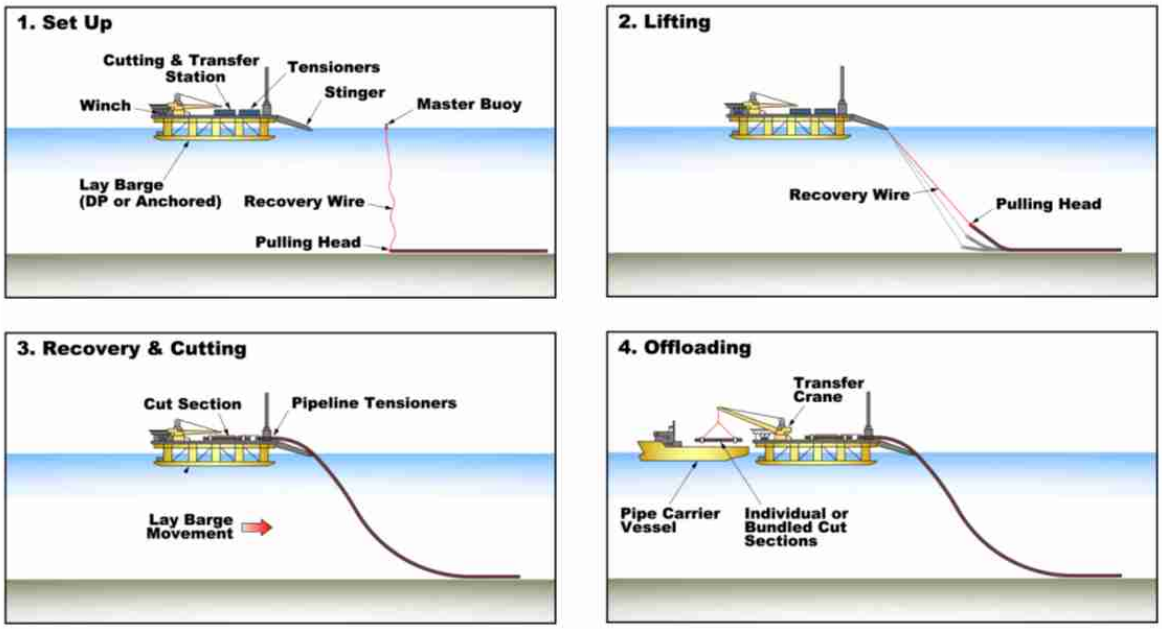


Figure 10.2 Reverse S-lay Method

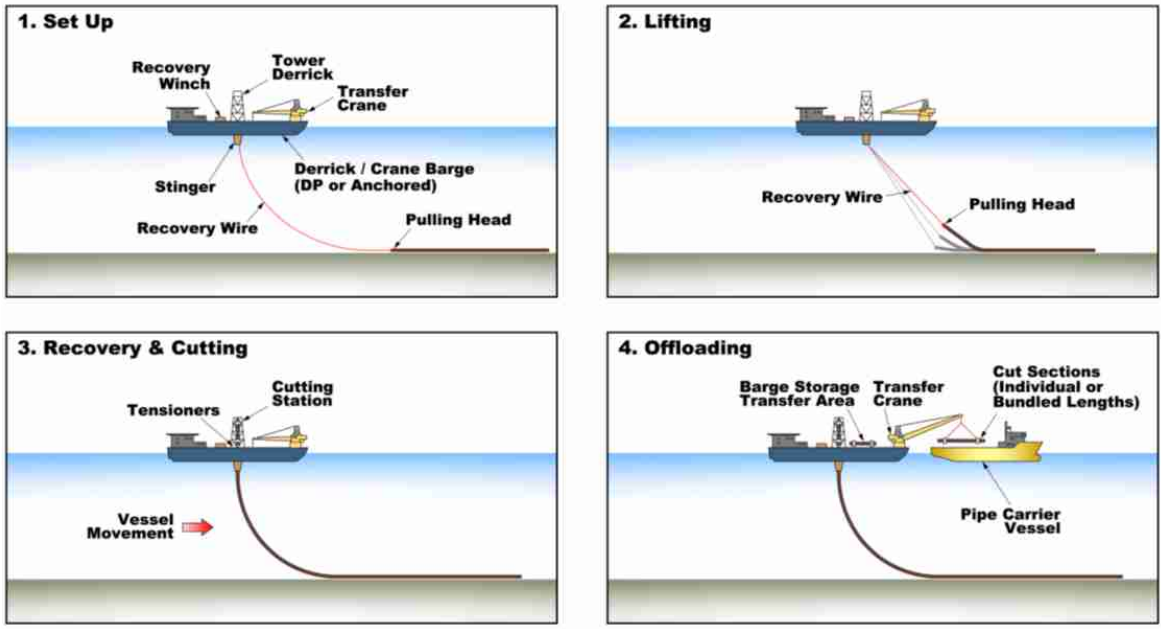


Figure 10.3 Reverse J-lay Method

These recovery methods are essentially the reverse of the S-lay and J-lay installation processes and can be achieved using dedicated lay barges. A pulling head is connected to the end of the line for attachment of the lay vessel abandonment and recovery wire. As the lay vessel moves backwards, the recovery wire is winched in and the line lifted up onto the stinger. Once the line is in the correct position the tension is transferred from the winch cable to the line tensioners. The line can then be cut within the vessel into manageable lengths and transferred either to a self-contained stockpile area or to a dedicated pipe carrier vessel, located alongside, for transportation to a shore base.

The difference between the S and J techniques is that the J-lay method of pipe laying was developed and optimised primarily for deepwater applications.

2.2.3 Full Recovery by Cut and Lift

This process is shown in Figure 10.4.

This recovery method would not require the use of a dedicated lay vessel. The line is cut on the seabed into manageable sections and recovered to the surface using the vessel crane for transportation to shore. There are a variety of cutting techniques available, such as abrasive water jetting, wire or rotating cutters, explosive, thermic lance, oxy-arc or shear cutters. Several of these techniques (mostly the cold-cutting methods) have been developed for remote operations subsea.

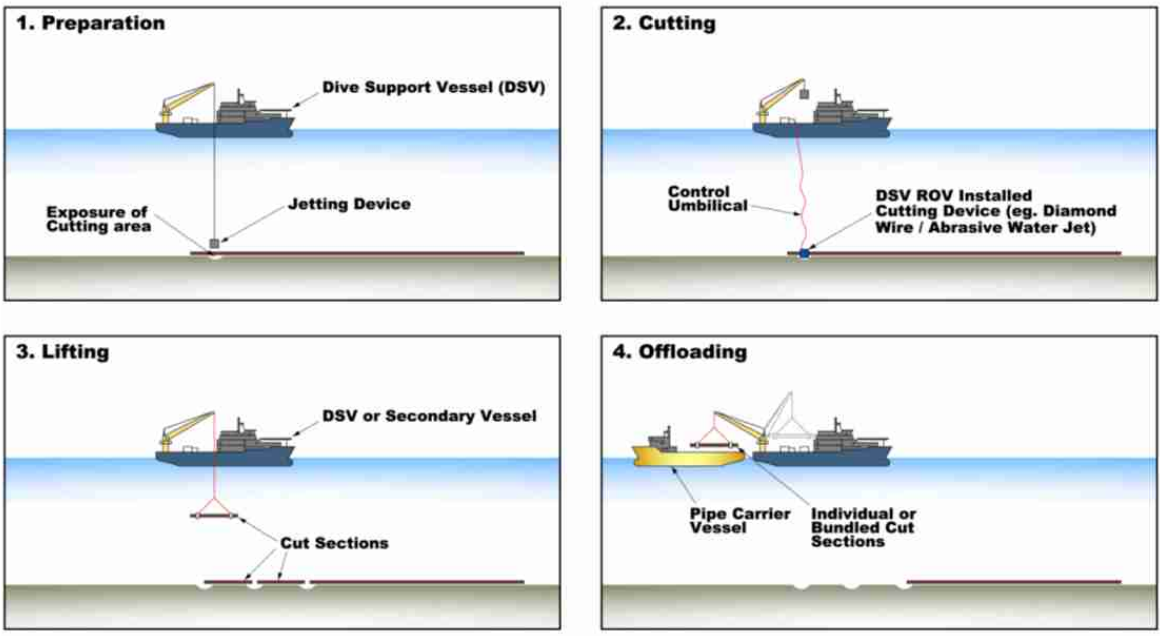


Figure 10.4 Cut and Lift Method

3 Items to be Decommissioned

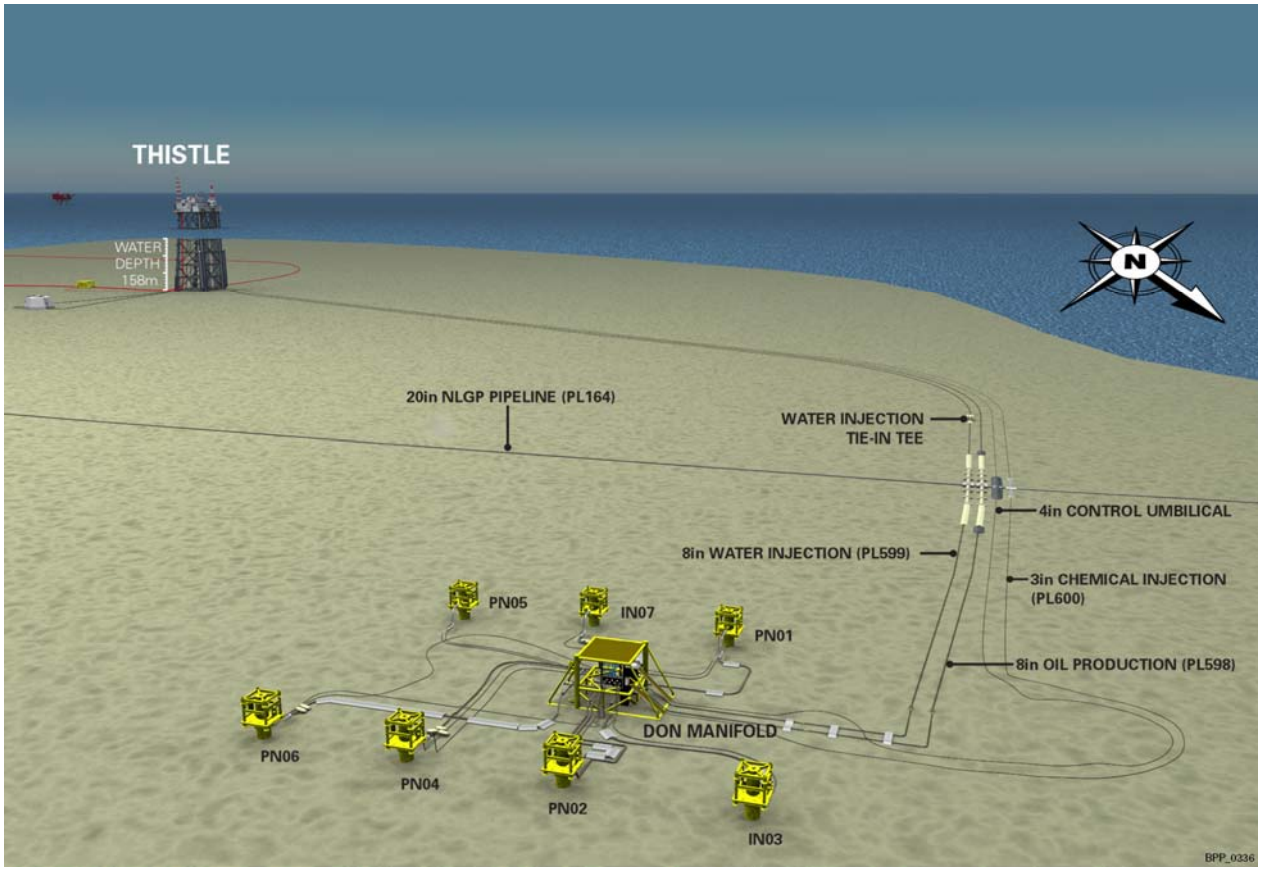
3.1 Introduction

The pipelines, umbilicals and jumpers to be decommissioned are listed in Table 10.1 and shown in Figures 10.5 to 10.7.

From the Don Manifold to	DECC No	Description	Well Ref	Status
Thistle	PL598	8in rigid pipeline	N/A	Filled with inhibited seawater and isolated at the Thistle topsides and wells
Thistle	PL599	8in rigid pipeline	N/A	Filled with inhibited seawater and isolated at the Thistle topsides and wells
Thistle	PL600	3in chemical injection umbilical	N/A	Blocked and shut in
Thistle	Not Allocated	4in control umbilical	N/A	Subsea control inoperable. Disconnected at the Thistle topsides
Xmas Tree No 1	PL845	4in flexible jumper	PN01	Oil production (filled with inhibited seawater and isolated at the xmas tree)
		4in rigid jumper		In place (disconnected at both ends)
Xmas Tree No 2	PL598	4in rigid jumper	PN02	Oil production (suspended and disconnected at manifold)
Xmas Tree No 3	PL599	4in flexible jumper	IN03	Water injection (filled with inhibited seawater and isolated at the xmas tree)
		4in rigid jumper		In place (disconnected at both ends)
Xmas Tree No 4	PL821	4in flexible jumper	PN04	Oil production (filled with inhibited seawater and isolated at the xmas tree)
Xmas Tree No 5	PL981	4in flexible jumper (refer to Note)	PN05	Oil production (decommissioned and recovered to shore in May 2000). Both ends (manifold and xmas tree) have been blanked off and tested
Xmas Tree No 6	PL1073	4in flexible jumper	PN06	Oil production (suspended, filled with inhibited seawater and isolated at the xmas tree)
Xmas Tree No 6	PL1073A	1in chemical injection umbilical	PN06	Inoperable. Umbilical disconnected at xmas tree
Xmas Tree No 7	PL1338	4in flexible jumper	IN07	Water injection (suspended, filled with inhibited seawater and isolated at the xmas tree)
Production Wells	Not Allocated	Chemical injection umbilicals	PN01/02/ 04/05	Inoperable. All umbilicals disconnected at xmas trees
All Wells	Not Allocated	Control umbilicals	PN01/02/ 04/ 05/06 IN03/07	Subsea control inoperable. PN02 and PN05 jumpers removed and all other control jumpers disconnected

Note: PL981 was decommissioned May 2000. See Appendix 10A for decommissioning correspondence with DECC.

Table 10.1 List of Items to be Decommissioned



Note: Pipelines and umbilicals are shown untrenched for clarity.

Figure 10.5 Don Field Pipeline System Layout

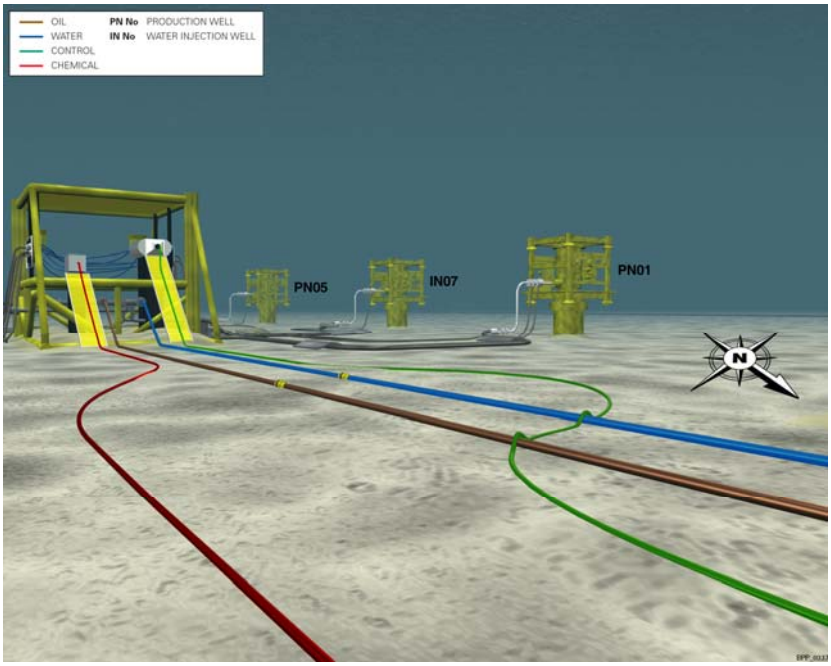


Figure 10.6 Lines at Don Manifold

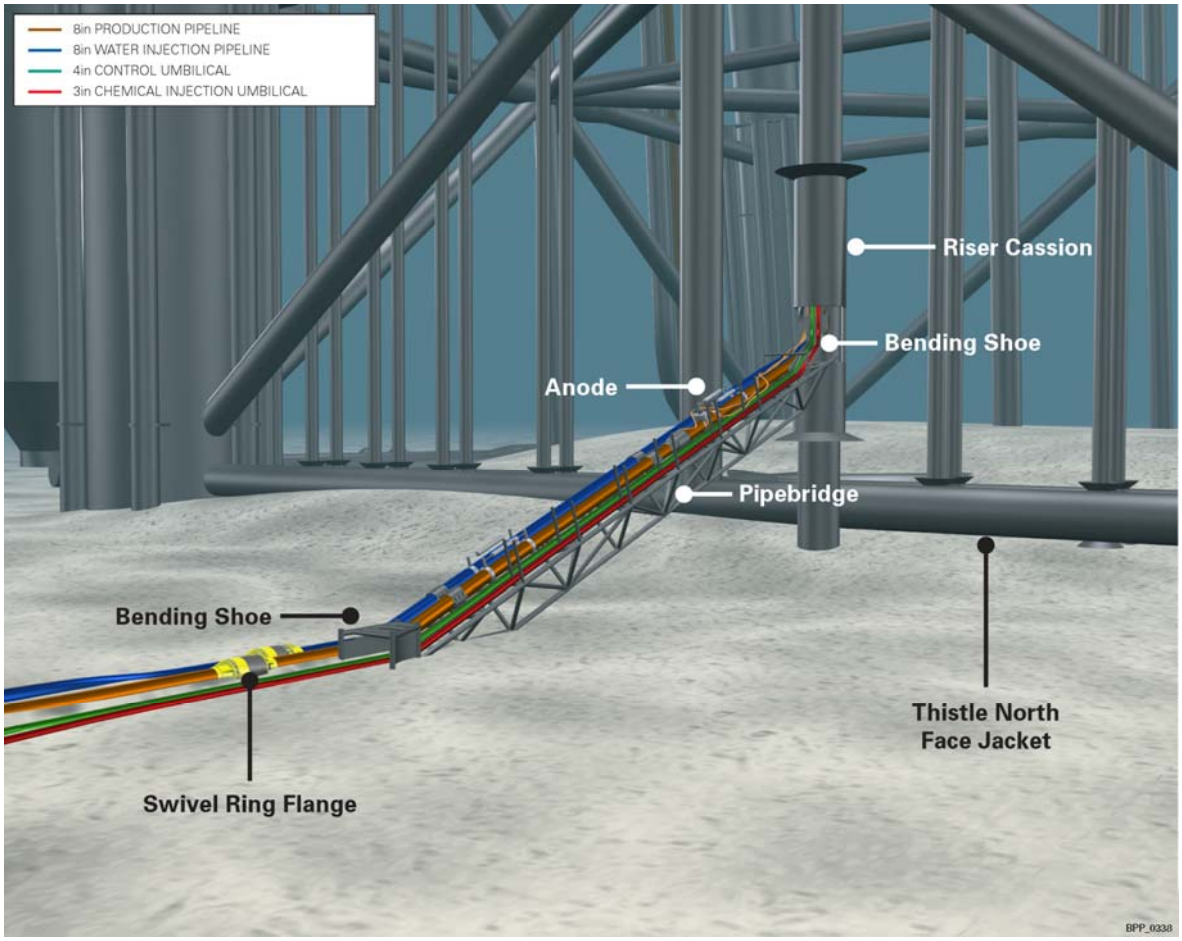


Figure 10.7 Pipebridge at Thistle

3.2 8in Oil Production Pipeline (PL598)

The 8in oil production pipeline between Thistle and the Don manifold, as shown in Figure 10.8, is 17.4km long and was designed to be trenched and buried. Stabilisation features include flexiweight mattresses, grout formworks, grout bags, rock dump and supports.

The pipeline has been made hydrocarbon free, cleaned to less than 10ppm Oil-in-Water (OiW) and filled with inhibited seawater at ambient pressure. The pipeline has been isolated at the Thistle topsides. The pipeline has remained trenched and is buried over 98.5% of its length. There are no spanning concerns and there have been no FishSafe spans since installation in 1988.

The secure soil and low seabed currents provide a stable environment in which exposure or span development is not expected. Further details on the integrity of the pipeline are given in Paragraph 5.4.

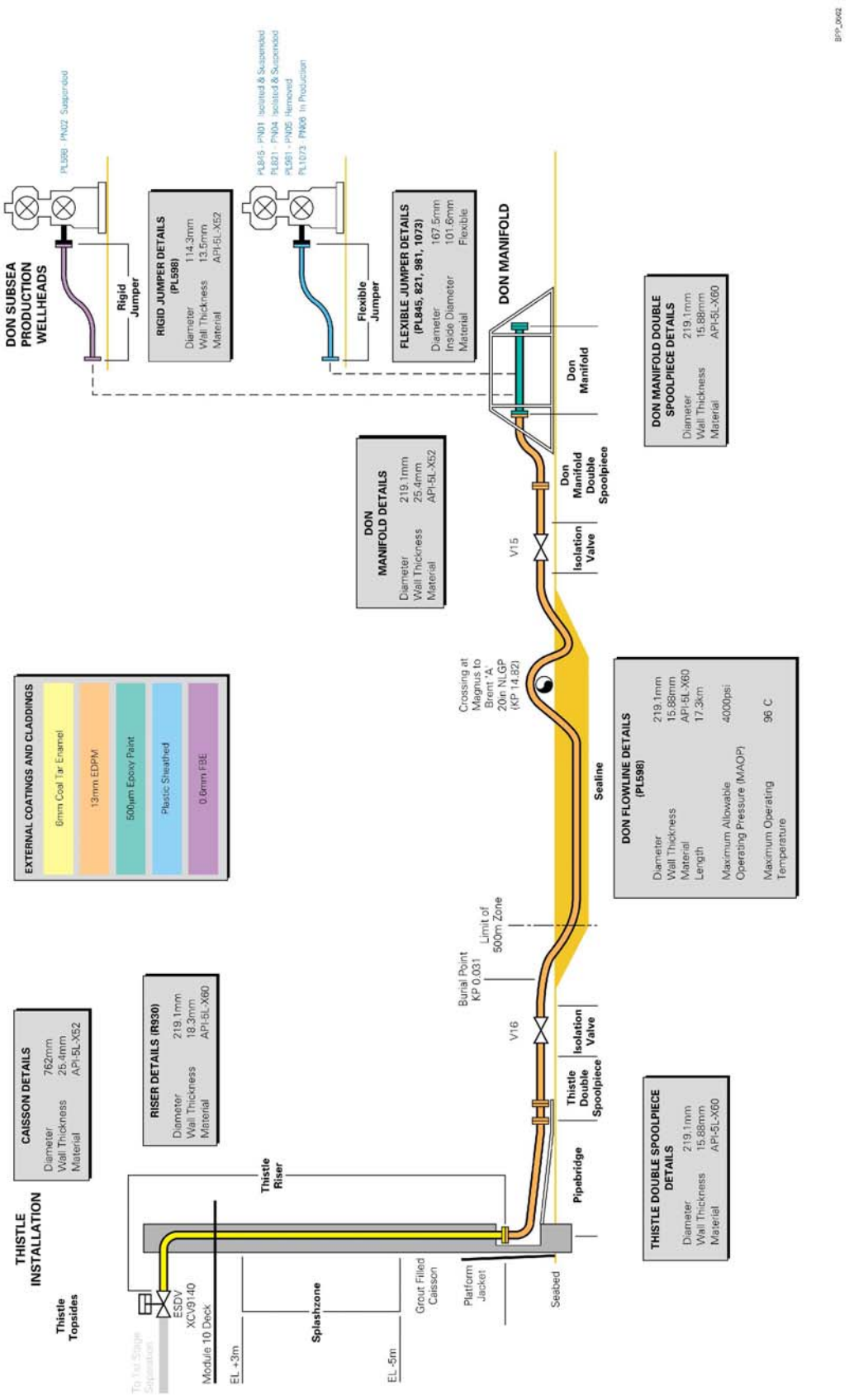


Figure 10.8 8in Production Pipeline (PL598) Details

3.3 8in Water Injection Pipeline (PL599)

The 8in water injection pipeline between Thistle and the Don manifold, as shown in Figure 10.9, is 17.4km long and was designed to be trenched and buried. A tie-in tee-piece and protection frame are located 13.1km from Thistle.

Stabilisation features include flexiweight mattresses, grout formworks, grout bags and supports.

The pipeline is corroded with significant channelling through its entire length. It currently contains inhibited seawater at ambient pressure and is isolated at the Thistle topsides. The pipeline forms the return loop from Don to Thistle for the production pipeline cleaning programme, so the pipeline has been pigged and flushed as per the 8in production pipeline.

The pipeline has remained trenched and is presently buried over 98.3% of its length. There are no spanning issues and no FishSafe spans have been found since installation in 1988. The secure soil and low seabed currents provide a stable environment in which exposure or span development is not expected. Further details on the integrity of the pipeline are given in Paragraph 5.4.

3.4 3in Chemical Injection Umbilical (PL600)

The 3in chemical injection umbilical, as shown in Figure 10.10, is approximately 17.7km long, and was designed to be trenched and buried. The umbilical contains six chemical injection hoses.

Stabilisation features include flexiweight mattresses, grout bags, rock dump and supports.

The umbilical has not been functional since it became blocked and then ruptured in 1995. It presently contains scale inhibitor, corrosion inhibitor and methanol.

The chemical injection umbilical has remained consistently trenched and is presently buried over 98.7% of its length. There is one span, located at the Thistle tie-in, the removal of which will be deferred until the Thistle platform is decommissioned. The trenched condition is expected to continue due to the secure soil and low seabed currents associated with the area.

3.5 4in Control Umbilical

The 4in control umbilical, as shown in Figure 10.10, is approximately 17.7km long, and was designed to be trenched and buried. The umbilical is used to carry electrical power, two-way electrical signals and hydraulic fluid for control and monitoring of the wells.

Stabilisation features include flexiweight mattresses, grout bags, rock dump and supports.

The umbilical is not presently functional due to loss of electrical continuity.

The umbilical has experienced a consistent burial profile throughout its operational life and is presently 99.8% buried. Due to the low seabed currents and stiff clay soil in the area, it is likely that these conditions will continue.

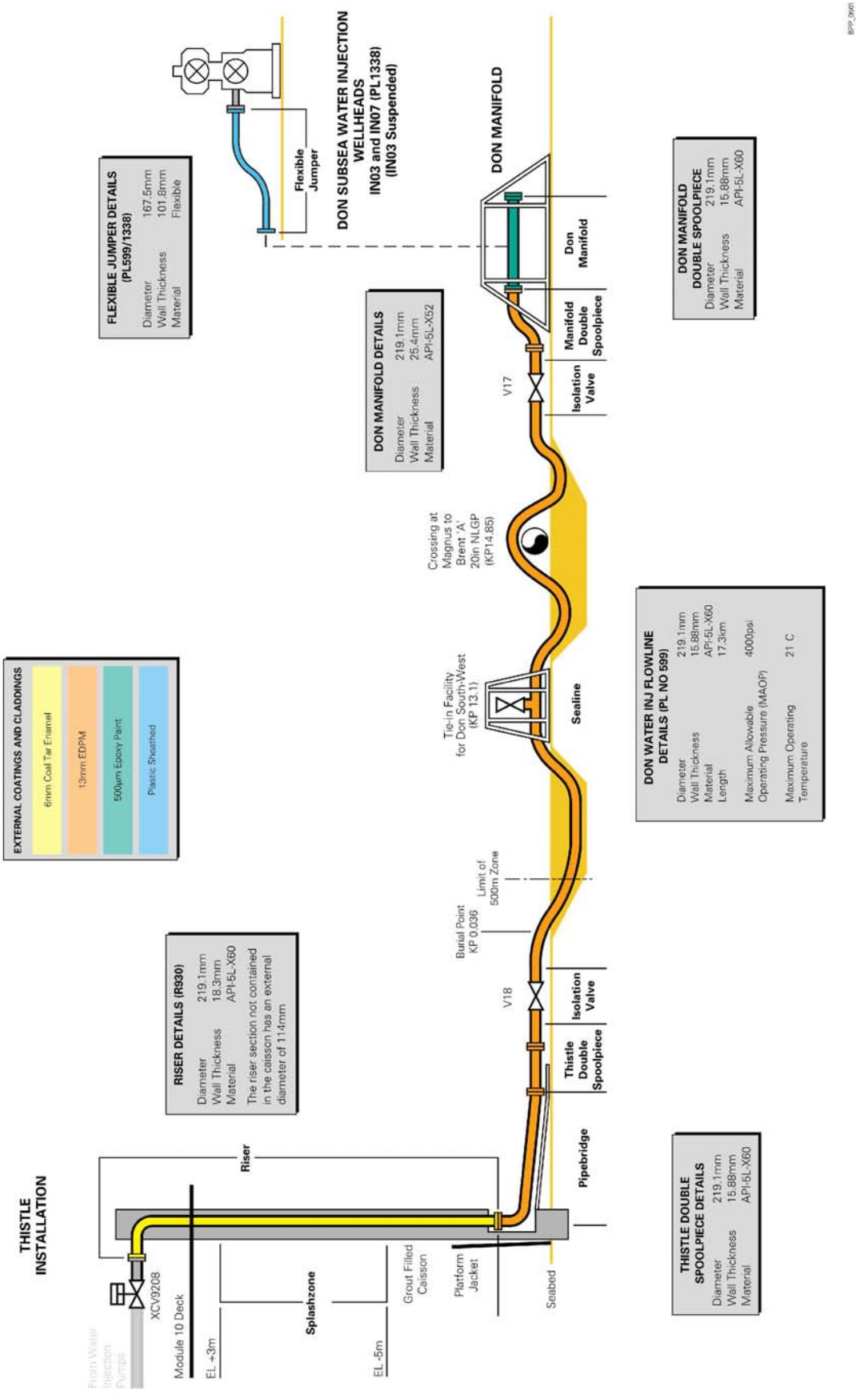


Figure 10.9 8in Water Injection Pipeline (PL599) Details

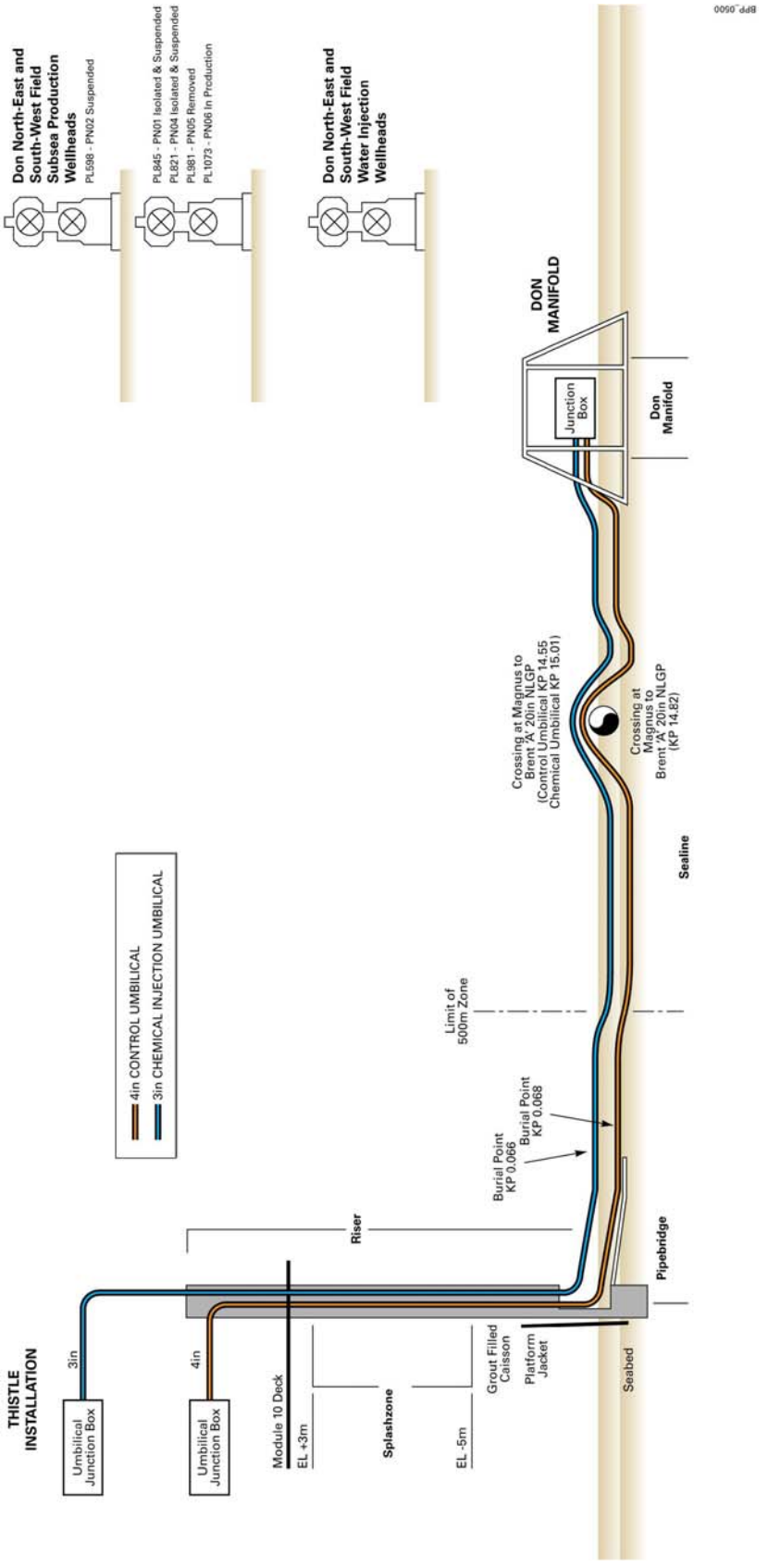


Figure 10.10 3in Chemical Injection and 4in Control Umbilicals Details

3.6 NLGP Crossings

Approximately 2km from the Don manifold, the two 8in pipelines and the two umbilicals emerge from their trenches to cross over the 20in Northern Leg Gas Pipeline (NLGP), which is laid on the seabed.

Stabilisation of the pipelines and umbilicals is provided by a combination of Glass Reinforced Plastic (GRP) protection covers (8in pipelines only), flexiweight mattresses, grout formworks, grout bags and rock dump (refer to Figures 10.11 and 10.12).

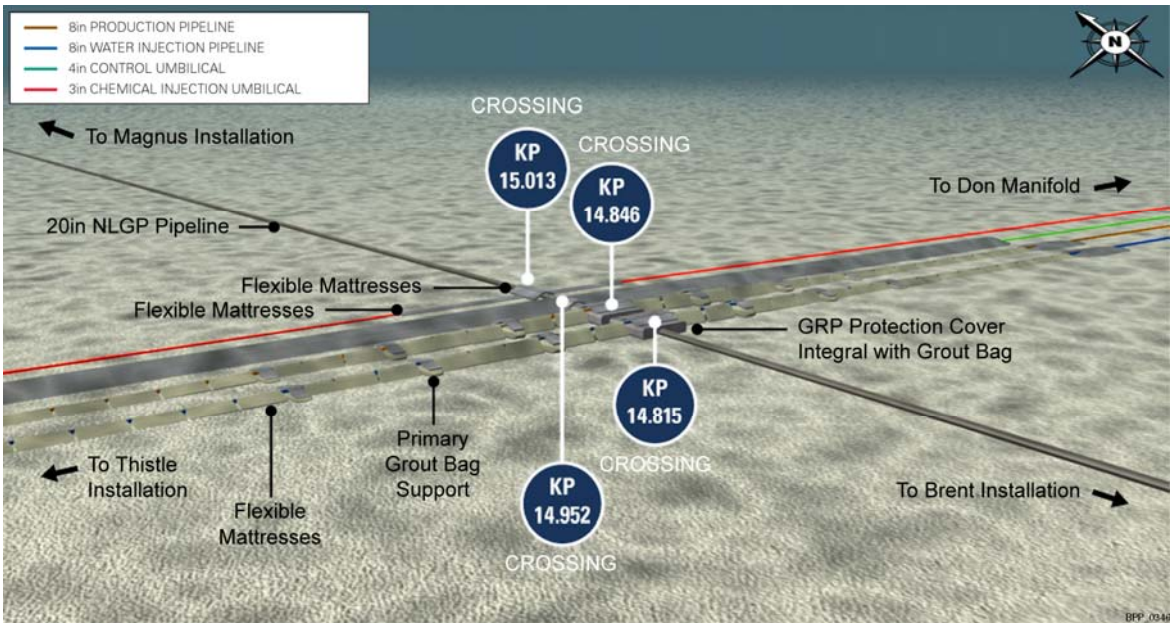


Figure 10.11 Pipelines and Umbilicals Layout at NLGP Crossings

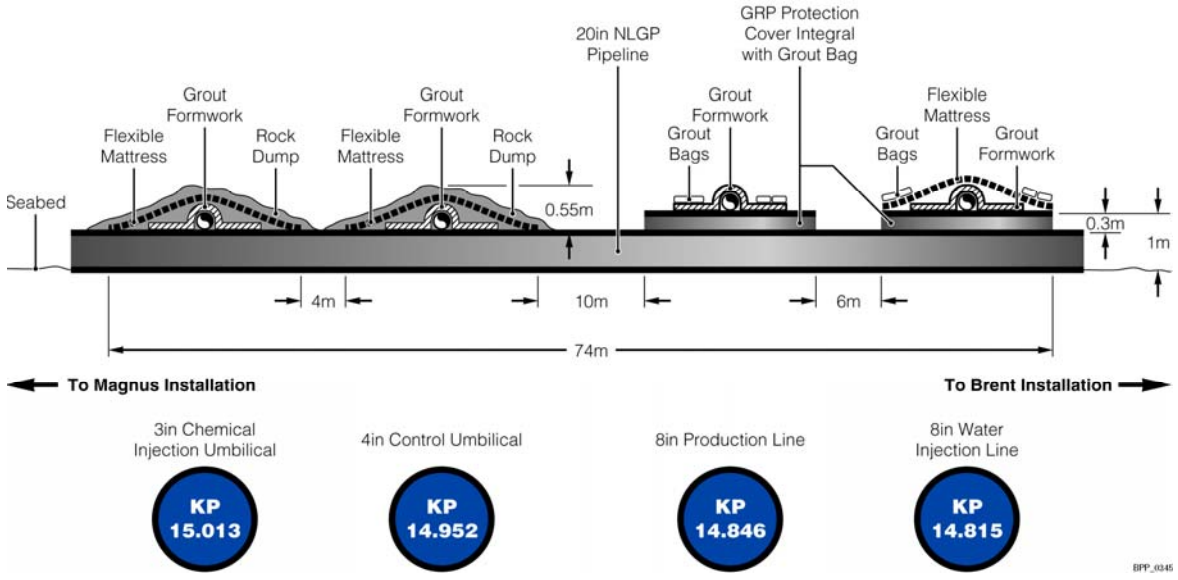


Figure 10.12 Cross-section of Pipelines/Umbilicals at NLGP Crossings

3.7 Production and Water Injection Flowline Jumpers

The Don Field includes five oil production and two water injection wells. These wells are tied back to the Don manifold using 4in rigid and flexible flowline jumpers, as shown in Figure 10.13.

All flowline jumpers contain either raw or inhibited seawater and are disconnected at one or both ends.

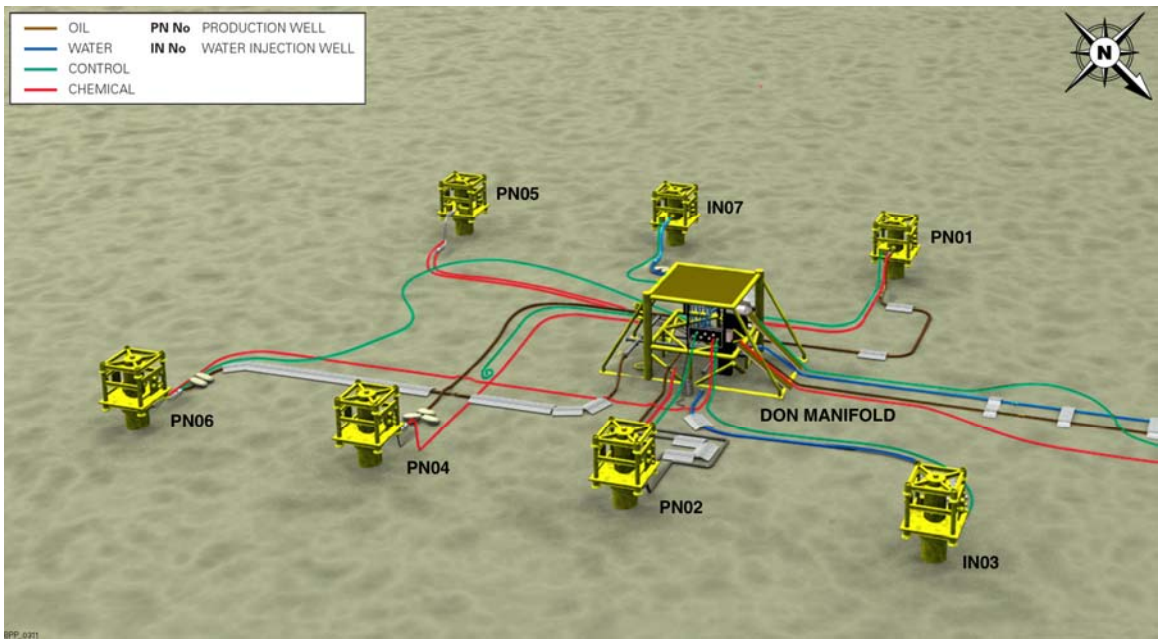


Figure 10.13 Don Field Flowline and Umbilical Jumpers

3.8 Control and Chemical Injection Jumpers

Control umbilical jumpers were connected between the Don manifold and each wellhead. PN02 and PN05 control jumpers have been removed and all other control jumpers disconnected.

The chemical injection system has been inoperable since 1995. The jumpers have been disconnected at the wells and may contain scale inhibitor, corrosion inhibitor, demulsifier and methanol.

Jumpers are routed on the seabed with flexiweight mattresses used for stabilisation, where necessary.

3.9 Protection and Stabilisation Features

The Don pipeline system uses flexiweight mattresses, grout formworks and grout bags and rock dump protection features. The majority of these are on the NLGP crossing and at the Don Manifold area.

The primary role of these protection features is to act as a safety feature to protect users of the sea from snagging/interacting with the pipelines. The secondary role is to prevent the pipeline from being damaged by anchors/dropped objects etc. The recommended decommissioning option for these features is to:

- Remove all features at the Don manifold area and the pipeline spools to the manifold area
- Remove all features from the umbilicals (umbilicals cut back and buried)
- Remove all flexiweight mattresses and small grout bags
- Cut out and recover sections of pipe that emerge out of the seabed back to stable buried pipe, so that there is no possibility of a snagging hazard
- Grout formwork to remain in situ and will be made safe for other users of the sea as demonstrated by over-trawlability trials

If, due to the condition of the flexible mattresses, risk to diving personnel is such that recovery to surface is not practicable, BP will apply for necessary consents to leave these in situ.

Refer to Section 6 Paragraph 3 for further details.

Flexiweight Mattresses

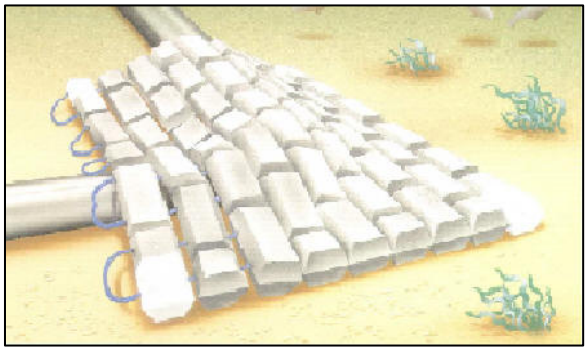


Figure 10.14 Flexiweight Mattress

The majority of the flexiweight mattresses are located within the Don manifold area and comprise of blocks of concrete cast on to polypropylene rope as shown in Figure 10.14. The mattresses are typically 5m x 2m and weigh approximately 3 tonnes.

Grout Formwork

Figure 10.15 Grout Formwork

The majority of grout formwork lies between the NLGP crossing and the Don manifold area, and each formwork comprises a canvas sack filled with grout as shown in Figure 10.15.

3.9.1 8in Oil Production Line (PL598)

When the oil production line was installed, and at certain times during its operation, flexiweight mattresses, grout formwork, grout bags and rock dump have been used to stabilise the pipeline as shown in Figure 10.16.

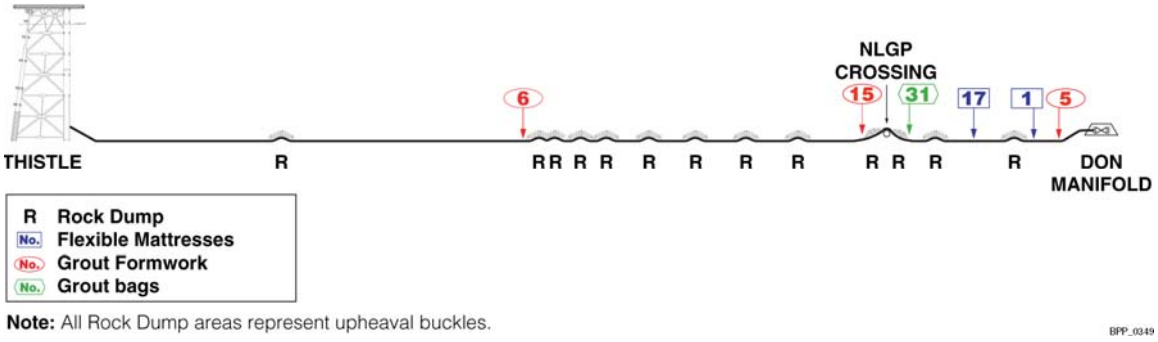


Figure 10.16 8in Oil Production Pipeline Stabilisation Features

Approximately 2km from the Don manifold, the oil production line crosses over the NLGP using a GRP support, flexiweight mattresses and grout bags. Refer to Paragraph 3.6 for further details.

3.9.2 8in Water Injection Line (PL599)

When the water injection line was installed, and at certain times during its operation, flexiweight mattresses, grout formwork, grout bags and rock dump have been used to stabilise the pipeline, as shown in Figure 10.17.

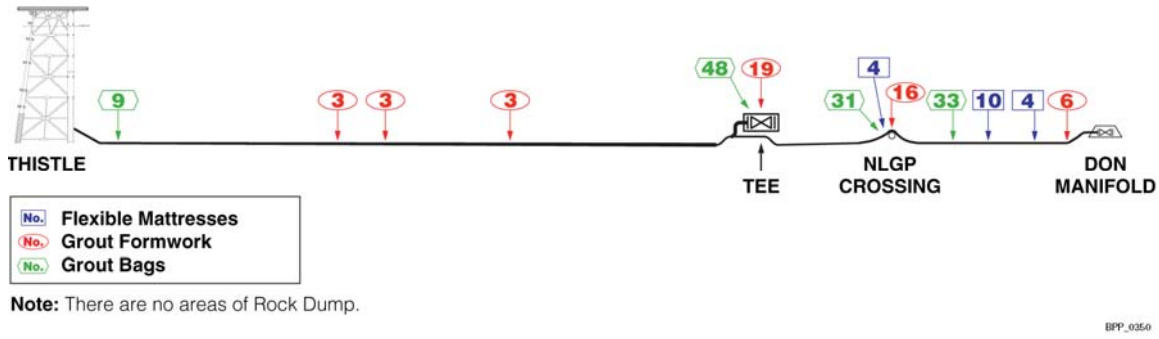


Figure 10.17 8in Water Injection Pipeline Stabilisation Features

Approximately 2km from the Don manifold, the water injection line crosses over the NLGP using a GRP support, flexiweight mattresses and grout bags. Refer to Paragraph 3.6 for further details.

A tie-in tee-piece, located 13.1km from Thistle, was installed for a proposed future tie-in. The tie-in tee-piece is protected by grout formwork and a protective frame attached to the pipeline.

3.9.3 3in Chemical Injection Umbilical (PL600)

When the chemical injection umbilical was installed, and at certain times during its operation, flexiweight mattresses, grout formworks, grout bags and rock dump have been used to stabilise the umbilical as shown in Figure 10.18.

Figure 10.18 3in Chemical Injection Umbilical Stabilisation Features

Approximately 2km from the Don manifold, the chemical injection umbilical crosses over the NLGP using flexiweight mattresses, grout formworks and rock dump. Refer to Paragraph 3.6 for further details.

3.9.4 4in Control Umbilical

When the control umbilical was installed, and at certain times during its operation, flexiweight mattresses, grout formworks and rock dump have been used to stabilise the umbilical as shown in Figure 10.19.

Figure 10.19 4in Control Umbilical Stabilisation Features

Approximately 2km from the Don manifold, the control umbilical crosses over the NLGP using flexiweight mattresses, grout formworks and rock dump. Refer to Paragraph 3.6 for further details.

4 Scope of Decommissioning Works

4.1 General

The Don pipelines and umbilicals decommissioning scope of work is as follows:

- Flowline jumpers, and chemical injection and control umbilical jumpers between the Don manifold and individual wells
- The 8in production pipeline from the double spoolpiece flange at the Don manifold to the Thistle 500m zone
- The 8in water injection pipeline from the double spoolpiece flange at the Don manifold to the Thistle 500m zone
- The 4in control umbilical between the Don manifold and the Thistle 500m zone
- The 3in chemical injection umbilical between the Don manifold and the Thistle 500m zone

Note: Decommissioning of the materials within the Thistle 500m zone will be deferred until the Thistle is decommissioned. The NLGP crossing will also be deferred until NLGP decommissioning.

4.2 Pipeline, Umbilical, Flowline and Jumper Cleaning

The 8in production pipeline (PL598) and the 8in water injection pipeline (PL599) have been cleaned by pigging and flushing with inhibited water to a cleanliness of 10ppm OiW. Both pipelines are disconnected from any process plant topsides on the Thistle Installation.

Four hydraulic cores of the 4in control umbilical held oceanic HW540, a water-based hydraulic fluid totalling approximately 6900 litres. The Environmental Impact Assessment reviewed options and recommended no cleaning for the control umbilical which will be left in situ (refer to Section 9 for further details). Eventual gradual discharge of the contained fluid will pose little or no risk to the marine environment, or even if it were discharged in the unlikely event of a one-off occurrence.

The contents of the 3in chemical injection umbilical (PL600) included Surflo SI662 scale/corrosion inhibitor (1800 litres), Surflo 6442 scale/corrosion inhibitor (1250 litres), Surflo H356 scale inhibitor (1100 litres) and methanol (1250 litres). As a result of core blockage and uncertain integrity, it is not feasible to clean the umbilical. It is proposed to leave the chemical umbilical in situ with no cleaning. This option has been deemed as having the least impact on the surrounding marine environment. BP will apply for the necessary permits to discharge these chemicals.

All flowlines contain either raw or inhibited seawater and are disconnected at one end or both.

4.3 Primary Scope

Certain activities (referred to as Primary Scope) will be performed irrespective of the final option selected. The following equipment will be removed and returned to shore for final disposal or recycling:

- The Don manifold
- Production and water injection pipeline subsea tie-in double spoolpieces and associated isolation valves at the Don manifold
- Untrenched sections of umbilicals at the approaches to the Don manifold
- Flexible flowline and umbilical jumpers between the Don manifold and wells, including the remaining 4in rigid flowline jumpers PN01 (PL845) and IN03 (PL599) horizontal sections
- Flexiweight mattresses and small grout bags

5 Pipelines Decommissioning (8in Oil Production PL598 and 8in Water Injection PL599)

5.1 General

The 8in oil production and water injection pipelines are routed in parallel between the Thistle Installation and the Don manifold, with a typical separation distance of 25m. Both pipelines are 17.4km in length, trenched and buried. The tie-in spoolpieces at both ends are untrenched and include a manually operated subsea valve. Both pipelines cross over the 20in NLGP approximately 15km from the Thistle Installation. The water injection pipeline has a spare, unused tee which is located approximately 4km from the Don manifold.

5.2 Material Inventory

Both 8in pipelines extend from the connection at the Don manifold to pig traps on the Thistle topsides.

The total weight of steel pipe and other equipment installed as part of the pipelines is approximately 3237 tonnes, with an additional 7229 tonnes of stabilisation, including rock dumps, stabilisation mattresses, grout formworks, grout bags and supports. The material inventory is summarised in Table 10.2. It should be noted that the weight and materials of the risers, Don topsides equipment and the pipebridge have not been accounted for in the material inventory as decommissioning of these items will be deferred until the Thistle installation is decommissioned.

Material	8in Oil Production Pipeline (PL598)		8in Water Injection Pipeline (PL599)	
Equipment				
Steel pipe	17.4km	1384 tonnes	17.39km	1382 tonnes
Other equipment	N/A	27 tonnes	N/A	28 tonnes
Rubber insulation (EPDM)	17.4km	187 tonnes	17.39km	186 tonnes
Concrete weight coating	157m	22 tonnes	148m	21 tonnes
Equipment Total Weight	**1620 tonnes**		**1617 tonnes**	
Stabilisation (Excluding NLGP Crossing)				
Rock dump	583m	4241 tonnes	None	N/A
Flexiweight mattress	18 pcs	129 tonnes	14 pcs	74 tonnes
Grout formwork	11 pcs	178 tonnes	34 pcs	390 tonnes
Grout bags	None	N/A	90 pcs	33 tonnes
Stabilisation Total Weight	**4548 tonnes**		**497 tonnes**	
Stabilisation at NLGP Crossing Only				
Rock dump	64m	364 tonnes	N/A	N/A
Flexiweight mattress	None	N/A	4 pcs	27 tonnes
Grout formwork	15 pcs	228 tonnes	16 pcs	197 tonnes
Grout bags	31 pcs	684 tonnes	31 pcs	684 tonnes
NLGP Stabilisation Total Weight	**1276 tonnes**		**908 tonnes**	

Table 10.2 Inventory of Materials – 8in Pipelines

5.3 Burial Status

5.3.1 Design Burial Cross-section

The two 8in pipelines were designed to be trenched as shown in Figure 10.20.

Trenching was not performed, by design, at the following locations:

- Thistle and Don manifold tie-in spoolpieces
- Within 40m of end (sealine) flanges
- Within 60m either side of the 20in NLGP crossings
- Within 10m either side of the water injection tee-piece

Transition from full trench depth to exposure is typically 10m at each end at these locations.

A 50m transition was designed at the manifold approach. After trenching, the pipelines were actively backfilled.

Inspections on both the 8in pipelines were performed on an annual basis during the period 1990 to 2002. The technique used was either sidescan sonar or visual Remotely Operated Vehicle (ROV), or a combination of the two. Sidescan was performed more frequently, with visual ROV often used to supplement sidescan inspection shortfalls at the extreme ends of the pipeline and to examine specific anomalies. A full General Visual Inspection (GVI) was last carried out in 2009.

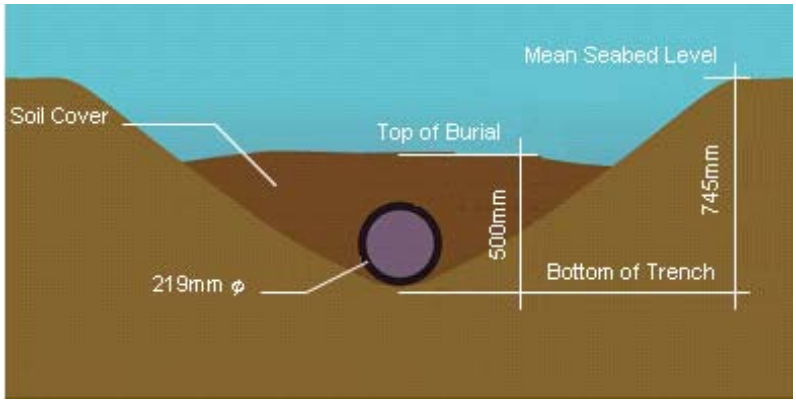


Figure 10.20 Typical Cross-section of 8in Pipelines

5.3.2 Operational History

Burial

The 8in production pipeline (PL598) has had a consistent burial profile. Exposure levels have remained extremely low, and are generally associated with features such as tie-in spools and approaches to the Don manifold and crossings which were designed to be untrenched. Post-installation, 643m of the line was exposed (4.8%). However, this slight exposure has decreased during the lifetime of the pipe as a result of remedial work and natural backfilling. Remedial rock dump and mattress placement was performed in 1991, 1992 and 1994 to restrain buckles, which also removed associated exposure. These remedial features have since become partly buried by seabed sediment. The 2009 GVI survey has confirmed our understanding that the stability of the pipeline remains stable in an out of use condition.

The 8in water injection pipeline (PL599) has had a consistent burial profile. Levels of exposure have remained extremely low and generally associated with design features such as tie-in spools and approaches to the Don manifold, crossing and tee. Post-installation, 355m of the line was exposed (2.04%). However, this slight exposure has decreased during the lifetime of the pipe as a result of remedial work and natural backfilling. The 2009 GVI survey has confirmed our understanding that the stability of the pipeline remains stable in an out of use condition.

Span

The 8in production pipeline has had very few spans. The few spans reported have been associated with upheaval buckling rather than seabed movement. By 1994, all spans were successfully rock dumped.

Where spans were reported in more than 1 year, only moderate change in length and height was observed. Since buckling is an anomaly caused by pressure and temperature effects during operations, no further buckles or associated spans will occur.

The 8in water injection pipeline has had very few spans. Spanning is not a concern on this pipeline and there has been no requirement for remedial measures (eg rock dumping or mattressing) due to spans.

None of the spans on the 8in pipelines has exceeded the FishSafe criteria of 10m x 0.8m.

5.3.3 Overall Burial Trend

The historical burial trend is detailed in Table 10.3. Results of these surveys indicated that there have been minor changes in the total length of exposed pipeline year to year, but after the remedial works, exposed areas have been extremely limited, with no trend of change or development.

Year	Total Exposed Length			
	Metres[1]		Proportion of Line (%)[2]	
	PL598	PL599	PL598	PL599
2009	267	296	1.53 (0.18)	1.7 (0.43)
2002	266	253	1.49 (0.46)	1.36 (0.47)
2001	245	287	1.40 (0.86)	1.65 (0.72)
2000	264	–	1.52 (0.95)	–
1999	168	–	0.96 (0.96)	–
1998	248	353	1.43 (0.66)	2.03 (1.55)
1997	147	143	0.84 (0.12)	0.83 (0.42)
1996	242	207	1.39 (0.20)	1.20 (0.70)
1995	143	207	0.82 (0.15)	1.21 (0.76)
1994	196	270	1.30 (0.02)	1.57 (0.64)
1993	158	225	1.00 (0.25)	1.30 (0.89)
1992	183	116	1.20 (0.37)	0.68 (0.68)
1991[3]	833	355	4.80 (3.69)	2.04 (1.17)

Notes: (1) Figures show length including spoolpieces.

(2) Figures in brackets show the percentage of pipeline exposed excluding spoolpieces (ie after completion of remediation activities).

(3) 1991 survey was performed prior to rock dump remedial work.

Table 10.3 Exposure History of 8in Pipelines

5.4 Present Condition

5.4.1 General

The Don oil production and water injection pipelines have been out of service since 2003. Both pipelines have been cleaned by pigging and flooded with seawater prior to being disconnected.

The last intelligent pig run was performed in 1996 and the results indicated that the oil production pipeline was fit for purpose. However, the results indicated channelling in the water injection pipeline. Modelling used at the time predicted through wall thickness failure of the water injection pipeline in 2000, however this never occurred.

The internal inventory of the pipelines has not been displaced since the production ceased, ie oil production and the water injection pipeline contain produced fluids and de-aerated seawater respectively. The pipelines were made hydrocarbon free during 2009.

5.4.2 Length and Location of Exposures and Spans

8in Oil Production Pipeline (PL598)

The last inspection of the 8in oil production pipeline in 2009 reported that the pipeline was almost entirely (98.5% of the total length) buried with only 267m of exposure. Of this length, 223.9m is associated with the Thistle and Don manifold spoolpieces and 10m with their transition zones.

Only one anomalous span was found by the most recent inspection of the 8in oil production pipeline in 2009. This 11.2m long x 0.15m high span is associated with a shallow, unprotected buckle, close to the Thistle Installation at KP 0.6266. No spans will remain on the 8in production pipeline once the primary scope is carried out.

8in Water Injection Pipeline (PL599)

The last inspection of the 8in water injection pipeline in 2009 reported that the pipeline was almost entirely (98.3%) buried with only 296m of exposure. Of this length, 221.7m is associated with the Thistle and Don manifold spoolpieces.

Only one anomalous span was found by the most recent inspection of the 8in water injection pipeline in 2009. This 22.1m long x 0.25m high span, is at the pipeline exit from the bridge at the Thistle Installation at KP 0.0984. This span will remain in situ until the Thistle decommissioning.

5.4.3 Present Burial Depth

Burial depth information is available when a GVI is performed. Although performed less frequently than sidescan sonar survey, GVIs demonstrated consistent burial depths for both pipelines.

The most recent GVI on the full length of the pipelines was performed in 2009.

Excluding pipeline sections designed not to be buried and exposures (as listed in Paragraph 5.4.2), the typical depth of burial is 0.30m to 0.50m for the 8in oil production pipeline and 0.24m to 0.52m for the 8in water injection pipeline as shown in Figures 10.21 and 10.22 respectively. The small 3.4m long area at KP 12.292 on the production pipeline, shown as an exposure in Figure 10.21, is a rock dumped area (rock has been displaced over the crown of the pipeline) but is still considered satisfactory. The area at KP 14.847 on the oil production and water injection pipelines, shown as an exposure in Figures 10.21 and 10.22, is the NLGP crossing which is mattressed.

Due to the low seabed currents and stiff clay soil in the area, these conditions will continue in future.

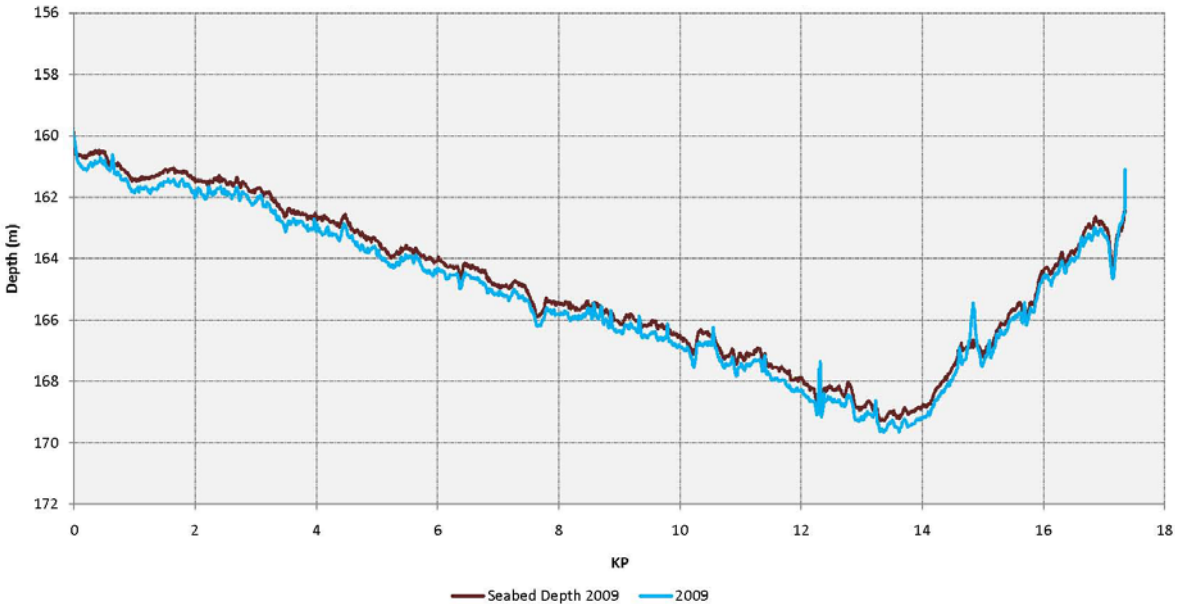


Figure 10.21 8in Production Pipeline (PL598) Burial Depth

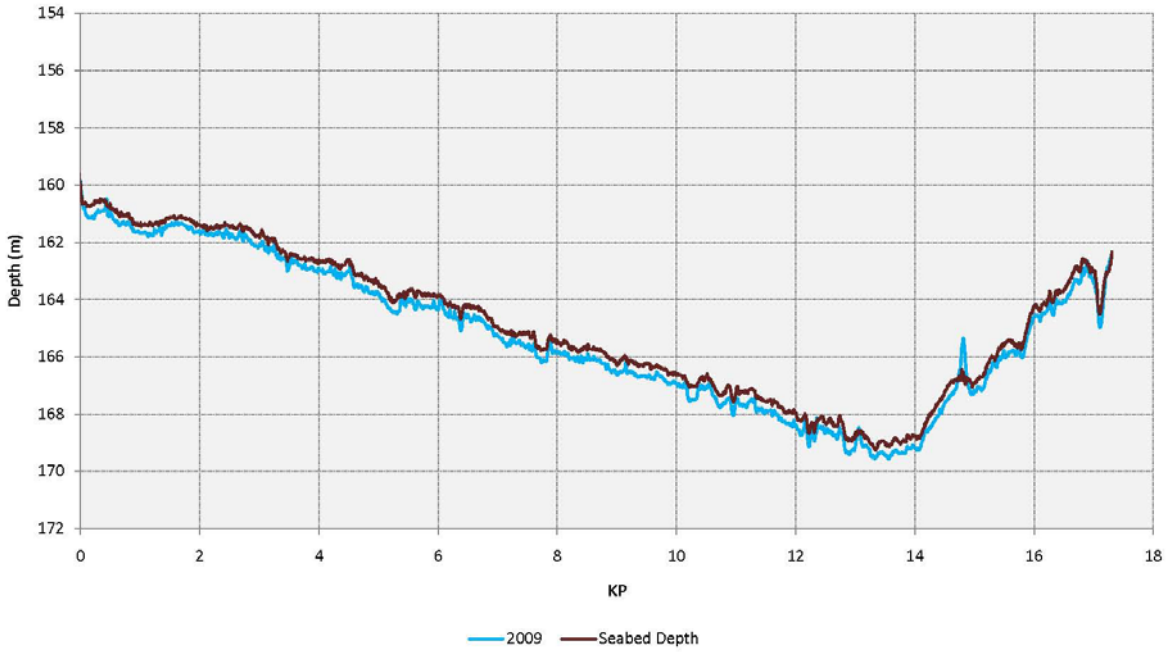


Figure 10.22 8in Water Injection Pipeline (PL599) Burial Depth

5.5 Description of Decommissioning Options for the Pipelines

Paragraphs 5.5.1 to 5.5.4 discuss the available options for decommissioning the 8in oil production pipeline (PL598) and 8in water injection pipeline (PL599).

5.5.1 Reuse

Reuse of pipelines in situ or for another application elsewhere was ruled out as not feasible because:

- There is no guarantee of the long-term integrity of the pipelines (refer to Paragraph 5.4.1 for further details)
- No alternative development opportunities have been identified
- It is not economically viable

5.5.2 Leave In Situ with No Remedial Work

This option involves no work other than Primary Scope Activities, and is based on the presumption that the current and future status of the pipelines poses no unacceptable risk to other users of the sea.

The soil in this area consists of a thin veneer of silty sand, overlying clay. This type of soil presents a stable environment, in which it is extremely unlikely that scour or spans develop. The status has remained stable since installation, with the exception of local upheaval buckles on the production pipeline, which have been stabilised for over 10 years. None of the pipelines have experienced significant spanning, and there has never been a FishSafe anomaly or snagging hazard since installation.

Whilst this option presents no technical challenges or costs short-term, leaving the pipelines in situ does raise long-term risk and liability issues with respect to other users of the seabed, and exposes the operator to a responsibility for monitoring and carrying out any remedial works on the pipeline as required.

5.5.3 Leave In Situ with Selective Removal

As described in Paragraph 2.1.3, removal of selected sections involves cut-out and recovery of areas which emerge out of the seabed by design. The open ends of the remaining sections would be protected from interaction with other sea users.

The section of pipeline proposed for selective recovery is the water injection tee, protective structure and associated stabilisation features.

It is considered that where upheaval buckle areas are protected by grout formwork, recovery would not be necessary. In addition, areas of spans, exposures and inadequate burial will be removed.

Selective recovery of the above sections of pipeline would be performed using the same cut and lift method described in Paragraph 2.2.3. This would present similar risks in terms of safety and technical challenges, although these would be reduced due to the smaller scope and shorter duration of work.

There are particular challenges associated with removal of stabilisation mattresses, pipelines and supports which inevitably impose risk to divers assisting during the operations. In addition, the pipeline crossings are designed to protect the NLGP, which is a live 20in gas pipeline located untrenched, directly beneath the crossing.

Selective recovery reduces the risk to other users of the sea. However, these lines will be inspected and remedial maintenance taken to ensure the risk to others sea users remains low.

5.5.4 Full Recovery by Reverse Reeling

This option would leave a clean seabed after decommissioning and eliminate both potential hazards to other users of the sea and the perpetual liability for inspection and remedial maintenance. The procedure of pipeline recovery by reverse reeling is described in Paragraph 2.2.1.

Removal of soil cover or jetting may be required prior to recovery. Stabilisation features installed on the top of the pipelines would also need to be removed. Reverse reeling would be subject to further detailed engineering to confirm suitability, practicability and identify additional assurances needed.

It was decided that reverse reeling by S-lay or J-lay was not a viable option for Don due to the integrity of the lines.

5.5.5 Full Recovery by Cut and Lift

This option would leave a clean seabed after decommissioning and eliminate both potential hazards to other users of the sea and the perpetual liability for inspection and remedial maintenance. The procedure of pipeline recovery by cut and lift is described in Paragraph 2.2.3.

Removal of soil cover or jetting is required prior to recovery. Stabilisation features installed on the top of the pipelines should also be removed. Cut and lift is a proven technique for removal of short pipeline sections. Recovery of pipelines by cut and lift is very time consuming and weather dependent work, although it is less demanding as far as technical integrity of pipelines is concerned.

5.6 Assessment of Options for the 8in Pipelines

5.6.1 General

The assessment of decommissioning options [10.3] was performed using the following criteria:

- Technical (complexity and associated technical risk)
- Safety (short and long-term hazards/risks)
- Environmental (ecosystem impact, energy and waste considerations)
- Social (effects on other users of the sea, eg shipping and fishing)
- Economic criteria, ie the cost and timescale of the work

Results are detailed in Table 10.4.

Criteria	Topic	Pipeline	Units	Leave In Situ	Selective Remove	Remove	
						Reverse Reel	Cut and Lift
Safety	PLL	PLS[1]	Probability of Fatality	1.91×10^{-3}	3.17×10^{-3}	8.65×10^{-3}	12.7×10^{-3}
Environmental	GHG CO_2[2]	PLS	Tonnes	12,876	17,616	14,328	24,594
	Total Energy Requirement[3]	PLS	GJ	102,752	110,113	102,350	122,350
	Impact on Landfill Site	WI PL599	Tonnes	Negligible	100	1620	1620
		Prod PL598	Tonnes	Negligible	100	1620	1620
	Persistence	PLS	Years	300	300	0	0
Societal	Impact on Fisheries	PLS	–	Snagging Risk	No Impact	No Impact	No Impact
	UK Employment Impact	PLS	Man Years	None	Minimal	Minimal	Minimal
	Tax Impact to Society[4]	PLS	Ranking (£)	1	2	3	4
Technical		PLS	–	Feasible	Feasible	Feasible	Feasible
Economics[5]	Cost[4]	PLS plus umbilicals	Ranking (£)	1	2	3	4

Notes: (1) PLS is the combined figure for both the 8in production pipeline (PL598) and the 8in water injection pipeline (PL599).

(2) Gaseous emissions are expressed in terms of CO_2 equivalents.

(3) Energy is expressed in terms of the average energy use of UK households. In 2001 this was 80GJ.

(4) Tax impact to society and cost are linked. A ranking of 1 represents lowest cost option.

(5) Economics cover all the decommissioning activities for the 8in production pipeline (PL598), 8in water injection pipeline (PL599), 3in chemical injection umbilical (PL600) and 4in control umbilical.

Table 10.4 Summary of Relative Impacts of the Alternative Decommissioning Options for the Pipelines

5.6.2 Technical Feasibility

There are no major technical issues identified with any of the decommissioning options.

Leaving the pipelines in situ or selective recovery involves significantly less work than removing the pipelines and therefore carries less technical risk.

The highest technical risks would be associated with full recovery options when lifting the pipes to surface whilst minimising loss of material to the seabed.

5.6.3 Safety of Personnel

For all options that involve leave in situ or leave in situ with selected recovery, the ongoing survey requirement introduces long-term committed survey risks that dominate the overall risks. Long-term survey risks contribute 50% or more of overall risks for decommissioning in situ options. However, even with the addition of a long-term survey, the overall risks for decommissioning in situ are still the lowest of all the decommissioning options due to the minimal operational workscope involved.

Site preparation, including destruction/recovery of flexiweight mattresses over the NLGP, accounts for almost one third of the overall risk associated with selective recovery. Timing this recovery to coincide with decommissioning of the NLGP itself would enable selection of methods that are less diver-intensive and of shorter duration (since protection of adjacent assets would no longer be a consideration), thus reducing operational risks. With higher operational risks, selective recovery over the NLGP shows an increased overall risk compared with the option without recovery over the NLGP, although this is still much less than either of the full recovery options.

Risks for full recovery options are much higher with the increase in risk due to offshore operations (ie diving, cutting, rigging and lifting operations).

Full recovery by reverse reel is much better than recovery by cut and lift, with the transfer of pipe cutting operations onshore. However, all full recovery options present operational risks significantly higher than those for leave in situ or selective recovery.

Full recovery of the pipeline by whatever means eliminates any long-term survey commitment and the risks this would introduce. However, the magnitude of the operational risks still result in higher overall risks with recovery by cut and lift presenting the highest risk.

5.6.4 Environmental Impacts

Direct and indirect environmental impacts from activities associated with the decommissioning of pipelines can be either short-term impacts directly related to handling, recovering or recycling of materials, or long-term impacts lasting usually until the total degradation of respective materials.

Short-term Environmental Impacts

There are no identified significant environmental impacts associated with leaving the pipelines in situ on the seabed apart from the physical presence of the pipelines.

Small amounts of cuttings may be disturbed towards each end of the pipelines, which may cause a local impact on the adjacent seabed.

Any impact from such activity would be relatively minor and last only a few months. The vessels involved in the work would cause a very localised and transient impact on other users of the sea and give rise to localised atmospheric emissions due to fuel usage.

For full recovery options, seabed sediments along the entire route of the pipelines would be disturbed. The vessels would use fuels and produce combustion gases, and transportation on land to recycling sites would use fuel and produce combustion gases.

Recycling would require the removal of the pipelines coatings to allow access to the steel. This may result in potential hazards and environmental impacts during lifting, cutting and disposal work, although recycling the steel in the pipeline would have a positive environmental impact by conserving resources. The energy saved by recycling would be at least partially offset by the fuel used during the recovery of the lines.

Long-term Environmental Impacts

In the leave in situ and selective recovery options, the lines would gradually deteriorate and eventually break up. The corrosion products from the steel are benign and would not cause any significant environmental impacts. The coating would most likely break up and could potentially be spread from the pipeline location.

Studies show that the aluminium-zinc-indium and galvallum III anodes would cease to provide cathodic protection after 35 to 40 years and the lines could be present in the seabed for 300 years or more, as the slow process of corrosion and degradation continues.

Fuel would be used, and combustion gases released, during periodic inspections and potential remedial activities.

In the full recovery options, the seabed would be left clear of potential obstructions. No other long-term environmental impacts have been identified. Apart from the possible nuisance associated with transportation and recycling activities, there would be very little onshore environmental impact. It is generally anticipated that the majority of pipe could not be recycled due to its present condition and the amount of energy that would be required to achieve the end product.

Environmental assessment of these aspects demonstrated that there is no clearly discernable environmental benefit associable with any of the feasible decommissioning options and the overall long and short-term environmental impact is moderate whichever decommissioning option is chosen.

5.6.5 Societal Impacts on Other Users of the Sea

If all the pipelines were fully recovered, there would be no safety risk to other users of the sea and a very small additional area of seabed would once again be available for fishing operations.

When left in situ the pipelines pose a potential snagging hazard, which represents a safety risk for the commercial fishing industry. However, it is considered that the individual risk to fishermen from this source is extremely small due to the extent and depth of burial.

The seabed along the routes is stable and it is unlikely that a trawl-board would interact with either line. This will be confirmed by a trawler sweep of the pipelines on completion of decommissioning. Periodic surveys will then be conducted to confirm that adequate burial depths are maintained. If the pipelines are left in situ, the steel will gradually corrode and the coating would eventually break up, with the possibility that small fragments of debris from a deteriorating pipeline would be spread from the present route of that pipeline.

5.6.6 Cost Assessment

Some of the decommissioning cost components would be shared between the pipelines and umbilicals, eg management, detailed engineering, studies etc, and costs have been calculated on the basis of pipelines and umbilicals being decommissioned at the same time.

There is a significant cost difference between leave in situ and total removal. However, there is more work and risk associated with the complete removal option and this is reflected in the cost ranking. It is also reflected in the safety risks where the complete removal option results in a safety exposure to personnel that is greater than the other options. The partial removal option has a small cost penalty but significantly reduces the fishing snagging hazard.

5.7 Recommended Decommissioning Option for the 8in Pipelines (PL598 and PL599)

The options for decommissioning the 8in pipelines have been assessed in terms of technical feasibility, safety risk, environmental impact, societal impact and cost. Technical issues do not constrain the selection of any option, but the increased safety risk associated with removal of the line is a factor. There are no significant environmental concerns associated with any of the options.

The main area of concern for the evaluation centres on the possible effects of the presence of the line and, in particular, future deterioration of the line and the potential risk this poses for fishing activity. The pipeline has been present and clearly marked on navigation charts for over 17 years.

The recommended option for the 8in pipelines is to leave in situ with selective removal, as this satisfied the assessment criteria best, along with deferral of the NLGP crossing.

An independent review of the pipeline options was performed by Atkins Boreas [10.4], which supports BP's comparative assessment conclusion to leave in situ with selective removal of the 8in pipelines.

BP, in parallel with work on Don decommissioning, will continue to explore other commercial options for both the infrastructure and the fields.

6 Umbilicals Decommissioning (3in Chemical Injection Umbilical (PL600) and 4in Control Umbilical)

6.1 General

The 4in control umbilical and the 3in chemical injection umbilical (PL600) are routed parallel with the 8in pipelines between the Thistle Installation and the Don manifold, and are approximately 17.7km long. The umbilicals, which were designed to be trenched and buried, both cross over the 20in NLGP approximately 15km from the Thistle Installation.

6.2 Material Inventory

The 4in control umbilical contains hydraulic hoses and power/signal cores. The 3in chemical injection umbilical contains six chemical injection hoses. The total weight of the umbilicals is 440 tonnes, with a further 2193 tonnes of stabilisation, including rock dumps, stabilisation mattresses, grout bags and supports. The material inventory is summarised in Table 10.5.

Material	4in Control Umbilical		3in Chemical Injection Umbilical (PL600)	
Equipment				
Umbilical	17.73km	280 tonnes	17.72km	160 tonnes
Equipment Total Weight	**280 tonnes**		**160 tonnes**	
Stabilisation (Excluding NLGP Crossing)				
Rock dump	181m	380 tonnes	None	N/A
Flexiweight mattress	8 pcs	45 tonnes	2 pcs	7.2 tonnes
Grout formwork	None	N/A	None	N/A
Grout bags	None	N/A	12 pcs	1.3 tonnes
Stabilisation Total Weight	**425 tonnes**		**8.5 tonnes**	
Stabilisation at NLGP Crossing Only				
Rock dump	61m	213 tonnes	109m	1474 tonnes
Flexiweight mattress	1 pcs	19 tonnes	1 pcs	19 tonnes
Grout formwork	6 pcs	17 tonnes	6 pcs	17 tonnes
Grout bags	None	N/A	None	N/A
NLGP Stabilisation Total Weight	**249 tonnes**		**1510 tonnes**	

Table 10.5 Inventory of Materials – 4in Control and 3in Chemical Injection Umbilicals

6.3 Burial Status

6.3.1 Design Burial Cross-section

The umbilicals were designed to be trenched to a depth of 0.3m from normal seabed level to the underside of the umbilical. Trenching was not performed, by design, at:

- The Thistle and Don manifold approaches
- Within 60m either side of the 20in NLGP crossing

Transition from full trench depth to exposure is typically 10m at Thistle and the NLGP crossing and 50m at the Don manifold approach.

After trenching, the umbilicals were actively backfilled.

Inspection of the 4in control umbilical was scheduled on an annual basis during the period 1991 to 1998 and on a biennial basis since 1998.

Inspection of the 3in chemical injection umbilical was scheduled on an annual basis during the period 1991 to 1995. After the chemical umbilical blocked and became redundant in 1995, the inspection frequency was modified to reflect inspection for threats to other users of the sea only. The technique used was sidescan sonar, visual ROV, or a combination of the two. Sidescan was performed more frequently, with visual ROV used to supplement sidescan inspection shortfalls at the extreme ends of the pipeline and to examine specific anomalies.

6.3.2 Operational History

Burial

The historical burial trend is detailed in Table 10.6.

The 4in control umbilical has experienced a consistent burial profile. Exposure levels have remained extremely low and are generally associated with design features such as the approaches to Thistle, the manifold and NLGP crossing, which were designed to be untrenched.

Post-installation, 17m of the line was exposed (0.1%). This slight exposure has remained constant during the lifetime of the umbilical. Rock dumping was performed in 1992 to protect the umbilical at the manifold approach. It is clear that exposure is extremely limited, with no trend of increase in exposure over the years. Due to the low seabed currents and stiff clay soil in this area, it is likely that these conditions would continue in future.

The 3in chemical injection umbilical has experienced a consistent burial profile throughout its life. Exposure levels have remained extremely low and are generally associated with design features such as the approaches to Thistle, manifold and crossing, which were designed to be untrenched.

Post-installation, 191m of the line was exposed (1%). This minor exposure has remained constant during the lifetime of the umbilical. Rock dumping was performed in 1992 where the umbilical had been disturbed at the NLGP crossing. Inspection results from 1991 to 2001 show that exposure fluctuates by a relatively small amount (between 0.66% and 1.82% of the length surveyed).

Year	Total Exposed Length			
	Metre		Percent	
	Control Umbilical	Chemical Umbilical	Control Umbilical	Chemical Umbilical
2009	51	219	0.29	1.23
2002	29.2	–	0.17	–
2001	–	218	–	1.23
2000	79.2	–	0.45	–
1999	–	–	–	–
1998	32.0	–	0.18	–
1997	32.9	–	0.19	–
1996	79.0	–	0.44	–
1995	31.4	209	0.18	1.18
1994	78.0	113	0.45	0.66
1993	–	322	–	1.82
1992	78.0	1518	0.40	8.63
1991	17.0	191	0.10	1.07

Table 10.6 Exposure History of the 4in Control and 3in Chemical Injection (PL600) Umbilicals

Span

Spanning has not been an issue for the 4in control umbilical. No spans were reported until 1996. Single spans were found in 1996 and 1998, two spans were found in 2000 and a further two spans were found in 2009. These spans have extremely small dimensions (5 to 10cm high).

Spanning has not been an issue for the 3in chemical injection umbilical. Only three spans have been reported in the last 10 years. These are located at the tie-in points and have extremely small dimensions (5cm high).

None of the spans on either of the umbilicals has exceeded the FishSafe criteria (10m x 0.8m).

6.4 Present Condition

6.4.1 General

The control umbilical is not presently functional. The four hydraulic hoses of the control umbilical contain a water-based hydraulic fluid.

The chemical injection umbilical has not been functional since it became blocked and then ruptured in 1995. Hoses of the umbilical presently contain various scale/corrosion inhibitors and methanol.

6.4.2 Length and Location of Exposures and Spans

4in Control Umbilical

The most recent inspection of the 4in control umbilical in 2009 reported that the umbilical was almost entirely (99.71%) buried with only 51m of exposure. Most of this length is associated with the NLGP crossing. The reported level of umbilical exposure has remained consistently low, being between 0.1% and 0.47% of the inspected length. The 2009 GVI survey has confirmed our understanding that the umbilical remains stable in an out of use condition.

Two spans were found in the most recent inspection in 2009. The spans have extremely small dimensions (5 to 10cm high).

3in Chemical Injection Umbilical (PL600)

The most recent inspection of the 3in chemical injection umbilical in 2009 reported that the umbilical was almost entirely (98.8%) buried with only 219m of exposure. These exposures are associated with the Don manifold and Thistle approaches.

Three, extremely minor spans were reported by the most recent inspection of the 3in chemical injection umbilical in 2009. The longest span is 94cm long x 2cm high. Spans were also reported at the Don manifold and Thistle Installation approaches. The umbilical at the Don manifold approach is to be removed eliminating this span. Removal of the umbilical at the Thistle platform will be deferred until the Thistle platform is decommissioned.

6.4.3 Present Burial Depth

Burial depth information is available when a visual inspection GVI is performed. Although such inspections were performed less frequently than sidescan sonar survey, they demonstrate consistent burial depths.

The most recent full-length visual inspection of the 4in control umbilical was performed in 2009. Excluding sections where the umbilical was designed not to be buried and the above exposures, the typical depth of burial is 0.18m to 0.37m as shown in Figure 10.23.

The most recent full-length visual inspection of the 3in chemical injection umbilical was performed in 2009. Excluding sections where the umbilical was designed not to be buried and the above exposures, the typical depth of burial is 0.11m to 0.37m as shown in Figure 10.24.

Due to the low seabed currents and stiff clay soil in the area, there is no reason to believe that these conditions will change in the future as indicated by results from lines in the same vicinity.

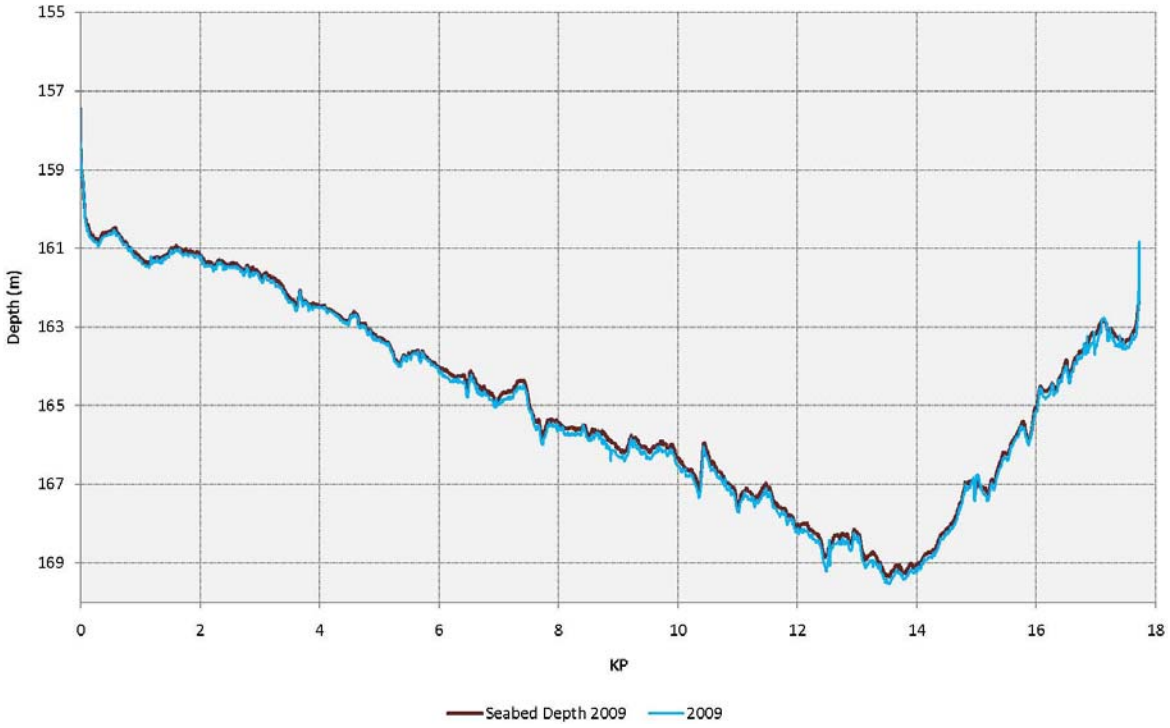


Figure 10.23 4in Control Umbilical Burial Depth

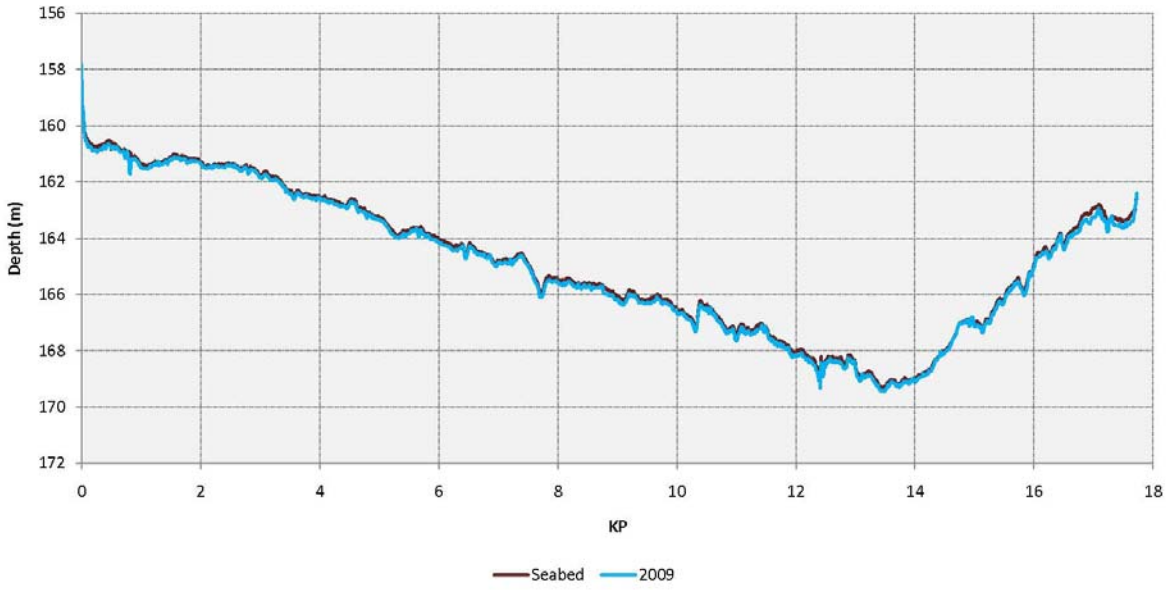


Figure 10.24 3in Chemical Injection Umbilical Burial Depth

6.5 Description of Options for the Umbilicals

The available options for decommissioning the 4in control umbilical and 3in chemical injection umbilical (PL600) are described in Paragraphs 6.5.1 to 6.5.5 and similar to those described for the pipelines options in Paragraph 5.5.

6.5.1 Reuse

Reuse of umbilicals in situ or for another application elsewhere was ruled out as not feasible because:

- There is no guarantee of the long-term integrity of the umbilicals
- No alternative development opportunities have been identified
- It is not economically viable

6.5.2 Leave In Situ with No Remedial Work

This option involves no work other than Primary Scope Activities, and is based on the presumption that the current and future status of the umbilicals poses no unacceptable risk on other users of the sea. The soil in this area consists of a thin veneer of silty sand, overlying clay. The umbilicals are well buried, in terms of length and depth. The status has remained stable since installation. None of the umbilicals have experienced significant spanning, and there has never been a FishSafe anomaly or snagging hazard since installation.

Whilst this option presents no technical challenges or costs short-term, leaving the umbilicals in situ does raise long-term risk and liability issues with respect to other users of the seabed, and exposes the Operator to a responsibility for monitoring and carrying out any remedial work on the umbilicals as required.

6.5.3 Leave In Situ with Selective Removal

As described in Paragraph 2.1.4, removal of selected sections involves cut-out and recovery of areas which emerge out of the seabed by design. The open ends of the remaining sections would be protected from interaction with other sea users. The sections of umbilicals proposed for selective recovery are the NLGP crossings. These areas are 'above seabed features' by design, which were identified by the historical review, where the existing protection may deteriorate over many years, and would require particular monitoring and continued remedial work to minimise the threat to other users of the sea.

In addition, areas of spans, exposures and inadequate burial could be removed locally if required. However, the historical review indicates there are no areas of exposure or spanning on these umbilicals that might require this type of remedial work.

Selective recovery of the NLGP crossings would be performed using the same method as cut and lift, as described in Paragraph 2.2.3. This would present similar risks in terms of safety and technical challenges, although these would be reduced due to the smaller scope and shorter duration of work.

There are particular challenges associated with removal of stabilisation mattresses, pipelines and supports which inevitably impose risk to divers assisting during the operations. In addition, the crossings are designed to protect the NLGP, which is a live 20in gas pipeline located untrenched, directly beneath the crossing.

Selective recovery reduces the risk to other users of the sea. However, since the majority of the buried pipelines and umbilicals remain, inspection and remedial maintenance will ensure the risk to others sea users remains low.

As an alternative to the direct selective recovery discussed above, recovery of the NLGP crossings can be deferred until it can be safely carried out in conjunction with the decommissioning of the 20in NLGP. The deferred selective recovery option offers the benefit of reducing the risk of recovering the umbilicals over the live 20in NLGP.

6.5.4 Full Recovery by Reverse Reeling

This option would leave a clean seabed after decommissioning and eliminates both potential hazards to other users of the sea and the perpetual liability for inspection and remedial maintenance. The procedure of umbilical recovery by reverse reeling is described in Paragraph 2.2.1.

Removal of soil cover or jetting may be required prior to recovery. Stabilisation features installed on the top of the umbilicals would also need to be removed. It is technically feasible to recover the two umbilicals simultaneously. Reverse reeling would be subject to further detailed engineering to confirm suitability, practicability and to identify additional assurances needed.

6.5.5 Full Recovery by Cut and Lift

This option would leave a clean seabed after decommissioning and eliminates both potential hazards to other users of the sea and the perpetual liability for inspection and remedial maintenance. The procedure of pipeline recovery by cut and lift is described in Paragraph 2.2.3.

Removal of soil cover or jetting is required prior to recovery. Stabilisation features installed on the top of the umbilicals should also be removed. Subsea cutting of umbilicals can be safely carried out using suitable ROVs.

6.6 Assessment of Options for the Umbilicals

6.6.1 General

The assessment of decommissioning options [10.3] was performed using the same system of criteria considered for the two 8in pipelines, as follows:

- Technical (complexity and associated technical risk)
- Safety (short and long-term hazards/risks)
- Environmental (ecosystem impact, energy and waste considerations)
- Social (effects on other users of the sea, eg shipping and fishing)
- Economic criteria, ie the cost and timescale of the work

Results are detailed in Table 10.7.

Criteria	Topic	Umbilical ID	Units	Leave In Situ	Partial Remove	Remove	
						Reverse Reel	Cut and Lift
Safety	PLL	Both[1]	Probability of Fatality	1.27×10^{-3}	1.5×10^{-3}	2.3×10^{-3}	5.4×10^{-3}
Environmental	GHG CO_2[2]	Both	Tonnes	14,586	16,164	11,454	17,586
	Total Energy Requirement[3]	Both	GJ	41,702	45,668	37,550	45,000
	Impact on Landfill Site	C I PL600	Tonnes	Negligible	30	160	160
		Control	Tonnes	Negligible	30	280	280
	Persistence	Both	Years	400	400	0	0
Societal	Impact on Fisheries	Both	–	Snagging Risk	No Impact	No Impact	No Impact
	UK Employment Impact	Both	Man Years	None	Minimal	Minimal	Minimal
	Tax Impact to Society[4]	Both	Ranking (£)	1	2	3	4
Technical	–	Both	–	Feasible	Feasible	Feasible	Feasible
Economics[5]	Cost[4]	Both plus pipelines	Ranking (£)	1	2	3	4

Notes: (1) Both is the combined figure for the 3in chemical injection umbilical (PL600) and the 4in control umbilical.

(2) Gaseous emissions are expressed in terms of CO_2 equivalents.

(3) Energy is expressed in terms of the average energy use of UK households. In 2001 this was 80GJ.

(4) Tax impact to society and cost are linked. A ranking of 1 represents lowest cost option.

(5) Economics cover all the decommissioning activities for the 8in production pipeline (PL598), 8in water injection pipeline (PL599), 3in chemical injection umbilical (PL600) and 4in control umbilical.

Table 10.7 Summary of Relative Impacts of the Alternative Decommissioning Options for the Umbilicals

6.6.2 Technical Feasibility

There are no major technical issues identified with any of the decommissioning options.

Leaving the umbilicals in situ or selective recovery involves significantly less work than removing the umbilicals and therefore carries less technical risk.

6.6.3 Safety of Personnel

For all options involving some decommissioning in situ, the ongoing survey requirement introduces long-term committed safety risks that dominate the overall risks.

Leave in situ with selected removal, including the NLGP crossings, makes little difference to the overall risk between the leave in situ options due to the dominance of the long-term survey. However, as for the pipelines, timing this recovery to coincide with decommissioning of the NLGP itself would enable the selection of methods that were less diver intensive and of shorter duration (since protection of adjacent assets would no longer be a consideration), therefore reducing operational risks. Even with operational risks lower than for full recovery options, overall risks for all decommissioning in situ options are higher due to the effects of long-term survey.

Full recovery by cut and lift presents the highest operational risk arising from the offshore destruct activities and, even in the absence of long-term survey requirements, still presents the highest overall risk for this same reason.

Operational risks for full recovery by reverse reel are very much less than for recovery by cut and lift (due to the required offshore working durations being reduced) and, without the long-term survey commitment, present the lowest overall risk.

The Quantitative Risk Assessment (QRA) shows that the safety risks associated with all of the options are well within acceptable limits and the margin of error for the analysis.

6.6.4 Environmental Impacts

Direct and indirect environmental impacts of activities associated with the decommissioning of umbilicals can be either short-term impacts directly related to handling, recovering or recycling of materials, or long-term impacts lasting usually until the total degradation of respective materials.

Short-term Environmental Impacts

There are no identified environmental impacts associated with leaving the umbilicals in situ on the seabed apart from the physical presence of the umbilicals.

Selective trenching or burial operations would disturb clean sediment and impact benthic communities in the immediate vicinity of the present routes.

Small amounts of cuttings may be disturbed towards each end of the umbilicals and this may cause a local impact on the adjacent seabed.

Any impact from such activity would be relatively minor and last only a few months. The vessels involved in the work would cause a very localised and transient impact on other users of the sea and give rise to localised atmospheric emissions due to fuel usage.

For the full recovery option, seabed sediments along the entire route of the umbilicals would be disturbed, but the short-term disturbance would be less than for the trench or bury options. The vessels would use fuels and produce combustion gases, and transportation on land to recycling sites would use fuel and produce combustion gases.

Long-term Environmental Impacts

In the leave in situ and selective recovery options, umbilical degradation will occur externally due to prolonged exposure to seawater. The degradation rates for the various umbilical materials were not extensively researched but are anticipated to be less than that for carbon steel pipelines. Degradation of each layer/sheathing of the umbilicals will occur, allowing seawater to degrade the internal and external surfaces simultaneously, so accelerating the degradation process. The predicted life of the umbilical is in excess of 400 years.

Fuel would be used, and combustion gases released, during periodic inspections and potential remedial activities.

In the full recovery option, the seabed would be left clear of potential obstructions. No other long-term environmental impacts have been identified.

6.6.5 Societal Impacts on Other Users of the Sea

If all the umbilicals were fully recovered, there would be no safety risk to other users of the sea and a very small area of seabed would once again be available for fishing operations.

When left in situ the umbilicals pose a potential snagging hazard, which represents a safety risk for the commercial fishing industry. However, it has been shown that the individual risk to fishermen from this source is extremely small [10.3], due to the extent and depth of burial.

The seabed along the routes is stable and it is unlikely that a trawl-board would interact with either line. This will be confirmed by a trawler sweep of the lines on completion of decommissioning. Periodic surveys will then be conducted to confirm that adequate burial depths are maintained.

There is a significant cost difference between leave in situ and total removal. However, there is more work and risk associated with the removal option, and this is reflected in the costs. It is also reflected in the safety risks where the removal option results in a safety exposure to personnel that is greater than that for the other two options. The partial removal option has a small cost penalty but significantly reduces the fishing snagging hazard.

6.6.6 Cost Assessment

Some of the decommissioning cost components would be shared between the umbilicals and pipelines, ie management, detailed engineering, studies etc. The costs have been compiled on the basis that pipelines and umbilicals will be decommissioned at the same time and are therefore included in the pipelines assessment (refer to Paragraph 5.6.6).

6.7 Recommended Decommissioning Option for the 4in Control Umbilical and 3in Chemical Injection Umbilical (PL600)

The options for decommissioning the umbilicals have been assessed in terms of technical feasibility, safety risk, environmental impact, societal impact and cost. Technical issues do not constrain the selection of any option, but the increased safety risk associated with removal of the line is a factor. There are no significant environmental concerns associated with any of the options.

The recommended option for the umbilicals is to leave them in situ with selective removal as this satisfies the assessment criteria best, along with deferral of the NLGP crossing.

An independent review of the umbilical options was performed by Atkins Boreas [10.4], which supports BP's comparative assessment conclusion to leave in situ with selective removal of the umbilicals.

It is recommended to leave the buried section of the umbilicals with no intervention works proposed as more than 98.8% of the entire length is buried with the burial depth between 0.11m to 0.37m. Due to the low seabed currents and stiff clay soil in this area these conditions would continue in future.

7 Selected Decommissioning Option for Pipelines and Umbilicals

The recommended decommissioning works are grouped based on the following phases:

(1) Preparation for pipeline and umbilical disconnection and decommissioning:

  (a) Cleaning, flushing, hydrocarbon-freeing of pipelines and connected production flowlines, and disconnection from wells. (Flushing, disconnection and isolation tasks completed in 2009.)

  (b) Disconnection of pipelines and umbilicals-related equipment on Thistle Installation.

(2) Recovery and disposal of removed items and pipeline sections:

  (a) Primary Scope Activities involve disconnecting and recovering onshore the following items:

    - Flowline and umbilical jumpers between the Don manifold and wells
    - Production and water injection pipeline subsea tie-in double spoolpieces and associated isolation valves at the Don manifold
    - Don manifold and associated pipework

  (b) Recovering the water injection tie-in tee-piece for recycling.

  (c) Recovering flexiweight mattresses and grout bags at the Don manifold.

(d) Cut out and recover sections of pipe that emerge out of the seabed back to stable buried pipe, so that there is no possibility of a snagging hazard.

(e) Remove all features from the umbilicals (umbilicals cut back and buried).

(f) Grout formwork will be left in situ and made safe for other users of the sea as demonstrated by over-trawlability trials.

(g) Remedial work to eliminate any snagging hazards.

(3) Post-decommissioning activities, including surveys.

The Don Owners will ensure that the site of the pipelines and umbilicals remains free from obstructions. This will involve a monitoring programme to confirm that the pipelines and umbilicals remain safely buried. The method of inspection will be the most appropriate available at the time of survey. At present, this is most likely to be a visual inspection by ROV, or by an ROV-carried sub-bottom profiler utilising acoustic pulse induction methods.

The first survey will be carried out within 1 year of completion of the decommissioning work to provide baseline survey data and confirmation that the pipeline is not a hazard to other users of the sea. A second survey will be carried out within 3 years of the initial post-decommissioning survey, with a future survey regime being determined in conjunction with the DECC, based on the analysis of the first two surveys.

8 References

[10.1] Petroleum Act 1998, http://www.hmso.gov.uk/.

[10.2] DECC Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, http://www.decc.gov.uk/.

[10.3] Don Pipeline System Decommissioning Technical Report, Lloyd's Register EMEA, Ref No R-658-40621-1B July 2005.

[10.4] Independent Review of BP Don Pipeline Decommissioning Options, Atkins Boreas, Revision C, Ref No BR07028 2008.

Appendix 10A
Decommissioning of 4in Flexible Jumper (PL981)

Department of
Trade and Industry

Oil and Gas Office
Atholl House
86-88 Guild Street
Aberdeen AB11 6AR

Fax 01224 254018
Web Site www.og.dti.gov.uk
Minicom 0171 215 6740

Mr Blair McKay
East of Shetland Business Unit
BP
Farburn Industrial Estate
Dyce
Aberdeen
AB21 7PB

Direct Line: 01224 254029
E-mail: clare.duncan@dti.gsi.gov.uk
Our Ref: ABE/20/4/13
Date: 20 September 2000

Dear Mr McKay

DON FIELD: DECOMMISSIONING OF PIPELINE PL981

Thank you for your letter of 25 August, providing information on the decommissioning of PL981 (PN05) in the Don field. As I mentioned in my letter of 16 August, the decommissioning of this pipeline can be approved through an Exchange of Letters rather than a formal decommissioning programme. This letter gives approval to the decommissioning of PL981.

When a decommissioning programme is prepared for the remaining Don facilities in the future, it should contain a paragraph explaining that PL981 was decommissioned at an earlier date. The information contained in your letter of 25 August should also be included.

I would like to take this opportunity to remind you that the Hydrograhpic Office must be informed of any change in pipeline status. If you have not already done so, please let them know about the removal of PL981 so that they may update their charts.
Their address is:

The United Kingdom Hydrographic Office
Chart Branch 1C (Oil and Gas)
Admiralty Way
Taunton
Somerset
TA1 2DN

Yours sincerely

Clare Duncan

CLARE DUNCAN
Offshore Decommissioning Unit

dti

Recycled Paper

bp **Blair McKay**
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25 August 2000

Clare Duncan
Department of Trade and Industry
Oil & Gas Office
Atholl House
86-88 Guild Street
Aberdeen
AB11 6AR

Reference: BM-2508-02

Dear Clare

Don Field - Decommissioning of PL981 (PN05)

With reference to your letter of 16/8/00 requesting information on the status of PL981 (PN05) in the Don Field, we reply as follows:

- PL981 has been removed from the site. This was carried out in May of this year.
- The method of removal was by disconnection from the Christmas Tree and at the manifold end and lifting by crane. Both ends (at the manifold and Christmas Tree) have been blanked off and tested.
- This flowline was used to replace that of PL1073 (PN06) which has been removed from site and disposed of onshore.
- The pipeline was deoiled back to the platform using proprietory chemicals (see spec sheet attached) Ethylene Glycol Monobutyl Ether prior to removal.

Attached is a schematic of the as left status for PN5 and PN6.

If you require any further information please do not hesitate to contact myself.

Yours sincerely

Blair McKay

BP Exploration Operating Company Limited
Registered in England & Wales, No.305943
Registered Office: Britannic House,
1 Finsbury Circus,
London EC2M 7BA

Amoco (U.K.) Exploration Company
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No.05438-27;
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Our Ref: ABE/20/4/13
Date: 16 August 2000

Dear Mr McKay

DON FIELD – DECOMMISSIONING OF PL981 (PN05)

I understand from correspondence between yourselves and colleagues in the DTI that PL981 is to be decommissioned following repair works on PL1073.

Britoil plc are currently in receipt of a notice under section 29 of the Petroleum Act 1998, dated 16 May 1995, in respect of PL981 on the Don field. This notice requires Britoil to submit to the Secretary of State, on or before such date as he may at any time hereafter direct, a decommissioning programme setting out the measures proposed to be taken in connection with the decommissioning of this pipeline.

However, as you propose to remove the pipeline from the seabed before the end of field life, it is our intention that the decommissioning be approved through an Exchange of Letters, rather than a formal decommissioning programme.

I should be grateful if you would respond with the following information:

- Confirmation that the pipeline is to be removed or has been removed
- When the pipeline is to be removed or was removed
- Method of removal
- Details of any cleaning activities
- What will happen to the pipeline once it is returned to shore

I should be grateful if you would forward this information for my attention within 30 days of the date of this letter. If you pass this letter to a colleague for action, please inform me of their name and contact details. If you have any questions regarding this matter, please do not hesitate to contact me on 01224 254029.

Yours sincerely

Clare Duncan

CLARE DUNCAN
Offshore Decommissioning Unit

Champion Blacksmith

SAFETY DATA SHEET

PAGE: 1 of 5
PRINT DATE: 26/11/1997
REF: SDS077

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY

Product name BLACKSMITH EGMBE

Product code: SDS077

Supplier: CHAMPION BLACKSMITH
1 Abbotswell road, West Tullos
ABERDEEN AB12 3AD

Emergency telephone number: 01224 879022 Fax No: 01224 876022

2. COMPOSITION/INFORMATION ON INGREDIENTS

Identification of the preparation EGMBE. 2-BUTOXYETHANOL

Chemical Name	CAS-No	EEC-No	Class	Weight %
ETHYLENE GLYCOL MONOBUTYL ETHER	111-76-2	603-014-00-0	Xn; R20/21/22 Xi; R37	100

3. HAZARDS IDENTIFICATION

Most important hazards: HARMFUL

Specific hazards Harmful by inhalation, in contact with skin and if swallowed

4. FIRST AID MEASURES

General advice:

Inhalation: Move to fresh air in case of accidental inhalation of vapours. Consult a physician after significant exposure. Oxygen or artificial respiration if needed.

Skin contact: Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. If skin irritation persists, call a physician.

Eye contact: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep eye wide open while rinsing.

Ingestion: Immediately give plenty of water (if possible charcoal slurry). Rinse mouth. If possible drink milk afterwards. Call a physician immediately. Do not induce vomiting. Never give anything by mouth to an unconscious person.

Product name: **BLACKSMITH EGMBE**

PAGE: 2 of 5
PRINT DATE: 28/11/1997
REF: SDS077

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: water spray, Dry powder, sand, foam, carbon dioxide (CO2)

Extinguishing media which must not be used for safety reasons:
Do not use a solid water stream as it may scatter and spread fire.

Specific hazards: Burning produces irritant fumes

Special protective equipment for firefighters: In case of fire, wear a self contained breathing apparatus.

Specific methods: Cool containers / tanks with water spray. Standard procedure for chemical fires.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear personal protective equipment.Keep people away from and upwind of spill/leak.

Environmental precautions: Do not let product enter drains.Do not flush into surface water or sanitary sewer system.

Methods for cleaning up: Soak up with inert absorbent material. Shovel into suitable container for disposal. After cleaning, flush away traces with water.
Small amounts: Dilute with plenty of water.

7. HANDLING AND STORAGE

Handling: In case of insufficient ventilation, wear suitable respiratory equipment. Avoid formation of respirable particles.Do not breath vapours or spray mist.

Storage: Keep containers tightly closed in a cool, well-ventilated place.Keep away from heat and sources of ignition.Do not store together with incompatible products.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Chemical Name:	National occupational exposure limits:
ETHYLENE GLYCOL MONOBUTYL ETHER	8Hr TWA MEL 25ppm Sk

Engineering measures to reduce exposure: Ensure adequate ventilation, especially in confined areas.

Personal protection equipment:

- Respiratory protection: Respirator with combination filter for vapour/particulate filter type A2
- Hand protection: PVC or other plastic material gloves
- Eye protection: Tightly fitting safety goggles, face-shield.

- Skin and body protection:	Lightweight protective clothing, hard hat with brim,heavy duty work shoes.
Hygiene measures:	When using do not eat or drink.Contaminated work clothing should not be allowed out of the workplace. Keep away from food, drink and animal feeding stuffs. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:		Liquid	
Colour:		Clear, colourless	
Odour:		ether-like	
	20		
Boiling point/range:		163-173	°C
Melting point/range:		-75	°C
			°C
Flash point:		67	°C
Autoignition temperature:		240	°C
Explosion limits:	- lower	1.1	vol. %
	- upper	10.6	vol. %
Relative density:	(20 °C)	> = 0.898	
		< = 0.902	
Water solubility:	(20 °C)	completely miscible	

10. STABILITY AND REACTIVITY

Stability:	Stable at normal conditions
Conditions to avoid:	Heating in air
Materials to avoid:	Strong acids and oxidizing agents
Hazardous decomposition products:	Incomplete combustion may produce small amounts of Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Acute toxicity:	
Local effects:	Harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Harmful by inhalation and in contact with skin.
Sensitization:	
Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher

Product name: **BLACKSMITH EGMBE**

PAGE: 4 of 5
PRINT DATE: 26/11/1997
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12. ECOLOGICAL INFORMATION

Mobility:	No data available
Persistence / degradability:	Readily biodegradable, according to appropriate OECD test
Bioaccumulation:	No data available
Ecotoxicity:	No data available

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Offer surplus and non-recyclable solutions to an established disposal company. Dispose of as special waste in compliance with local and national regulations.Must be reconditioned or disposed as special waste.

Contaminated packaging: Empty containers should be taken for local recycling, recovery or waste disposal.Must be reconditioned or disposed as special waste.

14. TRANSPORT INFORMATION

UN-No: **Marine pollutant:**

ADR/RID

Class: **Item:**

TREM-CARD: **EAC/HI:**

Proper shipping name: Not classified as dangerous in the meaning of road and railway transport regulations

IMO

Class: **IMDG Page:**

EmS: **MFAG:**

Proper shipping name: Not classified as dangerous in the meaning of sea and air transport regulations

ICAO

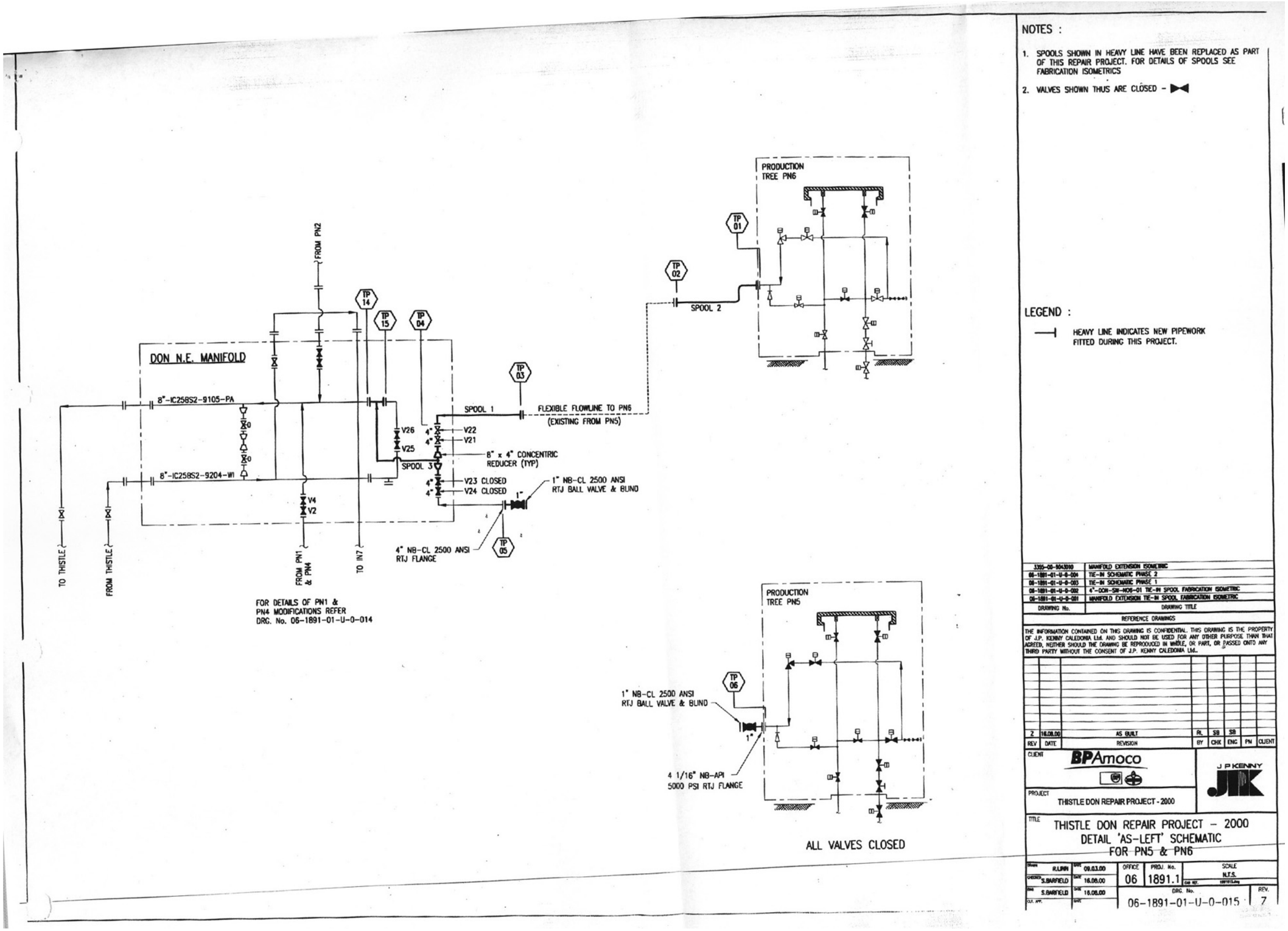
Class: **UN/ID No:**

Proper shipping name

15. REGULATORY INFORMATION

Classification according to European directive on classification of hazardous preparations 90/492/EEC

- Contains:



NOTES :

1. SPOOLS SHOWN IN HEAVY LINE HAVE BEEN REPLACED AS PART OF THIS REPAIR PROJECT. FOR DETAILS OF SPOOLS SEE FABRICATION ISOMETRICS
2. VALVES SHOWN THUS ARE CLOSED – ⋈

LEGEND :

HEAVY LINE INDICATES NEW PIPEWORK FITTED DURING THIS PROJECT.

3355-00-9043010	MANIFOLD EXTENSION ISOMETRIC
05-1891-01-U-0-004	TIE-IN SCHEMATIC PHASE 2
05-1891-01-U-0-003	TIE-IN SCHEMATIC PHASE 1
05-1891-01-U-0-002	4"-DON-SW-MO6-01 TIE-IN SPOOL FABRICATION ISOMETRIC
05-1891-01-U-0-001	MANIFOLD EXTENSION TIE-IN SPOOL FABRICATION ISOMETRIC
DRAWING No.	DRAWING TITLE

REFERENCE DRAWINGS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONFIDENTIAL. THIS DRAWING IS THE PROPERTY OF J.P. KENNY CALEDONIA Ltd. AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE THAN THAT AGREED, NEITHER SHOULD THE DRAWING BE REPRODUCED IN WHOLE, OR PART, OR PASSED ONTO ANY THIRD PARTY WITHOUT THE CONSENT OF J.P. KENNY CALEDONIA Ltd..

REV	DATE	REVISION	BY	CHK	ENG	PN	CLIENT
2	16.08.00	AS BUILT	RL	SB	SB		

CLIENT: BPAmoco

J P KENNY

PROJECT: THISTLE DON REPAIR PROJECT - 2000

TITLE: THISTLE DON REPAIR PROJECT – 2000
DETAIL 'AS-LEFT' SCHEMATIC
FOR PN5 & PN6

DRAWN R.LINN 09.03.00	OFFICE 06	PROJ. No. 1891.1	SCALE N.T.S.	
CHECKED S.BARFIELD 16.08.00				
APP. S.BARFIELD 16.08.00	DRG. No. 06-1891-01-U-0-015			REV. 7

Section 11
Interested Party Consultation

1 Introduction

This section describes the consultation process regarding the proposed decommissioning activities for the Don Field, as described in these Decommissioning Programmes.

2 Consultation Process

Consultation has been undertaken with a range of interested parties, including the Health and Safety Executive (Offshore Safety Division) (HSE (OSD)) and Scottish Fishermen's Federation (SFF), since planning first began for the decommissioning of the Don Field in June 2004. In addition, as required under the Department of Energy and Climate Change (DECC) Guidance Notes [11.1], a period of statutory public consultation was undertaken between 19th October and 17th November 2009.

Statutory consultations with the list of consultees provided by DECC (the SFF, the National Federation of Fishermen's Organisations, the Northern Ireland Fishermen's Federation and Global Marine Systems Ltd) was undertaken when the second draft of these Decommissioning Programmes was submitted to DECC. Each statutory consultee was provided with a CD ROM of the second draft of the Decommissioning Programmes, accompanied by a letter as shown in Appendix 11A. A response letter was received from the SFF as shown in Appendix 11C. No response was received from the other statutory consultees.

Also at this second draft stage, the draft Decommissioning Programmes were published on the BP website at www.bp.com/don from where it is possible to read and download the decommissioning document. A Public Notice, similar to that shown in Appendix 11B, was published in national and local publications highlighting the existence of the information on the BP website and pointing out that copies are available for viewing at BP's offices in Aberdeen. This provided a wider audience with access to information on the Don Field facilities and decommissioning process. The BP website includes an email address, specific to the decommissioning process, where it is possible to submit comments on the Decommissioning Programmes.

No comments or questions were received during the public consultation phase but BP will continue to make information available to all relevant interested parties as the decommissioning of the Don Field progresses.

3 References

[11.1] DECC Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, http://www.decc.gov.uk/.

Appendix 11A
Letters Sent to Statutory Consultees

bp

James F Blacklaws
Decommissioning Subsea Project Manager

BP Exploration Operating Company Ltd
North Sea Headquarters
1 Wellheads Avenue
Farburn Industrial Estate
Dyce
ABERDEEN
AB21 7PB

16 October 2009

Global Marine Systems Ltd
New Saxon House
1 Winsford Way
Boreham Interchange
Chelmsford
Essex
CM2 5PD

BP/DON/GMS/L/007

Direct: 01224 832909
Main: 01224 832000
Blackljf@bp.com

Dear Sirs

DON DECOMMISSIONING PROGRAMME
STATUTORY CONSULTATION

On behalf of the Don owners, I am pleased to enclose a copy of the draft decommissioning programme for the field in hard copy and CD formats.

Under the requirements of the Petroleum Act 1998 and in accordance with DECC's Decommissioning Guidance Notes for Industry, statutory consultees have 30 days in which to provide comments on the decommissioning programme. The official period for consultation will begin on Monday 19th October 2009 and end on Tuesday 17th November 2009.

The Decommissioning Programme contains detailed proposals for the Don manifold, wells, pipelines and associated facilities.

I would be grateful if you could send your written comments to me at the address above and would be pleased to provide additional copies of the decommissioning programme or any further information you may require.

I look forward to receiving any comments you may have before the 17th November.

Yours faithfully

James F Blacklaws

bp

James F Blacklaws
Decommissioning Subsea Project Manager

BP Exploration Operating Company Ltd
North Sea Headquarters
1 Wellheads Avenue
Farburn Industrial Estate
Dyce
ABERDEEN
AB21 7PB

16 October 2009

The National Federation of Fishermen's
Organisations
NFFO Offices
30 Monkgate
York
YO31 7PF

BP/DON/NFF/L/004

Direct: 01224 832909
Main: 01224 832000
Blackljf@bp.com

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Yours faithfully

James F Blacklaws

bp

James F Blacklaws
Decommissioning Subsea Project Manager

BP Exploration Operating Company Ltd
North Sea Headquarters
1 Wellheads Avenue
Farburn Industrial Estate
Dyce
ABERDEEN
AB21 7PB

16 October 2009

Northern Ireland Fishermen's Federation
1 Coastguard Cottages
The Harbour
Portavogie
Co Down
BT22 1EA

BP/DON/NIFF/L/006

Direct: 01224 832909
Main: 01224 832000
Blacklif@bp.com

Dear Sirs

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STATUTORY CONSULTATION

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I look forward to receiving any comments you may have before the 17th November.

Yours faithfully

James F Blacklaws

bp

James F Blacklaws
Decommissioning Subsea Project Manager

BP Exploration Operating Company Ltd
North Sea Headquarters
1 Wellheads Avenue
Farburn Industrial Estate
Dyce
ABERDEEN
AB21 7PB

16 October 2009

Scottish Fishermen's Federation
24 Rubislaw Terrace
Aberdeen
AB10 1XE

BP/DON/SFF/L/005

Direct: 01224 832909
Main: 01224 832000
Blackljf@bp.com

Dear Sirs

DON DECOMMISSIONING PROGRAMME
STATUTORY CONSULTATION

On behalf of the Don owners, I am pleased to enclose a copy of the draft decommissioning programme for the field in hard copy and CD formats.

Under the requirements of the Petroleum Act 1998 and in accordance with DECC's Decommissioning Guidance Notes for Industry, statutory consultees have 30 days in which to provide comments on the decommissioning programme. The official period for consultation will begin on Monday 19th October 2009 and end on Tuesday 17th November 2009.

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I look forward to receiving any comments you may have before the 17th November.

Yours faithfully

James F Blacklaws

Appendix 11B
Public Notice Advertisement

PUBLIC NOTICE
The Petroleum Act 1998
DON DECOMMISSIONING PROJECT

BP has submitted, for the consideration of the Secretary of State for Energy and Climate Change, a draft Decommissioning Programme for the Don Field in accordance with the provisions of the Petroleum Act 1998. It is a requirement of the Act that interested parties be consulted on such decommissioning proposals.

The items/facilities covered by the Decommissioning Programme are:

The Don manifold, wells, pipelines and associated facilities located in Block 211/18a of the United Kingdom Continental Shelf, 230km north east of the Shetland Islands.

BP hereby gives notice that a summary of the Don Decommissioning Programme can be viewed at the internet address: www.bp.com/don

Alternatively, a hard copy version of the programme can be requested or hard copy inspected at the following location during office hours:

BP
1 Wellheads Avenue
Dyce
Aberdeen AB21 7PB
Contact: Richard Grant
Tel: 01224 832347
e-mail: richard.grant2@bp.com

Representations regarding the Don Decommissioning Programme should be submitted in writing to Richard Grant at this address where they should be received by Tuesday 17th November and should state the grounds upon which any representations are being made.

19th October 2009

Richard Grant
External Affairs department
BP
I Wellheads Avenue
Dyce
Aberdeen AB21 7PB

Appendix 11C
Letter from the Scottish Fishermen's Federation

SCOTTISH FISHERMEN'S FEDERATION
24 Rubislaw Terrace · ABERDEEN · AB10 1XE
Telephone: 01224 646944 · Fax: 01224 647058
e-mail: sff@sff.co.uk
Website: www.sff.co.uk

Ref: MS/TM/L09-85

17 November 2009

James F Blacklaws, Esq.,
Decommissioning Subsea Project Manager,
BP Exploration Operating Company Limited
North Sea Headquarters
1 Wellheads Avenue
Farburn Industrial Estate
Dyce
AB21 7PB

Dear James,

DON DECOMMISSIONING PROGRAMME STATUTORY CONSULATATION

I refer to your letter and enclosures of 16th October, 2009 (your ref DP/DON/SFF/L/005), concerning the above.

Our Federation welcomes the opportunity to review and offer comments on the above referenced Don Decommissioning Programme Document. We preface our response by hereby confirming that we are fully supportive of the Programme, all as laid out in the aforementioned Document.

BP is well aware, as indeed are all relevant U.K. Government Authorities, and Others, that the Scottish Fishermen's Federation's Longterm and Consistent Policy towards the Decommissioning of all Redundant Offshore Energy Infrastructure is that of achieving the Maximum, Timely and Safe Removal of such hardware from the Seabed for efficient disposal ashore. To this end, we are rewarded to note that BP's proposals are, in essence, consistent with the SFF's preferred clean Seabed Policy Objective, save that we note that the Grout Formwork at certain locations, the NLGP Umbilical and Pipeline Crossings, as well as the various relevant hardware immediately adjacent to and within BP's Thistle Platform Safety Zone shall be left in Situ.

Our Federation also notes that BP's Plans for the Don Manifold to Thistle Pipelines and associated Umbilicals are for these items to be left In Situ. Our Federation's preferred stance in respect of Pipelines, is that any that are PROUD of the seabed should be removed at the end of their economic life. However, we would also remind BP that the Federation recognises, where Pipelines are Demonstrably Safely Buried or Trenched that, we are comfortable that in such instances the Seabed should not be disturbed. In these instances such Pipelines should be regularly monitored in accordance with Internationally accepted standards and therefore, in noting BP's Statement that these Pipelines are trenched/buried and your ongoing commitment to regular Monitoring, we are therefore on this occasion, supportive of BP's approach to these particular Pipelines; all as laid out in the Decommissioning Document. We are further pleased to note that where the project has identified that parts of these Pipelines/Umbilicals are PROUD of Seabed, or exposed in their trenches, or indeed are susceptable to upheaval buckling, that your company has undertaken to Safely and Appropriately Section Out or deal with such items, again in accordance with relevant Industry Standards.

The Scottish Fishermen's Federation also notes BP's comments in respect of Don related Drill Cuttings. We have previously discussed this matter at length with yourselves and indeed various other relevant parties and we are therefore content to leave this item with yourselves and indeed the relevant Industry Experts on this occasion. We have also and will continue to contribute to Cross Industry JIP'S in respect of Drill Cuttings and in this respect trust that BP shall continue contribute to the General Drill Cuttings Debate.

Our Federation further confirms that it would be pleased to cooperate with BP in respect of Fishing Over Trawlability Trials Etc in respect of all relevant Don Decommissioned Assets – these would include those

V.A.T Reg. No. 605 096 748
Members: Anglo Scottish Fishermen's Association Clyde Fishermen's Association Fishsalesmen's Association (Scotland) Limited Mallaig & North-West Fishermen's Association
Orkney Fisheries Association Scallop Association Scottish Pelagic Fishermen's Association Limited The Scottish White Fish Producers Association Limited Shetland Fishermen's Association

SCOTTISH FISHERMEN'S FEDERATION
24 Rubislaw Terrace · ABERDEEN · AB10 1XE

Telephone: 01224 646944 · Fax: 01224 647058
e-mail: sff@sff.co.uk
Website: www.sff.co.uk

items, outwith the Thistle Safety Zone, listed in Paragraph 3 above. We also reaffirm that we are pleased to note BP's ongoing commitment towards a programme of regular generic monitoring of the Don Decommissioned Assets. We would be pleased to openly share and contribute towards your future relevant monitoring strategy.

We further take this opportunity to confirm that we have consulted and reviewed BP's various supporting Technical Documents in respect of this Programme and hereby affirm that we are content with said Documents. We also appreciate the open manner of which we have be able to input into these Technical Documents, particularly in respect of the Environmental Statements Etc, in particularly the context of providing realistic and soforth Date Etc.

Our Federation also takes this opportunity to confirm our appreciation of BP's support for Initiatives such as FishSafe, The Fisheries Legacy Trust Fund Etc; These initiatives shall cumulatively be generally important in respect of various Future Decommissioning Strategies.

James, as you are aware, our mutual objective is that of achieving the removal of the above described items from the Seabed to Shore in such a manner that offers no compromise to either of our Industry's Safety, both in the Short and Longterm. The return of the Don Area to preinstalled Open Fisheries should always have the Longterm Safety of Fishermen in mind, as well as that of both of our Industries concern for and respect of the natural Sea Environment.

The Scottish Fishermen's Federation wishes the Don Decommissioning Project continued success. We also take this opportunity to register our appreciation for the open and regular manner in which the BP Don Decommissioning Project has dialogued with us heretofore. We trust that our open and regular dialogue continues, particularly as the Project draws towards what we are certain, that will be a Successful, Safe and Satisfactory outcome for all relevant parties.

Yours sincerely

Michael Sutherland
Director Of Operations

cc
SFF Internal
SFF Member Associations
John Watt

Richard Grant, BP External Affairs
Dave Bingham, BP Fisheries Liaison

Marine Scotland

V.A.T Reg. No. 605 096 748

Members: Anglo Scottish Fishermen's Association Clyde Fishermen's Association Fishsalesmen's Association (Scotland) Limited Mallaig & North-West Fishermen's Association Orkney Fisheries Association Scallop Association Scottish Pelagic Fishermen's Association Limited The Scottish White Fish Producers Association Limited Shetland Fishermen's Association

Section 12
Costs

1 Costs

The overall total cost for the proposed Don Field Decommissioning Programme is expected to be in the order of £150 million.

The workscope covered by this overall total cost includes:

- Plugging and abandoning wells
- Removing wellheads
- Cleaning, flushing, hydrocarbon-freeing of pipelines and connected production flowlines, and disconnection from wells. (Flushing, disconnection and isolation tasks completed in 2009.)
- Removing all flowlines, chemical injection and control umbilical jumpers between the wells and the Don manifold
- Removing the Don manifold and associated pipework
- Removing production and water injection pipeline subsea tie-in double spoolpieces and associated isolation valves at the Don manifold and Thistle
- Removing the water injection pipeline tie-in tee-piece
- Removing production and water injection pipeline subsea tie-in double spoolpieces and associated isolation valves at the Don manifold and Thistle
- Cutting out and removing sections of pipe that emerge out of the seabed back to stable buried pipe, so that there is no possibility of a snagging hazard
- Removing all features from the umbilicals (umbilicals cut back and buried)
- Removing flexiweight mattresses and grout bags at the Don manifold and Thistle

The workscope does **not** include:

- Grout formwork along the pipelines, which will remain in situ subject to successful over-trawlability trials
- Pipeline and umbilical Northern Leg Gas Pipeline (NLGP) crossings, which will be deferred until the NLGP is decommissioned
- Pipebridge, risers and associated topsides equipment at Thistle, which will be deferred until the Thistle Installation is decommissioned
- Drilling cuttings, which are not significant

2 Cost Estimates

The overall total cost is derived from cost estimates that have been developed for all aspects of the decommissioning activity. These estimates are based on data from contractors, detailed studies and standard industry data. The estimates indicate a range of uncertainty caused by a number of factors including the technical, safety and environmental risk detailed in the programme and also the contracting risk associated with the work yet to be completed.

The majority of the work associated with the Don Field Decommissioning Programme will be competitively tendered. The tendering activity will mitigate the commercial uncertainty currently in the estimate.

The overall total cost for the Don Field Decommissioning Programme is expected to be in the order of £150 million. This cost is expressed in 2009 values and includes allowances for engineering, project management and support costs.

3 References

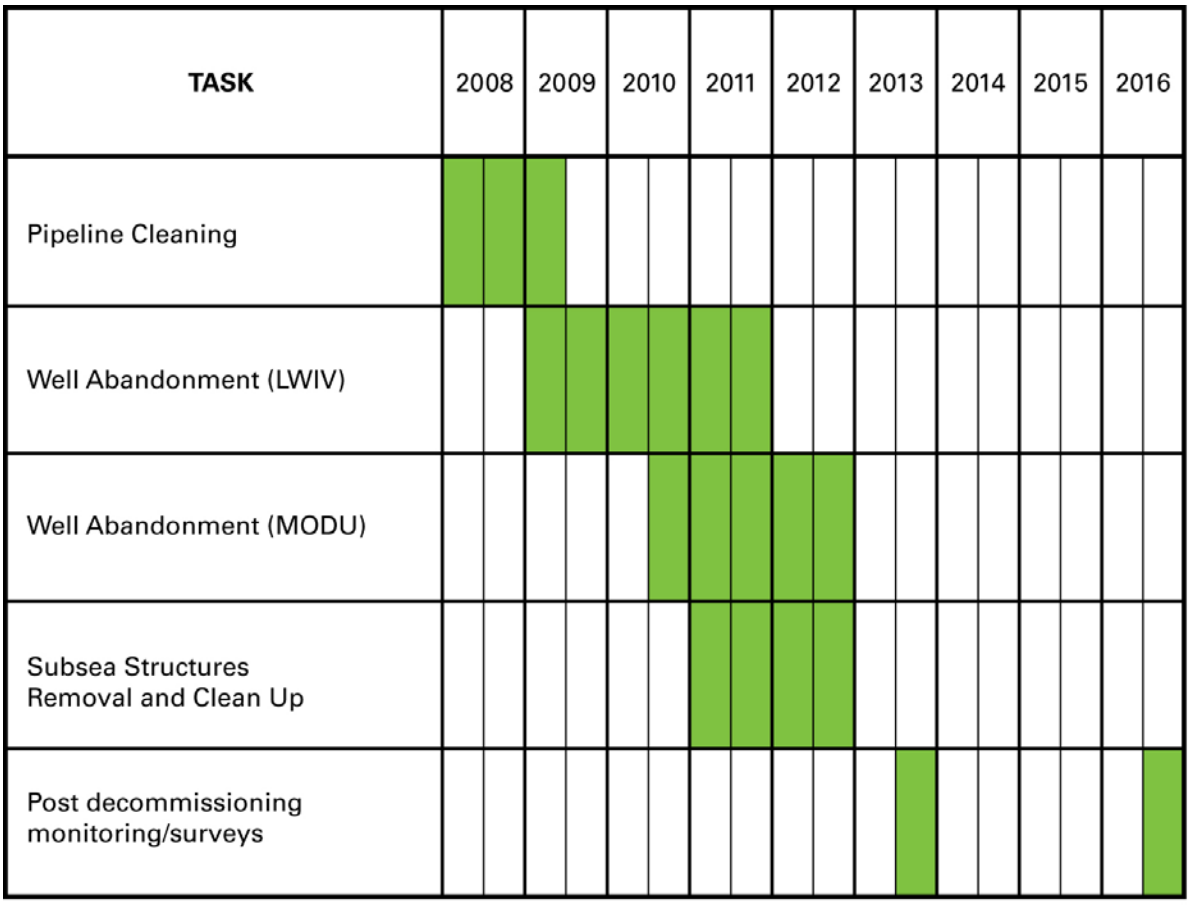
None.

Section 13
Schedule

1 Schedule

The indicative timeline for decommissioning the Don Field, as shown in Figure 13.1, has been developed taking into consideration the following:

- An appropriate timescale for regulatory approvals in accordance with the Department of Energy and Climate Change (DECC) Guidelines [13.1]
- The expected duration of decommissioning activities and the seasonal nature of the decommissioning and abandonment work
- Achieving the most efficient and cost effective way of executing the decommissioning activity, with the possibility of taking advantage of opportunities for 'bundling' with similar work in other projects



Note: Cessation of Production January 2005

Figure 13.1 Don Field Decommissioning Indicative Timeline

The offshore work programme for decommissioning will typically have the following main phases:

- **Pre-decommissioning Surveys**
- **Field Abandonment**

  This phase includes tasks performed before the abandonment of the wells and includes:

  – Flushing, disconnecting and recovering infield flowlines to isolate each well from the Don manifold and ultimately Thistle (flushing, disconnection and isolation tasks completed in 2009)

  – Disconnecting and recovering control and chemical umbilicals to isolate each well from the Don manifold and ultimately Thistle

  – Disconnecting pipelines from the subsea manifold after the pipelines have been flushed and cleaned to the required level of cleanliness

  – Recovering flexiweight mattresses and grout bags at the Don manifold and Thistle

  – Recovering the production and water injection tie-in spoolpieces and valves at Thistle and the Don manifold, water injection pipeline tie-in tee etc (refer to Section 10 for further details)

  – Recovering the Don manifold by DSV and cutting the manifold piles 3m below the existing seabed level

  – Cutting out and recovering sections of pipe that emerge out of the seabed back to stable buried pipe, so that there is no possibility of a snagging hazard

  – Removing all features from the umbilicals (umbilicals cut back and buried)

  – Performing over-trawlability trials on grout formwork that will be left in situ and made safe for other users of the sea

  – Performing a survey to identify any debris remaining on the seabed that might affect other users of the sea and removal of debris, if required

- **Well Abandonment**

  Reservoir abandonment and recovery of xmas trees

The programme plan will be updated during execution. This update will reflect performance, technology developments, market capability and resource availability.

2 References

[13.1] DECC Guidance Notes – Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, http://www.decc.gov.uk/.

Section 14
Licences Associated with the Disposal Option

1 Introduction

Approval of the Don Field Decommissioning Programmes is governed by the requirements of the Petroleum Act 1998, which is administered by the Department of Energy and Climate Change (DECC).

2 Permits and Consents

A Permits and Consents Register, developed by the Project Team, is used to control the permits and consents required to undertake the decommissioning work.

Management of the Permits and Consents Register is controlled by the project Safety Engineer. The register, and the Health, Safety and Environment (HSE) management system that controls its content and operation, will be audited and verified throughout the project to ensure compliance with internal and external requirements.

Items for inclusion in the Permits and Consents Register include, but are not limited to:

- Legislation, as listed in Paragraph 3
- Notification requirements to the Health and Safety Executive under Regulation 22 of the Pipeline Safety Regulations 1996 SI 1996 No 825
- Approval of a well abandonment programme in accordance with the obligation contained in the petroleum production licence

3 Relevant Legislation

The Don decommissioning project will be subject to the requirements of UK and EU legislation, in addition to other international treaties and agreements. The key pieces of legislation are:

- **Petroleum Act 1998**

  The Petroleum Act requires the Section 29 Notice Holders to produce a Decommissioning Programme through which permission to decommission may be granted. This is the primary legislation governing the project. The Decommissioning Programme must include a summary of the EIA.

- **OSPAR Decision 98/3** (the 'Sintra' agreement):

  The OSPAR Decision 98/3 prohibits the disposal of redundant installations at sea, but provides potential derogation from this requirement for a small number of more complicated circumstances.

  Note: Subsea installations are not separately identified in the Decision, but fall within the definition of a steel installation or a concrete installation.

In addition, offshore aspects of the project will be regulated by UK environmental regulation, in particular the:

- Offshore Chemicals Regulations 2002, SI 2002 No 1355
- Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005, SI 2005 No 2055
- Food and Environment Protection Act 1985
- Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007, SI 2007 No 1842
- Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999, SI 1999 No 360 (as amended by the Offshore Petroleum Production and Pipelines (Assessment of Environmental Impacts) (Amendment) Regulations 2007 SI 2007 No 933)

4 References

None.

Section 15
Project Management and Verification

1 Introduction

This section describes how BP, on behalf of the Section 29 Notice Holders, will manage the implementation of the Don Field Decommissioning Programmes and provide information to the Department of Energy and Climate Change (DECC) on the progress of the Decommissioning Programmes.

It also outlines the verification process that will be used to monitor the progress of the Decommissioning Programmes and ensure compliance with current regulations and working practices.

2 Project Management

2.1 Don Decommissioning Project Team

BP as the operator of the field will be responsible for the implementation of the overall project management. The Don Decommissioning Project Team will develop and implement the project from inception through to completion of all operations and final inspections of the site.

The BP Don Decommissioning Project Manager is responsible to the BP Decommissioning Manager for all activities associated with the decommissioning of the Don Field. The Decommissioning Project Manager's accountabilities include, but are not limited to:

- Overseeing the safety and well being of his/her people
- Delivering safe and reliable activities through quality planning
- Decommissioning preparations, driving standardisation of processes (where applicable)

2.2 Technical Execution

Work will be performed under relevant policies and procedures. Health, Safety and Environment (HSE) reviews and audits, personnel training and competence assessment are key elements within these policies and procedures.

3 Progress Reporting

Don Field decommissioning activities are intended to be managed in accordance with the project schedule (refer to Section 13) that will form the basis of progress reporting to the DECC.

BP will provide a quarterly written report on the progress of the decommissioning works to the DECC. This report will include information on the following topics:

- Health, Safety and Environment
- Highlights
- Overall Project Status
- Stakeholder Engagement
- Approvals
- Permits & Consents
- Structures Removal
- Waste Management
- Concerns
- Forthcoming Key Events
- Costs

Well abandonment progress will be reported to the Health and Safety Executive (Offshore Safety Division) on a weekly basis, in accordance with current legislation.

4 Verification

Specialist consultants will be engaged as required to ensure that satisfactory engineering and construction techniques are employed, and that work is performed to the satisfaction of the Section 29 Notice Holders and their insurers.

Well abandonment will be subject to well examination under Regulation 18 of the Design and Construction Regulations (DCR) [15.1].

Debris clearance activities shall be independently verified.

During 2011, verification activities will be undertaken to confirm that the Programme has been delivered. A close-out report will be produced within four months of the completion of offshore work, including debris clearance and post-decommissioning surveys.

5 References

[15.1] The Offshore Installation and Wells Design and Construction Regulations (DCR), SI 1996/No 913, http://www.opsi.gov.uk.

Section 16
Debris Clearance

1 Introduction

Once all facilities have been removed, post-decommissioning subsea clearance surveys and oilfield debris clearance will be carried out to ensure that the seabed is clear of obstructions that might affect fishing activities or other users of the sea.

Results of the debris clearance surveys and the seabed clearance certificates will be submitted to the Department of Energy and Climate Change (DECC).

2 Subsea Clearance Surveys

Once all decommissioning activities are complete, seabed clearance surveys will be carried out.

The areas covered by the surveys will be the area within the 500m zone around the Don Field subsea facilities and a 100m corridor either side of each pipeline.

3 Debris Clearance

Any non-consented oilfield-related debris that could interfere with other users of the sea will be removed.

The results of the debris clearance shall be independently verified.

4 References

None.

Section 17
Pre and Post-decommissioning Monitoring and Maintenance

1 Introduction

An important aspect of the decommissioning process is to understand the impact on the environment of the decommissioning process and to monitor the changes that will occur in the local region once all activities are complete.

2 Environmental Surveys

Results of the pre-decommissioning photographic survey of the drill cuttings can be found in RSK document number 60113 [17.1].

Two further surveys will be post (1 year and 4 years) the decommissioning activities. These surveys will assess the extent of the re-colonisation of the area and compare it against historic survey results. Additional surveys, if required, and time period between them will be agreed with the Department of Energy and Climate Change (DECC) after the decommissioning programme is implemented and the planned surveys delivered.

The scope of the post -decommissioning survey will be agreed with the DECC before the work is carried out and the survey results submitted to the DECC. The environmental survey is likely to be based upon the sample stations in historic survey to allow temporary recovery trends to be evaluated. Samples will be analysed for hydrocarbon, metals and other trace contaminants.

3 Monitoring of Remains

The Don Owners will ensure that the site remains free from obstructions. This will involve a monitoring programme to review the condition of the site, the structure and all other material left in situ, to ensure they remain as expected as a result of the Don Decommissioning Programme. The method of inspection will be the most appropriate available at the time of survey.

The first survey will be carried out within 1 year of completion of the decommissioning work to provide baseline survey data and a second survey will be carried out within 3 years of the initial post-decommissioning survey. A future survey regime will be determined in conjunction with the DECC, based on the analysis of the first two surveys.

4 References

[17.1] RSK Pre-decommissioning Photographic Survey of the Don Drill Cuttings, document number 60113.

Section 18
Supporting Studies

Company/ Organisation	Title/Description	Document No
Atkins Boreas	Review of BP Don Pipeline Decommissioning Options	BR07028/BP-235-A/Rev C, 22nd October 2007
Gardline Surveys	Don Cuttings Environmental Survey UKCS 211/18	5353, 01 July 1999
Lloyd's Register EMEA	Don Pipeline System Decommissioning Technical Report	R-658-40621-1B
Lloyd's Register EMEA	Don Field Pipelines QRA	
Lloyd's Register EMEA	Don Field Umbilicals QRA	
Stolt Offshore Limited	As-built Video	BP/DON/00/019-R
Stolt Offshore Limited	Don Field Trawl Damage Repair As-built Report	RE-ENG-397-303
Xodus AURORA	Don Decommissioning Environmental Impact Assessment/Environmental Statement	A-30171-S00-REPT-01-R01, June 2008

Annex
Letters from Section 29 Notice Holders

Britoil Public Limited Company

ConocoPhillips (UK) Theta Limited

bp

Trevor Garlick
Regional President
North Sea

BP Exploration Operating Company Ltd
North Sea Headquarters
1 Wellheads Avenue
Dyce
Aberdeen AB21 7PB

Thursday 5th May 2011

For the attention of:
Kevin Munro – Snr Manager
Department of Energy & Climate Change
Offshore Decommissioning Unit
Atholl House
86-88 Guild Street
Aberdeen
AB11 6AR

Direct (01224) 836905
Main 01224 832000
Mobile: 07901 510 803
garlict@bp.com

Dear Kevin,

Re: DON FIELD DECOMMISSIONING PROGRAMME PETROLEUM ACT 1998

We acknowledge receipt of your letter dated 7 April 2011, directing us to submit, jointly with our co-venturer, abandonment programmes for the Don field and pipelines within thirty days of your letter.

Britoil Public Limited Company support submission of the abandonment programme relating to the Don Field facilities Decommissioning as directed by the Secretary of State on 7 April 2011. The Programme will be issued to DECC once the formal letters of support are received from ConocoPhillips (UK) Theta Limited and these are incorporated in the document.

We confirm that we support the proposals detailed in the Don Field Decommissioning Programme dated May 2011 in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under Section 29 of the Petroleum Act 1998.

Yours Faithfully
For and on behalf of Britoil plc

Trevor Garlick
Regional President – BP North Sea

BP Exploration Operating Company Ltd
Registered in England & Wales No. 305943
Registered Office: Chertsey Road
Sunbury on Thames, Middlesex, TW16 7BP
7BP

Amoco (U.K.) Exploration Company
Inc. with limited liability in Wilmington
Delaware, USA, No. 05438-27
Branch Reg. in Scotland No. BR005086
Reg. Branch Address: Burnside Road, Farburn
Industrial Estate, Dyce, Aberdeen, AB21 7PB

ARCO British Ltd
Inc. with limited liability in
Delaware, USA, No. 722013007
Branch Reg. In England No. BR001713
Reg. Branch Address: Chertsey Road
Sunbury on Thames, Middlesex, TW16

ConocoPhillips

Andrew D Hastings
General Manager, Partner
Operated & Commercial
ConocoPhillips (U.K.) Theta Limited
Rubislaw House
Anderson Drive
Aberdeen AB15 6FZ

Tel: 01224 205000
Fax: 01224 205222

4th May 2011

Kevin Munro
Department of Energy and Climate Change
Offshore Decommissioning Unit
3rd Floor
Atholl House
86-88 Guild Street
Aberdeen
AB11 6AR

Dear Kevin

Don Field Decommissioning Programme Petroleum Act 1998

We acknowledge receipt of your letter dated 7 April 2011.

We, ConocoPhillips (UK) Theta Limited confirm that we authorise Britol Public Limited Company to submit on our behalf an abandonment programme relating to the Don Field facilities Decommissioning Field facilities as directed by the Secretary of State on 7 April 2011.

We confirm that we support the proposals detailed in the Don Field Decommissioning Programme dated May 2011, which is to be submitted by BP Exploration Operating Company in so far as they relate to those facilities in respect of which we are required to submit an abandonment programme under Section 29 of the Petroleum Act 1998.

Yours sincerely

Andrew D Hastings
General Manager, Partner Operated & Commercial

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