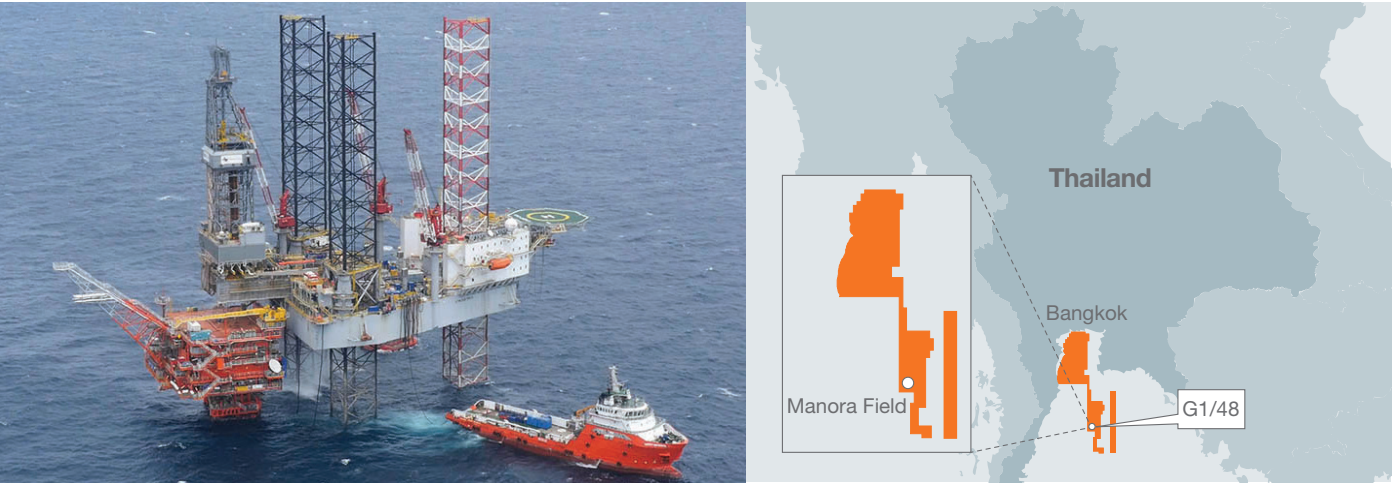




## Manora Field

### Block G1/48 – Gulf of Thailand



**Mubadala Petroleum holds a 60 percent interest in the G1/48 concession and is the operator. The remaining interest is held by Tap Energy (Thailand) Pty Ltd (30 percent) and Northern Gulf Petroleum Pte Ltd (10 percent).**

The Manora oil field started production on 11 November 2014. 2016 average year to date production is around 11,500 bopd. The field is situated approximately 80 kilometers offshore of Prachuap Khiri Khan Province. Manora was discovered in 2009 (Manora-1) and further appraised by three wells (Manora-2, -3, & -4) in 2010.

The development concept was selected in late 2011 and subsequently sanctioned in July 2012. The facilities include a wellhead processing platform with water injection facilities to maximize oil recovery. The oil is

stored in a floating storage and offloading (FSO) vessel and exported via shuttle tanker. The development project was completed with a significant safety record of 4,5 million man hours without a lost-time-incident (LTI) and since start of production the operation has achieved over 1 million man hours without LTI.

In June 2016 the offshore development gained accreditation of two major international safety and environmental standards ISO 14001 and OSHAS 18001.

Proved and probable reserves contained in Manora's primary reservoir, and recoverable by natural depletion, are estimated to be in the order of 20 million barrels (gross).

The production area (PA) of 161.14 square kilometers and the environmental impact assessment (EIA) were officially granted by the government in July 2012.



## Petroleum geology

<b>Basins</b>	Kra basin
<b>Source</b>	Oligocene and Early Miocene lacustrine algal shales
<b>Reservoirs</b>	Early Miocene lacustrine (main reservoirs) and Middle to Late Miocene fluvial (secondary reservoirs) sandstones
<b>Trap</b>	Three-way fault and dip closed hanging wall trap
<b>Seal</b>	Intra-formational Miocene shale



## Project details

<b>Name &amp; location of project</b>	Manora Field, Block G1/48, Gulf of Thailand
<b>Operator/developer</b>	MP G1 (Thailand) Limited
<b>Project description</b>	Greenfield offshore oil development in 44 meters water depth, producing from three sandstone reservoirs between 1,630 – 2,260 meters. Associated gas is utilized for power generation on the facilities and produced water is reinjected back into the reservoirs. A 4-pile single wellhead processing platform feeds crude oil to a floating storage and offloading (FSO) vessel via 8 inch diameter submarine pipelines for export.
<b>Upstream facilities</b>	Manora wellhead processing platform A (MNWPP-A): <ul style="list-style-type: none"><li>• 30 well slots<ul style="list-style-type: none"><li>- “10” production wells (main reservoirs) and shallow secondary reservoirs</li><li>- 4 water injection wells (main reservoirs)</li></ul></li><li>• Production facility capacity of 30,000 blpd</li><li>• Water injection system capacity of 30,000 blpd</li></ul>
<b>Export pipeline &amp; receiving facilities</b>	2 km x 8” diameter submarine pipelines (oil export/return lines) to FSO. Crude oil is exported via shuttle tanker from Manora FSO.
<b>Dates of commercial operations</b>	First production 11 November 2014
<b>Offshore personnel</b>	Normal complement of 20 persons for operation of MNWPP. The FSO has a total of 80 beds for field production and crew.