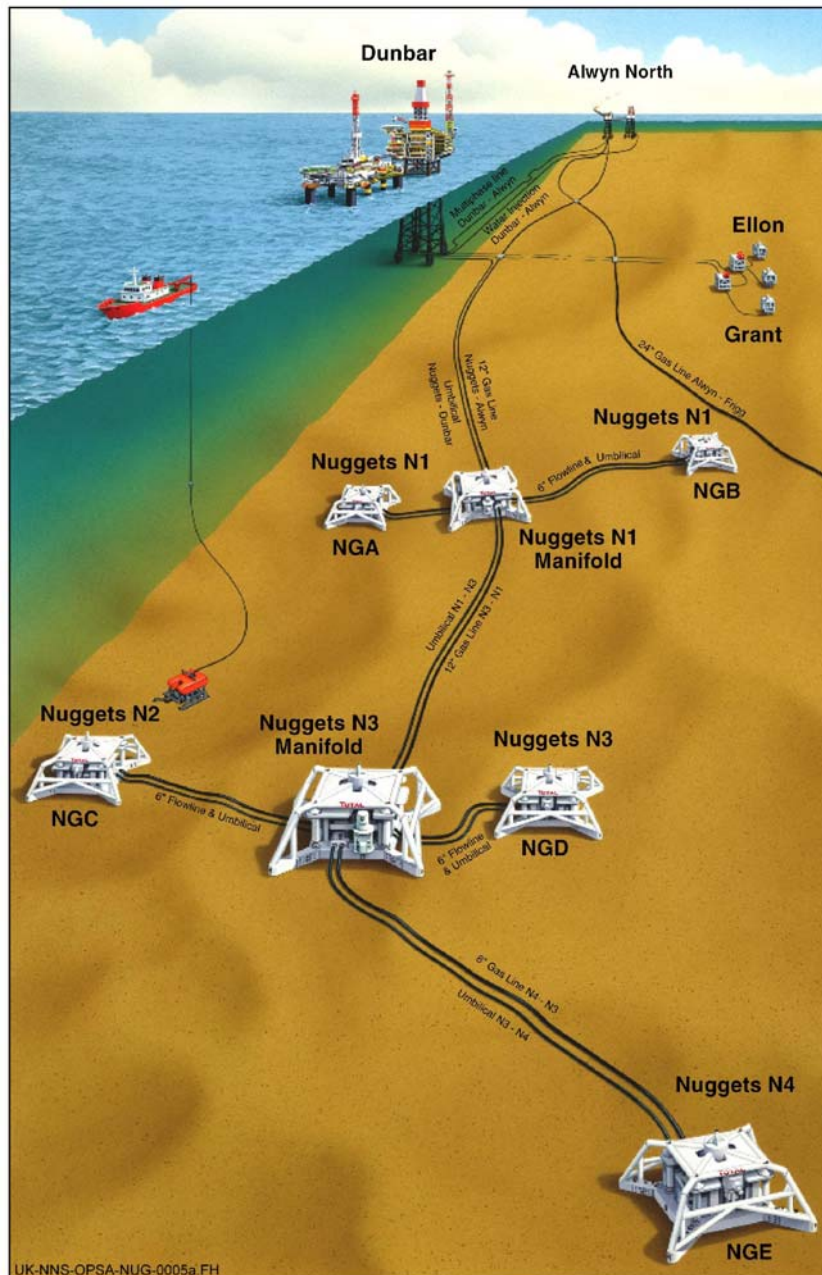


NUGGETS

Northern North Sea Nuggets Complex Subsea Development



The Nuggets field lies around 20 kilometres south of Dunbar and was discovered between 1972 and 1991. It is a development of four gas-bearing accumulations – N1 with two wells and N2, N3 and N4 with one well each. The five wells produce up to 6.0 million standard cubic metres of gas per day (36,600 barrels of oil equivalent per day).

The five isolated subsea wells that make up the Nuggets cluster are tied back via subsea pipelines to the Alwyn North platform, but controlled via the Dunbar platform. From Alwyn North, Nuggets' gas is exported via the Frigg UK line to the St Fergus Gas Terminal for processing and distribution.

N1, N2 and N3 began production in November 2001. N4, which is tied back via a 13-kilometre subsea pipeline to the N3 manifold, came onstream in October 2003. At a total length of 67 km, the Nuggets N4 tieback is the longest in the UK sector of the North Sea.

NUGGETS – FACTS & FIGURES

Block:	3/19a, 3/20a, 3/19b, 3/18, 3/24c, 3/24a, 3/25a; UK sector
Licence Number:	P.239, P.118, P.491, P090
Location:	400km north east of Aberdeen (approx 40 – 70 km south of Alwyn)
Operator:	TOTAL E&P UK Limited 100%
Date of Discovery:	N1 1972, N2 1989, N3 1991, N4 1974
Production Start:	November 2001
Original Estimated Recoverable Reserves:	Gas: 10.6 billion cubic metres (without N4)
Fist Year of Peak Production:	2001
Peak Production:	Gas: 1.83 billion cubic metres (without N4)
Water Depth:	110 -125 m
Estimated Gas Recovery Factor:	55%
Produced Water*:	Nil
Gas Production*:	4.35 million cubic metres per day/ 153 million standard cubic feet per day
Gas Gravity:	0.55 Specific Gravity relative to air
Sulphur:	Negligible
Nuggets Production Wells:	5
Transport System:	Pipeline to St Fergus via Alwyn and Frigg UK pipeline

**2007 figures*

ADDITIONAL INFORMATION

The reservoirs, discovered between 1972-1991, are called Nuggets N1, Nuggets N2, Nuggets N3 and Nuggets N4. They contain dry gas (99% methane) with a low proportion of liquid hydrocarbons (condensate) and water. Nuggets 1, the largest of the four Nuggets discoveries, along with Nuggets 2 and 3 was the first to be developed.

The de-bottlenecking of the gas plant on the Alwyn North platform, which was completed in 1999, increased processing capacity on the platform. This allowed the Nuggets fields to be developed.

The Nuggets N1 accumulation is exploited from two producing wells, 3/19a-NGA and 3/20a-NGB, located about 3.2 kilometres apart. They are connected by individual 6" pipelines to a small gas collection point/manifold. The N1 manifold is in turn linked by a 12" pipeline which transports the Nuggets gas the 40-kilometre distance to the Alwyn North platform. Exploitation of N2, N3 and N4 is by similar means with the five producing wells tied to a main pipeline by individual flowlines via two manifolds at N1 and N3 locations.

A 3" pipeline was piggybacked onto the main 12" trunk-line in order to supply hydrate inhibitor (chemicals to prevent ice-like crystals or hydrates forming inside the pipeline) from Alwyn North to the wellheads.

Electric and hydraulic power, controls, corrosion inhibitor (chemicals to protect the equipment from corroding) and methanol (hydrate inhibitor) is provided via a 19-kilometre umbilical from the Dunbar platform. The controls tie in with the existing fibre-optic link between Dunbar and Alwyn and enables wells to be controlled by Alwyn North.

The Alwyn North platform processes the gas received from Nuggets and sends out hydrate inhibitor to the wells. The only physical changes that needed to be made to the Alwyn North platform to enable it to handle the Nuggets gas was minor tie-in modifications, provision of a new dedicated receiving vessel, Nuggets dedicated facilities for storage and injection of hydrate inhibitor and temporary facilities for receiving pipeline pigs.