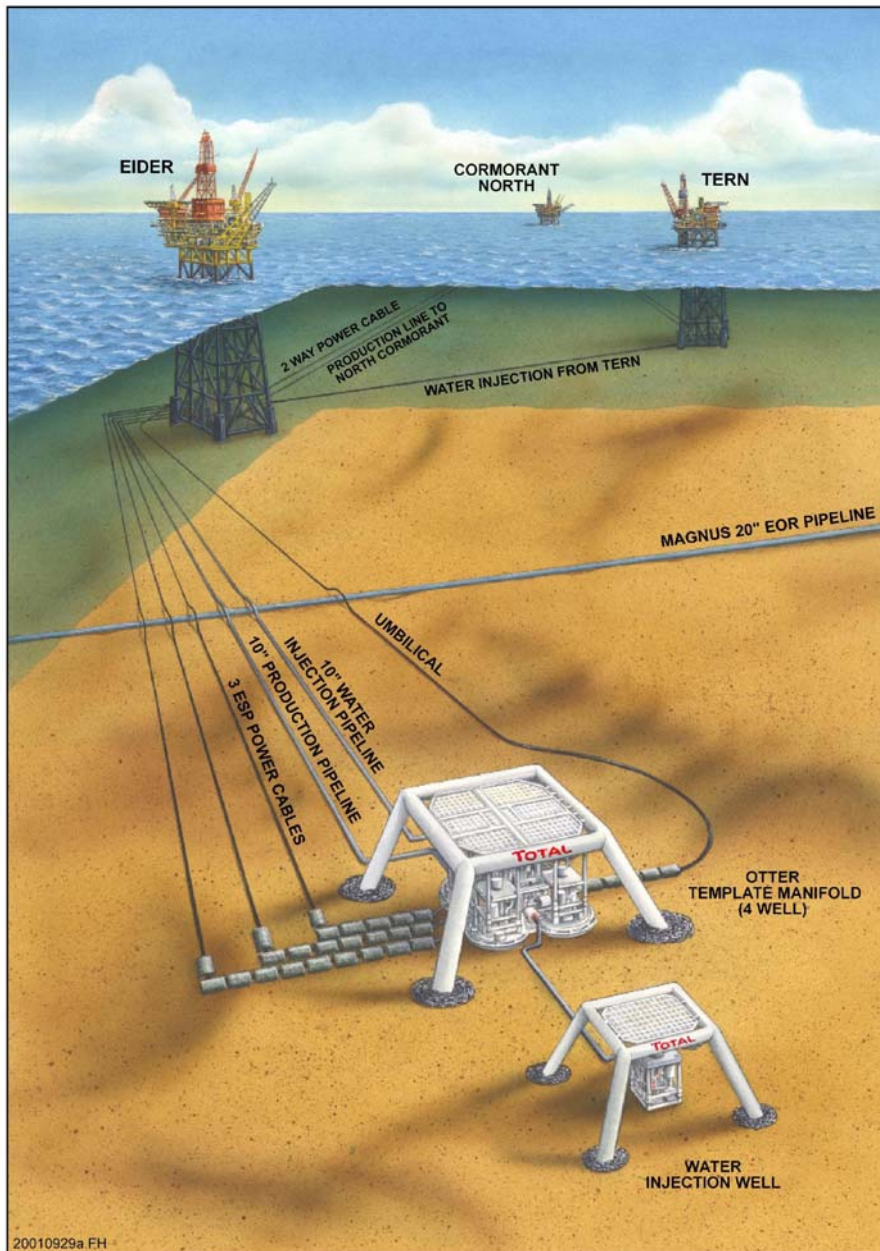


## OTTER

### Northern North Sea Otter Subsea Development



The Otter field lies 150km north east of Shetland, in a water depth of 182m making it one of the most northerly and deepest subsea tiebacks in the UK sector of the North Sea. First oil flowed in Q4 2002; the plateau production rate was around 30,000 barrels of oil per day.

The development, which is tied back to Shell's Eider platform, comprises five subsea wells – three oil producers and two water injectors. Oil is exported to the Sullom Voe Oil Terminal in Shetland via the Brent system while gas is exported to the St Fergus Gas Terminal via the Shell-operated FLAGS system.

Otter is a prime example of how technical innovation and commercial effectiveness within the oil and gas industry can unlock the stranded reserves of the UKCS. The development of Otter not only added new reserves but also extended the life of field of Eider.

## OTTER – FACTS & FIGURES

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<b>Block:</b>	210/15a; UK Sector	
<b>Licence number:</b>	n/a	
<b>Location:</b>	150km north east of Shetland	
<b>Licensees</b>	TOTAL E&P UK Limited (operator)	54.296%
	(Fina Exploration Ltd, Fina Petroleum Developments Ltd)	
	Dana Petroleum (E & P) Ltd	19.004%
	Esso Exploration and Production UK Limited	13.350%
	Shell UK Ltd	13.350%
<b>Date of Discovery:</b>	1977	
<b>Water Depth:</b>	182m	
<b>Production Start:</b>	13 October 2002	
<b>Production*:</b>	<b>25,000</b> barrels per day/ <b>3,975</b> cubic metres per day	
<b>Produced Water:</b>	0	
<b>Gas Production*:</b>	<b>0.3</b> million cubic metres per day	
<b>Gravity:</b>	36° API	
<b>Sulphur:</b>	0.34% wt	
<b>Production Wells:</b>	<b>3</b>	
<b>Injector Wells:</b>	<b>2</b>	
<b>Pipelines:</b>	21-kilometre 10" production flowline Otter to Eider. 21-kilometre 10" water injection flowline from Eider (injection water is provided by Tern) to Otter. Umbilical for electro-hydraulic control and supply of chemicals from Eider to Otter.	
<b>Transportation:</b>	Fluids are exported from Eider to North Cormorant via 12" pipeline and onward to Sullom Voe via the Brent System.	

*\*2007 figures*

## ADDITIONAL INFORMATION

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Hydrocarbons are exported from Otter via Eider to North Cormorant using an existing 12" pipeline and onward to Sullom Voe in Shetland via the Brent and FLAGS system.

The development comprises of five subsea wells (three oil producers and two water injectors) tied back to the Eider platform by a 21km, 10-inch production flowline. Artificial lift is provided by dual subsea electric submersible pumps (ESPs) installed in each of the producers. They are powered from Eider by three separate electrical cables. There is an umbilical line from Eider for the electro-hydraulic control and supply of chemicals and a 10-inch water injection line from Eider; the injection water is supplied from Tern Alpha.

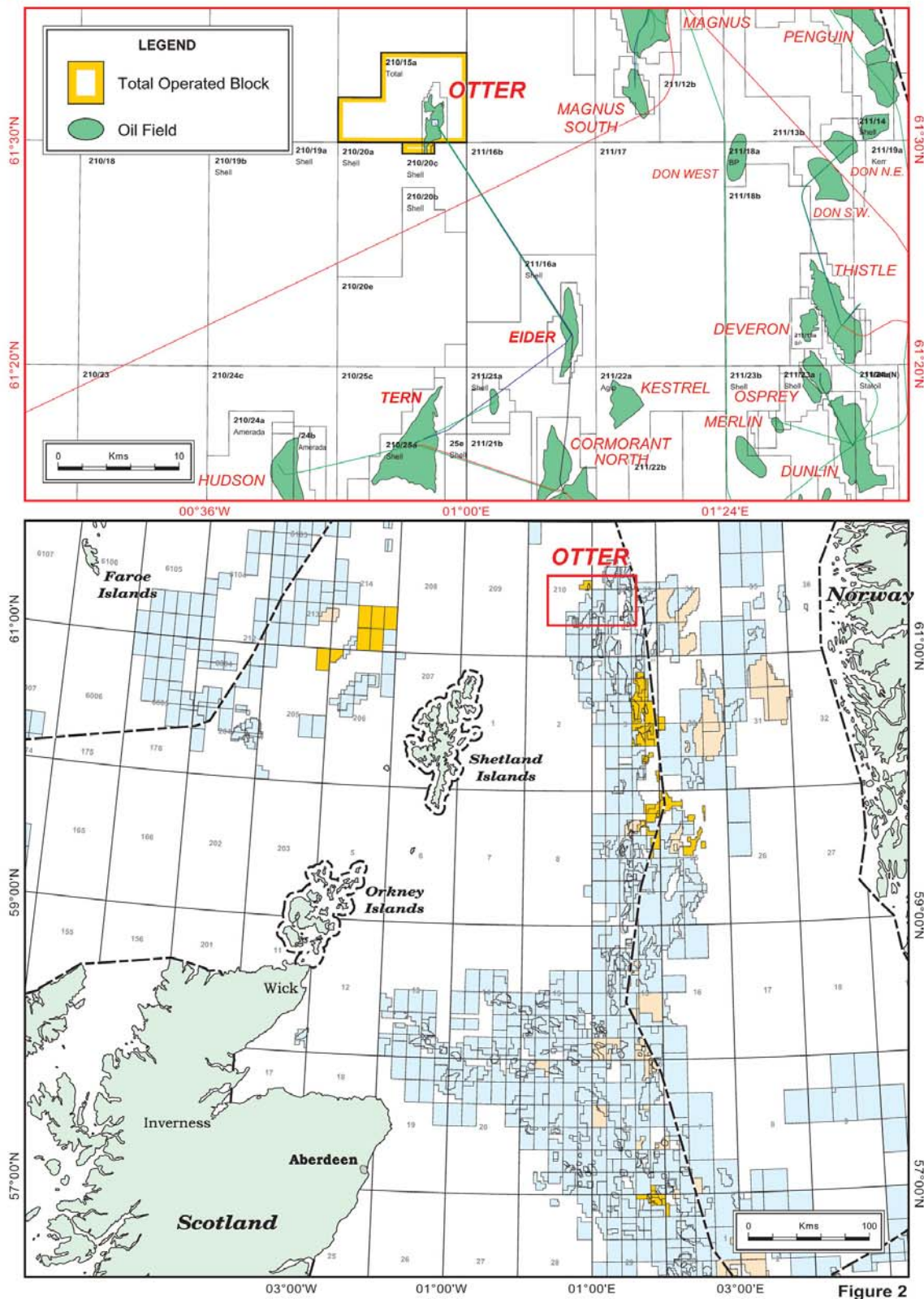
In order to provide flow assurance and protect the facilities, during the field life the production flowline is insulated and biocide is injected regularly into the water injection flowline. Extensive chemical injection facilities are provided in order to supply chemicals to injection points both downhole and at the template manifold to provide wax, hydrate, scale, emulsion and corrosion inhibition.

TOTAL E&P UK Limited and its co-venturers claimed a world first in installing dual ESPs in a subsea well. Moreover, at 21.5km it is the longest subsea tieback installed to date utilising ESPs. The artificial lift accelerates production and increases overall reserves while the second, back-up pump system in each of the producers allows for additional operational flexibility and redundancy.

Development and production consent for Otter was granted in July 2001. The project/construction phase consisting of the engineering, procurement and installation of the subsea and topsides facilities was completed in September 2002. First production was on 13 October 2002.



## Northern North Sea - Block 210/15a - Otter Field Location Map



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21 August 2003