[PS]Spain – Offshore Canary Islands – Tarfaya Basin: Implications of Sandia-1X Well Results in the Hydrocarbon Exploration Offshore Morocco*

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Abstract

There has been a reactivation of hydrocarbon exploration activity in the Morocco offshore in recent years, mainly targeting Jurassic and Cretaceous objectives. Most of these wells have been unsuccessful due either to lack of reservoir (target: clastic reservoir), or to the presence of biodegraded oil (target: carbonate reservoir). Well Sandia-1X (2015), is located 60km east of Fuerteventura, between the Canary Islands and the Moroccan coast in a water depth of 880m. It reached total depth of 3093m MD in the Paleocene-Lower Eocene. It is the only well drilled in Spanish territorial waters of the Tarfaya Basin to date. Sandia-1X well is situated in a special structural position within the Tarfaya Basin, to the South of the Essaouira Basin and the Agadir Canyon. The presence of the Canary Islands may play a key role retaining the sand prone turbidite deposits. Sandia-1X well penetrated the entire Tertiary section with good Miocene-Eocene sand packages that no other well had found so far; hence, increasing the chance of reservoir presence in the Morocco offshore.

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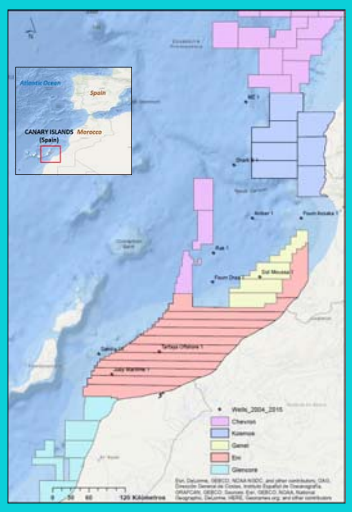
SPAIN – Offshore Canary Islands – Tarfaya Basin

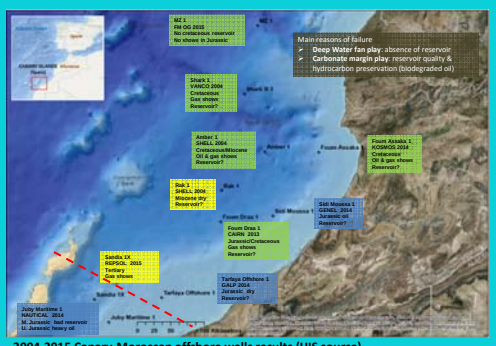
Implications of Sandia-1X well results in the hydrocarbon exploration offshore Morocco

Tarfaya-Essaouira 2018 blocks

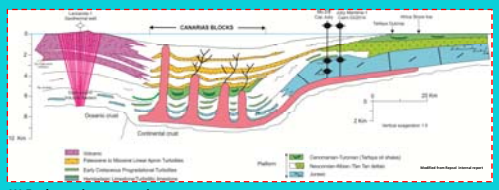


Acreage by operating companies (IHS source)

Canary-Morocco offshore plays



2004-2015 Canary-Moroccan offshore wells results (HIS source)

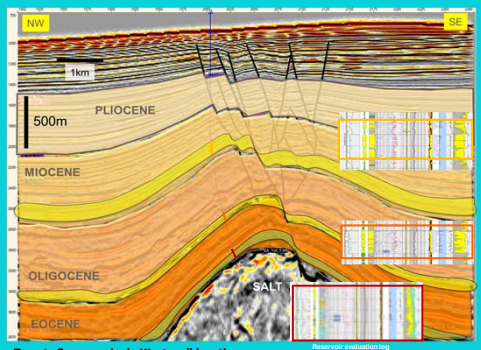


W-E schematic cross section

Sandia 1X general data

Well: Sandia-1X
Operator: Repsol
Spud: November 2014
Location: Tarfaya Basin between the Canary Islands and the Moroccan coast
WD: 880m
TD: 3093m MD
BH Age: Paleocene-Lower Eocene
BH Lithology: shale

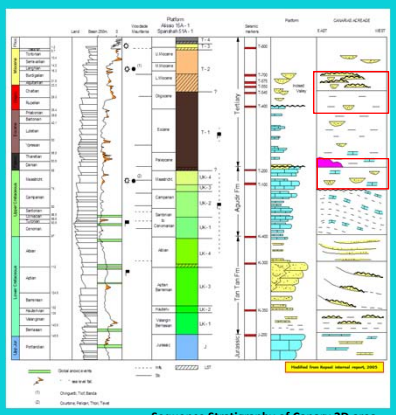
Location of Sandia-1X well & former Canarias blocks



Targets & reservoirs in XL at well location

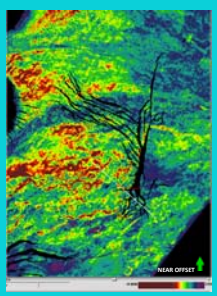
Sandia 1X well results

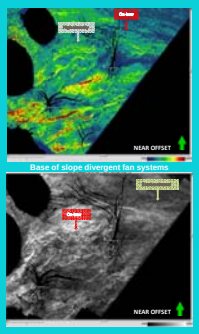
- Primary target Miocene-Paleocene turbidites: good reservoir water bearing gas shows
  - ✓ Miocene sand interval: gross reservoir is about 85m TVD with average porosity of 19%.
  - ✓ Base Oligocene sand interval: gross reservoir is about 25m TVD with average porosity of 18.5%
- Secondary target Paleocene turbidites: consist mainly on limestone and is of very low reservoir quality



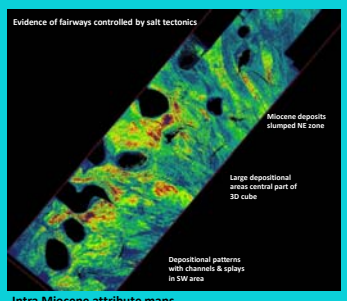
Sequence Stratigraphy of Canary 3D area

Evidence Of Large Channelized Miocene Turbiditic Systems

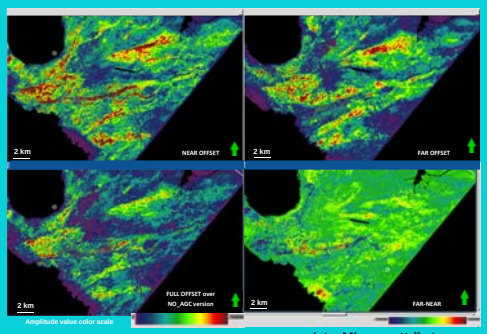




Intra Miocene attribute maps

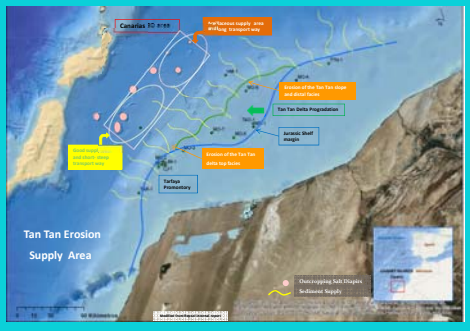


Intra Miocene attribute maps

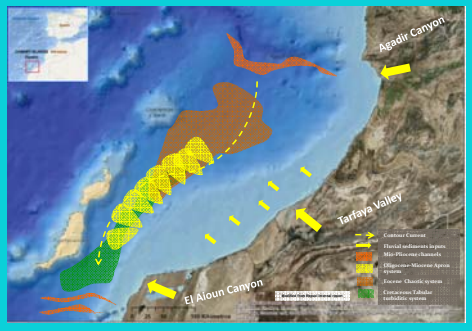


Intra Miocene attribute maps

Sand Distribution In Canary-Morocco Offshore



Tertiary reservoir possibilities in Canary 3D area



Possible sediments distribution over Tarfaya basin

Key factors controlling sand distribution in Canarias 3D area

- **Canary Islands**: natural barrier preventing sediments travel deeper into the basin.
- **Tan Tan delta**: important clastics supply area
- **Salt tectonics** : controlling fairways and depocentres
- **Contour currents**: distributing southwards sediments from Agadir Canyon

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