

Reservoir Classification for Turbidite Intervals at the Mars Discovery, Mississippi Canyon Block 807, Gulf of Mexico

by Mike Mahaffie, Shell Development Company

A descriptive reservoir classification was used to characterize the turbidite sands encountered at Project Mars, a significant Gulf of Mexico deep water oil discovery made under joint partnership with Shell Offshore, Inc. and British Petroleum, Inc. External reservoir geometries observed from seismic and internal fill characteristics from wireline logs and whole core form the basis for subdividing turbidite sands into three major categories: 1) thin-bedded channel levee and overbank sediments, 2) channel-fill

complexes, and 3) sheet sands. This classification scheme was implemented to link the various scales of investigation obtained from the subsurface with details of reservoir architecture determined from turbidite outcrop studies. In this manner, characteristics of sand continuity and connectivity at the outcrop scale can be incorporated with observations from seismic and well control toward more accurately predicting reservoir performance and field development strategy.

Depositional models were con-

structed for each significant turbidite sand package using this reservoir classification. The majority of reservoirs are described as sheet sands. Minor portions of the basin fill represent channel-fill complexes. Three depositional models are presented to illustrate the style of deposition at Mars and the utility of this classification scheme. Development drilling is currently underway using these depositional models as a framework for field exploration.

Biographical Sketch

Mike Mahaffie is a Senior Geologist working for Shell Development Company's Bellaire Technology Center. Mike received his B.S. in Geology from Southwest Missouri State University in 1982 and an M.S. degree in geology from Louisiana State University in

1985. He joined Shell in 1985 and initially worked on various exploration assignments in the coastal and interior basins of Southern California. In 1990, Mike transferred to New Orleans to assist in the pre-development and appraisal studies of Project Mars, a major deep water oil discovery. Mike focused on detailed seismic sequence stratigra-

phy and geologic evaluation of reservoir systems. Mike transferred to Shell Development in 1994 and has expanded his study of deep water depositional systems to the entire Gulf of Mexico. Mike is a member of AAPG and the New Orleans Geological Society.