

by *Michael Mileo*
Frade Project Manager
Chevron

Development of the Frade Field, Offshore Deepwater Brazil, Northern Campos Basin

The Frade project is Chevron's recently announced deepwater heavy-oil development project requiring a capital investment of approximately 2.5 billion \$US. The sanctioning of the Frade project marks a major milestone in an effort that began in 1997 when Brazil opened up its oil and gas reserves to foreign exploration. The Frade field is located in the Northern Campos Basin, approximately 370 kilometers offshore Rio de Janeiro, Brazil in 1,100 meters of water. The 154 km² Frade concession area is adjacent to the Petrobras Albacore Leste and Roncador developments. The field was discovered by Petrobras in 1986, and was subsequently appraised with a Petrobras well in 1989 and two Texaco wells in 2001.

Frade, a deep water heavy oil development project, has historically been both technically and economically challenged. The inherent subsurface and surface complexities alone might have shelved the development of this asset—particularly in the early evaluation stage. Moreover, the fiscal and political landscape in Brazil has been less than predictable raising additional obstacles to project success. After merging with Texaco in 2001, Chevron realized that a different approach would be required to determine the true value of the Frade asset, and initiated a systematic and standardized asset valuation process for Frade as part of its worldwide portfolio management exercise.

A phased subsurface evaluation strategy, using subsea wells, is being implemented in the development of Frade to better manage subsurface complexity and uncertainty. In addition, to facilitate smooth facilities startup, Chevron is using Petrobras' tried and true development methods in the Campos Basin and using vendors and contractors with proven track records working in Brazil.

The structure is a low relief anticline with two main fault blocks consisting of three stacked reservoirs, and spans an area of 20 km². The field will require water injection from the beginning of production to maintain reservoir pressure and maximize the life of the field and the ultimate oil recovery.

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The current development scenario consists of a total of 19 wells, 12 horizontal production and 7 vertical injection wells. The production wells will utilize an open-hole gravel pack completion with gas lift, and will be tied back to a floating production storage and offloading (FPSO) vessel. The FPSO will have the capacity to process 100,000 barrels of oil per day, compress 106 million standard cubic feet of natural gas, and store 1.5 million barrels of oil. The subsea architecture consists of a series of production flowlines, gas lift and water injection pipelines, and umbilicals. The production wells will be paired together to provide pigging loops, while the water injection wells will be connected through a pipeline and umbilical loop. The gas lift pipelines and production umbilicals will be manifolded to supply up to 4 production wells. Surplus gas will be routed to shore via existing Petrobras pipelines in the area, while the processed oil will be transported with conventional trading tankers and sold on the world market.

All major drilling and facilities contracts were awarded in 2006. Detailed engineering is essentially complete with manufacturing and construction activities currently underway. Offshore facilities installation and well drilling is anticipated to take place in 2008, resulting in first production from the Frade field during the first quarter of 2009. ■

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Biographical Sketch

MICHAEL A. MILEO is a project manager in Chevron's Project Resource Company, based in Houston, Texas. He joined Texaco in 1982 as a civil engineer in the Offshore District Office in Morgan City, Louisiana. During his more than 24 years with Texaco and now Chevron, Mr. Mileo has held a variety of project and facilities engineering management positions of increasing responsibility. He has been a project manager for both domestic and international upstream projects. In his current role as the Frade Project Manager, he has been responsible for the Frade project from initial asset evaluation and development concept screening through project commercialization and now project execution. His areas of responsibility include subsurface evaluation, well construction and drilling, facilities design and construction, and operations planning and assurance.

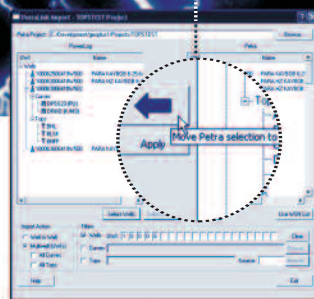
Mr. Mileo received both a BS and an MS in civil engineering from Bucknell University. He is a Certified Project Management Professional (PMP), as well as Licensed Civil Engineer in the states of Louisiana and Texas.

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