

Gulf of Mexico's Horn Mountain Field: Exploration Success below a Mature Field

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Abstract

Horn Mountain Field was brought online in 2002 as one of the early Middle Miocene producing fields in the deepwater Gulf of Mexico. By 2015, the field had a cumulative production of over 100 MMBOE but had experienced significant decline. Exploration success was needed to extend the life of the field.

The deeper M56 sands were first identified when seismic data showed an anomalous response above the Oligocene unconformity. In 2015, the Mississippi Canyon (MC) 127 SS3 successfully tested the M56, encountering pay in two of the three sands. Reprocessed 3D seismic data helped build the geologic story for these deepwater turbidite reservoirs where sand extent and connectivity remained the primary uncertainties. Three appraisal wells followed, leading to the sanctioning of “Horn Mountain Deep Field” in 2017 and a four-fold increase in production at the SPAR.

Early production performance coupled with regional geologic studies, paleoflow indicators on high-quality image logs, and pressure transient analysis (PTA) suggested the M56 extended further to the northwest where the seismic was poor under a salt canopy. The team integrated well data and existing streamer seismic data to support the “Horn Mountain West” exploration well, a 3 mile test from M56 production. Concurrently, the team initiated an ocean bottom node (OBN) survey to further increase the seismic resolution for the M56 and optimize a follow-on appraisal effort in the success case. In 2019, the Horn Mountain West exploration well successfully extended the M56 reservoir along structure and found all three M56 sands. Horn Mountain West was brought online as a 3-well subsea tieback in June 2022, bringing the total SPAR production to >60 MBOEPD, the highest level in Horn Mountain's 18-year production history. This project illustrates what can be achieved by a closely knit team integrating key subsurface elements to breathe new life into a mature field.