

PS Preparing for Success: Offshore Heavy Oil Appraisal and Development Analogues*

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Abstract

In anticipation of moving forward with an appraisal and development phase because of Staatsolie current Nearshore exploration campaign, several offshore heavy oil appraisal and development analogue cases have been studied. Shallow marine/coastal clastic reservoirs at depths of 800-1000 meters below seabed with expected multi-Darcy permeabilities and oil viscosities in the 100-500cp range for our expected crude type of 16° API is what has been anticipated for the Nearshore Exploration blocks. Based on this prediction a listing of analogue fields was developed together with a 3rd party benchmarking tool. Based on available papers the listing was further reduced to thirteen analogues of offshore heavy oil appraisal campaigns and summarized. From the study the following can be concluded, unfavorable production outcomes need to be derisked appropriately in one phase, before moving onto the next phase. For the uncertain production behavior, conduct a long-term flow deliverability assessment, Extended Well Testing (EWT) or an Early Production System (EPS). Horizontal well technology is the selected option for the heavy oil offshore field developments. An EPS can facilitate early field development at reduced costs. A Value-Of-Information calculation is an effective method to evaluate the benefit of an EWT/EPS.

Preparing for Success

Offshore Heavy Oil Appraisal & Development Analogues

In anticipation of moving forward with appraisal & development, as a result of Staatsolie's current exploration campaign in the nearshore area, numerous offshore heavy oil analogues have been studied. The seven most relevant are presented here, based on our expectations:

- Shallow marine or coastal clastic reservoirs
- Depths below seabed of 800-1000 m
- Multi-Darcy permeabilities & oil viscosities in 100-500 cp range
- Crude type of ca. 16° API gravity

Phased development is key to de-risk potential unfavourable production outcomes. Long-term flow deliverability can be assessed via Extended Well Testing (EWT) or an Early Production System (EPS). The latter can also facilitate early field development at reduced costs.

Legend

- 🔍 Year of discovery (company)
- 🏠 Year of first oil
- 💧 API gravity (viscosity)
- 📊 Recoverable volume
- 🌊 Aquifer type
- 📋 Well testing method
- 🏗️ Water depth
- 📈 Estimated plateau production

Bentley (U.K.)

Whalsay Energy

- 🔍 1977 (Amoco)
- 🏠 -
- 💧 10-12 API (1,500 cP)
- 📊 131 MMstb (p50)
- 🌊 Bottom
- 📋 DST & EWT
- 🏗️ 131 m
- 📈 -

Peregrino (Brazil)

Equinor & Sinochem

- 🔍 1994 (Petrobras)
- 🏠 2011
- 💧 14 API (163 cP)
- 📊 300-600 MMstb
- 🌊 Edge
- 📋 -
- 🏗️ 100 m
- 📈 100,000 stb/d

Captain (U.K.)

Chevron - Ithaca Energy

- 🔍 1977 (Texaco)
- 🏠 1997
- 💧 19-21 API (47-150 cP)
- 📊 350 MMstb
- 🌊 Bottom
- 📋 DST & EWT
- 🏗️ 105 m
- 📈 28,000 stb/d

Atlanta (Brazil)

QGEF & OGX & Barra Energia

- 🔍 2001 (Petrobras)
- 🏠 2018
- 💧 14 API (228 cP)
- 📊 147 MMstb (1P)
- 🌊 Bottom
- 📋 DST & EPS
- 🏗️ 1,550 m
- 📈 75,000 stb/d

Kraken (U.K.)

Cairn Energy & EnQuest

- 🔍 1985 (Occidental)
- 🏠 2017
- 💧 14 API (160-375 cP)
- 📊 140 MMstb
- 🌊 -
- 📋 DST
- 🏗️ 120 m
- 📈 30,000 stb/d

Mariner (U.K.)

Equinor

- 🔍 1981 (Unocal)
- 🏠 2019
- 💧 12-14 API (67 cP)
- 📊 300 MMstb
- 🌊 Bottom
- 📋 DST & EWT
- 🏗️ 112 m
- 📈 55,000 stb/d

Jubarte (Brazil)

Petrobras

- 🔍 2001 (Petrobras)
- 🏠 2006
- 💧 17 API (14.5 cP)
- 📊 600 MMstb
- 🌊 Bottom
- 📋 DST & EPS
- 🏗️ 1300 m
- 📈 130,000 stb/d