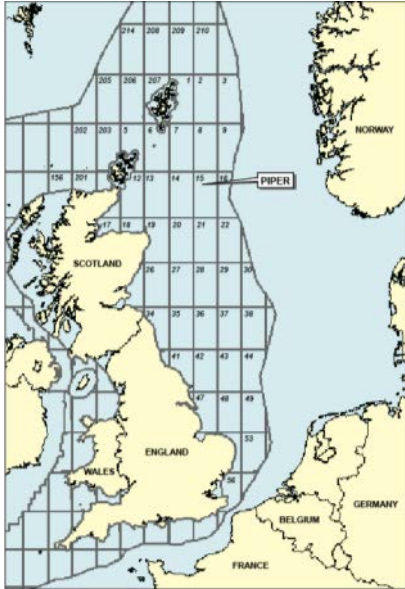


PIPER



Last Updated:

September 2018

The Piper field lies in block 15/17n of the United Kingdom Continental Shelf located 193km north east of Aberdeen in the Central North Sea. Located at co-ordinates 58°27'41"N, 00°15'04" E, the Piper 'B' platform stands in approximately 145m of water. Piper 'B' is an eight-legged fixed steel jacket supported platform. The Piper 'B' Platform was installed in 1992, and commenced production in February 1993.

Piper 'B's process facilities separate production from the Piper, Saltire, Chanter, Iona and Tweedsmuir reservoirs into oil, natural gas liquids (NGLs) and dry gas. The platform processes oil and condensate for onward transmission to Flotta Terminal. Piper receives gas for fuel gas provision from the Frigg gas network when required.

OPERATIONAL INFORMATION

Licence	P.220
Licensees	Repsol Sinopec Resources UK Limited (Op) 20.2770% Repsol Sinopec North Sea Limited 36.6670% Transworld Petroleum (U.K.) Limited 23.5000% Repsol Sinopec Alpha Limited 19.5560%
Platform Type	Eight-legged steel jacket
Platform Weight	Topside: 33,932 tonnes Jacket: 27,550 tonnes TOTAL: 61,482 tonnes
Drilling	Platform slots: 24 Pre-drilled wells: 8
Wells	Production: 12 Injection: 5
Nearest Installations	Saltire: 7.4 km Tartan: 18 km Claymore: 35 km
Associated Fields	Tweedsmuir: Subsea Tieback, 2 producers + 2 injectors Chanter*: 1 producer + 1 injector (drilled from Saltire) Iona*: 1 producer (drilled from Saltire) Saltire*: Oil and gas processing Dumbarton**: Gas received for processing

*Chanter, Iona and Saltire not currently producing.

**Gas export from Dumbarton currently suspended.

CAPACITY PROJECTION

The platform process system is nominally designed for the following quantities:

Description	Unit	Max Capacity	Projected ullage (% of maximum capacity)				
			2018	2019	2020	2021	2022
Piper Separator	BPD	212,000	●	●	●	●	●
Tweedsmuir Separator	BPD	57,000	●	●	●	●	●
Oil Export	BPD	140,000	●	●	●	●	●
Piper Produced Water	BPD	220,000	●	●	●	●	●
Tweedsmuir Produced Water	BPD	36,500	●	●	●	●	●
Piper Water Injection	BPD	107,000	●	●	●	●	●
Piper 1 st Compressor	MMscfd	140	●	●	●	●	●
Piper Sweetening	MMscfd	140	●	●	●	●	●
Tweedsmuir 1 st Compressor	MMscfd	140	●	●	●	●	●
Tweedsmuir Sweetening	MMscfd	54	●	●	●	●	●
2 nd Stage Compression	MMscfd	140	●	●	●	●	●
Gas Dehydration	MMscfd	108	●	●	●	●	●
NGL recovery	MMscfd	108	●	●	●	●	●
3 rd Stage Compression	MMscfd	84	●	●	●	●	●

Available Capacities:	●	> 25%
	●	5% to 25%
	●	< 5%

PRIMARY SEPARATION PROCESSING FACILITIES

Piper

The Piper fluids are separated in the Piper Separator operating at a pressure of circa 9 barg at 70°C. The oil phase is drawn from the separator by the Piper Booster Pumps and pumped via the Metering Package to the MOL suction manifold. MOL Pumps pump the final production through the subsea pipeline to the Flotta Terminal.

Off-gas from the Piper Separator is cooled in the Piper Separator Gas Coolers resulting in some condensate and water drop-out. The condensate is removed in the Piper Condensate KO Drum and returned by the Piper LP Condensate Pumps to the Piper Separator. The off-gas from the condensate knockout drum passes to the 1st stage gas compression facilities.

The produced water separated in the Piper separator is routed to the produced water clean-up facilities comprising the Hydrocyclone Package and produced Water Degasser prior to discharge overboard.

Tweedsmuir

Tweedsmuir fluid bulk gas / liquid separation occurs in the Slug Suppression System which operates at about 11 barg. The gas is routed via the Tweedsmuir Condensate KO drum to the Trim Cooler for further water/condensate removal.

The liquids from the Slug Suppression System are routed via the Tweedsmuir Heater to the 3-phase Tweedsmuir Separator. The gas from the Tweedsmuir Separator flows to the Tweedsmuir KO drum either directly (Separator in HP mode) or via Eductor (Separator in LP mode). Eductor is used for pipeline depressurisation and Cold Restart.

Oil from the Tweedsmuir Separator is routed to Crude Oil Booster Pumps and is then metered and exported via the MOL Pumps to Flotta with the Piper oil.

Produced water from the Tweedsmuir Separator is passed through hydrocyclones and a degasser before being discharged overboard.

GAS TREATMENT FACILITIES

Gas originating from the Piper B and Tweedsmuir Oil Separation Systems undergoes compression and treatment processes to make it suitable for use as:

- Lift Gas for Piper B and Tweedsmuir fields
- Platform fuel gas
- Export/sales gas

Gas treatment consists of sweetening, dehydration and NGL recovery. In gas sweetening, H₂S/CO₂ are removed by passing gas against Amine solution (MDEA in Piper B GSP & UCARSOL AP806 in Tweedsmuir GSP) in a contactor tower. The gas from the Piper and Tweedsmuir Oil Separation Systems is treated by dedicated gas sweetening systems. In gas dehydration, water is removed by adsorption onto a molecular sieve bed. Finally, NGLs are removed by cooling of the gas as it expands across Joule Thomson (J-T) valves.

Treated gas which is surplus to lift gas and fuel gas requirements is exported to onshore facilities.

PIPELINES

Oil Export	30" * 33.8km Joins main oil line to Flotta Pipeline 4.5km
Gas Export	16" * 1.8km + 18" * 53km Joins gas pipeline system to St Fergus Terminal and links in to the Claymore gas import line
Piper 'B' – Saltire	40" * 7.4km Interfield Pipeline Bundle containing: 10" multiphase oil/gas import from Saltire 16" water injection to Saltire 8" gas lift to Saltire All of these pipelines are not in service Power supply is provided to Saltire.
MacCulloch Oil Pipeline	10" * 35km (Not in service)
MacCulloch Gas Pipeline	6" * 35km (Not in service)

ENTRY SPECIFICATION

Subject to discussion and negotiation with Flotta Terminal

EXIT SPECIFICATION

Crude Oil Export

Set by Flotta Pipeline System entry requirements

Gas Export

Set by St Fergus entry requirements

Produced Water (Prevention of Oil Pollution Act 1971)

< 30 mg/L oil in water