



TP1 OPERATIONS MANUAL	Ref. No.: TP1V11
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SECTION 1 - INTRODUCTION	Revision No. : 3
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1.1.1

LOCATION

1.1.2

CENTRAL COMPLEX PLATFORMS



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1.1.1 LOCATION

The Frigg Field is a natural gas field which straddles the line dividing the Norwegian and UK sectors of the North Sea continental shelf. It lies within concession Blocks 25/1 and 10/1 between latitudes 59° 48' and 60° 00' N and between longitudes 01° 97' and 02° 15' E (European Datum 1960). The field lies 190km from the Norwegian coast and 360km from the Scottish coast.

1.1.2 CENTRAL COMPLEX PLATFORMS

The Central Complex of the Frigg Field comprises three installations, each of which is described below.

Platforms QP and TP1 are UK registered installations whilst TCP2 is Norwegian registered.

The Quarters Platform (QP) is registered as 10/1 - FRIGG - QP as an offshore installation. It is a steel jacket type structure of four tubular legs and stands in 104m of water. It is equipped as a living quarters and is capable of accommodating 136 persons.

Treatment Platform 1 (TP1) is registered as 10/1 - FRIGG - TP1 as an offshore installation. It is a concrete gravity structure comprising a skirt, base and caisson surmounted by two columns supporting a steel deck and stands in 103m of water. Gas produced and treated on the Alwyn Field platforms is transported via TP1 to the St Fergus Gas Terminal on the Scottish coast through the 32in line or via TCP2.

Treatment Compression Platform 2 (TCP2) is registered as 25/1 - FRIGG - TCP2 as an offshore installation. It is a concrete structure with a hexagon caisson base surmounted by three columns supporting a steel deck and stands in 104m of water. Gas produced by DP2, East Frigg, Lille Frigg and Frøy is treated on this platform before being transported to the St Fergus Gas Terminal on the Scottish coast. Condensate from Lille Frigg and East Frigg and the oil from Frøy is transported in the Frostpipe via Oseberg to the Sture Terminal outside Bergen.

QP and TCP2 are each linked to TP1 by separate bridges.



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DIAGRAM

Other Frigg Field Platforms



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1.2.1 OTHER FRIGG FIELD PLATFORMS

The platforms outside the Central Complex but which are included in the Frigg Field comprise two drilling platforms, each of which is described below.

Concrete Drilling Platform 1 (CDP1) is registered as 10/1 - FRIGG - CDP1 as an offshore installation. It is a concrete structure standing in 97m of water. This platform is no longer operational.

Drilling Platform 2 (DP2) is registered as 25/1 - FRIGG - DP2 as an offshore installation. It is an eight-legged steel lattice structure anchored by piles and stands in 98m of water.

The platform serves as a support for 24 wells:

- 23 gas producing wells (10 are currently producing and 13 are temporarily plugged);
- 1 injection well for produced water.

There is also a small living quarters which is sealed off, and no longer in use. DP2 is located approximately 800m north of TCP2.

CDP1 is a UK registered installation and DP2 Norwegian registered.

1.2.2 SATELLITE FIELDS

The Central Complex receives gas from the following Frigg satellite fields:

- East Frigg: This subsea production facility is located in the Norwegian sector of the North Sea in concession Blocks 25/1 and 25/2 and is approximately 18km east of the Central Complex.
- Lille Frigg: This subsea production facility is located in the Norwegian sector of the North Sea in concession Block 25/2 and is approximately 22km north west of the Central Complex.
- Frøy: This unmanned wellhead platform is located in the Norwegian sector of the North Sea in concession blocks 25/2 and 25/5 and is approximately 35 km south-east of the Central Complex.

1.2.3 INTERCONNECTED FIELDS

The Central Complex receives gas from the following outlying fields:

- Alwyn: This is located in concession Block 3/9 in the UK sector of the North Sea and is approximately 111km north-west of the Central Complex.

The Central Complex exports gas from the above-mentioned fields to St. Fergus, and Lille Frigg condensate and Frøy oil to Oseberg via the Frostpipe pipeline.



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1. GENERAL
2. DESCRIPTION



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1. GENERAL

The Frigg Field installation produces, treats, meters and exports natural gas to St. Fergus terminal. At St. Fergus the gas is further treated before it is distributed to consumers through the British Gas Council network.

2. DESCRIPTION

Gas from 11 producing wells on DP2 passes through one 26" flowline to TCP2. The scrubber desanders installed downstream of each wellhead on DP2 are now bypassed, apart from well A22A where the scrubber is still in operation for observation reasons.

A maximum wellhead pressure of 172 barg and a gas flow rate of 2.0 to 2.5 MMSCMD has been allowed for in the design of scrubber desanders, valves and pipework. Two wells (well 22/24) on DP2 are used for observation purposes and one well (well 3) is for liquid injection (including methanolated water from ODIN, NEF and East Frigg) from TCP2.

Gas produced by NEF and EF is transported to TCP2 through a 16" and a 12" pipeline for treatment and compression before being transported to St. Fergus terminal. Gas produced by Odin is transported to TCP2 through a 20" line for treatment and compression before being transported to St. Fergus.

The gas produced and treated on the Alwyn field is transported to TP1 through a 24" line then transferred to the 32" sea line on its way to St. Fergus terminal. There is also the facility to transfer the Alwyn gas to St. Fergus from TCP2 via the TP1/TCP2 dry gas Interconnection Line.

On TCP2 the gas is treated to prevent water condensation and hydrate formation during its transportation to St. Fergus. Gas compression equipment is installed to boost gas pressure prior to dehydration and pipeline export to St. Fergus. Three parallel treatment streams are installed; each designed for a maximum flow of 15MM SCMD. Two streams are available for operation, one stream is passivated. Each stream contains a separator, glycol contactor and glycol regeneration unit. In addition one FWKO vessel is implemented in the Odin stream process equipment.

A 32" dry gas interconnection is provided between TP1 and TCP2. Thus after the gas has been metered it can be exported through the sub-sea line of either platform to St. Fergus. This 32" line may also be used to equalize the pressure between the export lines, if required.

When exporting to St. Fergus terminal via TP1 platform there is the facility to inject condensate into the line from TCP2 through a 3in interconnection line between TCP2 and TP1.

In addition to the main interconnection lines between TP1 and TCP2, the following interconnection lines are installed.

- A 3in line to transfer slops from V47 on TP1.
- A 3in line for methanol transfer to/from TCP2.
- A 2in line to transfer the sump from V13 on TP1.
- A 2in line for glycol transfer to/from TCP2.



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2. DESCRIPTION (cont.)

In an emergency, gas can be flared through the flare platform (FP) at a very high rate to depressurize TCP2 platform. TP1 is connected to FP by a 24 inch subsea line; TCP2 is connected into the start of the sea line on TP1 via the inter-platform bridge. FP is certified for a continuous flow rate of 10 MMSCMD with a maximum allowable short period flow rate of 34 MMSCMD. As the flaring of the gas only takes place as of an emergency or major process upset, FP normally operates as a cold flare. The ingress of air and hence the formation of an explosive mixture is prevented by sweeping the system with nitrogen at a continuous flowrate of 2400 SCMD.

A 20 inch diameter cold vent stack is provided on TP1 as a back-up to the main flare platform, but depressurization must be limited to 6 MMSCMD when this is in use.

This back-up system has been modified to handle low temperature gas as a result of ALWYN gas arriving on TP1 at low temperature. Consequently the cold vent system acts as a permanent relief system for equipment and piping handling cold gas as well as being a back-up system for the flare platform.

On TP1 all relief lines from live systems are directed to LT relief system (V47), as the HP relief system is passivated.

Control and display devices for the Frigg Field process installation, NEF, EF, ODIN and ALWYN are contained on QP. More advanced equipment, the FCDA is installed both in CCR on QP, and in Compression Control Room on TCP2, to operate the East Frigg process equipment.