

MODEC's Next FPSO to be delivered in Brazil

MODEC
Cidade de Mangaratiba MV24
Project Manager
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“Cidade de Mangaratiba MV24” (meaning City of Mangaratiba in Portuguese) is the third FPSO (Floating Production, Storage and Offloading Vessel) to be delivered by MODEC to the Petrobras pre-salt development and the eighth offshore facility delivered to Brazilian waters. MV24 not only continues the development and growth of MODEC’s project services in Brazil but pushes them much further as this is the first FPSO with all production topside modules fabricated in Brazil.

History

MODEC first entered Brazil more than 10 years ago with the Fluminense FPSO for Shell Oil in 2003. Our growth continued from there with a series of 6 FPSOs and 1 FSO awarded by Petrobras. The addition of Cidade de Mangaratiba MV24 in 3rd quarter 2014 will increase MODEC’s available production capacity in Brazil to more than 650,000 barrels of oil per day (bopd) and with the completion of the two current projects under construction MODEC’s production capacity in Brazil will move beyond 900,000 bopd by 2016 (see Table).

The pre-salt FPSOs (MV22 through MV27) are a unique challenge as they are operating in more

than 2000m water depth with system pressures over 500bar and gas treatment facilities to remove CO2 and/or H2S. These characteristics require special materials and worker skill sets demanding an attention to quality from our fabricators that is at the core of our expansion into Brazil fabrication.

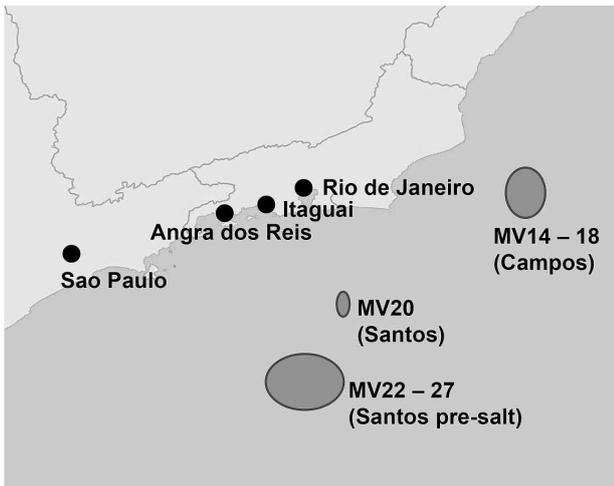
The first pre-salt FPSO, Cidade de Angra dos Reis MV22 (Pilot 1), was built and integrated in Asia and delivered 35 days earlier than the contractual delivery date. Cidade de Sao Paulo MV23 (Pilot 2) delivered 36 days earlier with all major fabrication in Asia and integration of topsides modules in Brazil. The marine conversion scope of Cidade de Mangaratiba MV24 (Pilot 5) was performed in Asia with topsides modules and integration in Brazil. Although many challenges were faced and overcome on MV24 there is every expectation to continue our tradition of a quality, early delivery having completed nearly 3 years of work and 16 million man hours with no harm to personnel or the environment. This level of accom-

Unit Name	Production Start	Oil Production Capacity
Fluminense (Shell)	2003	70,000 bopd
Cidade do Rio de Janeiro MV14	2007	81,000 bopd
Cidade de Macae MV15	2007	(FSO)
Cidade de Niteroi MV18	2009	100,000 bopd
Cidade de Santos MV20	2010	35,000 bopd
Cidade de Angra dos Reis MV22	2010	100,000 bopd
Cidade de Sao Paulo MV23	2013	120,000 bopd
Cidade de Mangaratiba MV24	2014	150,000 bopd
Cidade de Itaguai MV26	2015	150,000 bopd
Cidade de Caraguatatuba MV27	2016	100,000 bopd
TOTAL Installed FPSO Capacity (2016)		906,000 bopd

MODEC’s available production capacity in Brazil



Mr. KC Kwok, CEO of BrasFELS at mechanical completion ceremony



Location of FPSOs, fabrication yard and shipyard



FPSO in construction

ishment can only be achieved through strong and committed relationships particularly during the module fabrication and integration phase of the project.

Module Fabricators

Cidade de Mangaratiba MV24 implemented an execution strategy based on 2 primary module fabrication yards for fabrication of MODEC designed topsides modules. The two primary module fabrication yards were EBE's (Empresa Brasileira de Engenharia S/A) fabrication yard in Itaguaí and BrasFELS shipyard in Angra dos Reis. Each of these yards produced and delivered over 4,000t of modules. The pre-fabrication of structural steel was divided among several Brazilian steel fabrication yards while the piping was primarily performed in-house with the aid of several local pipe shops. EBE's base scope consisted of modules for separation and gas treatment while BrasFELS base scope was completion of the high pressure riser manifolds.

Integration

Integration of the topsides modules onto the FPSO was performed at BrasFELS shipyard in Angra dos Reis. This work required close collaboration between the MODEC and BrasFELS team due to the dynamics associated with vessel maneuvers in association with availability of both modules and cranes. Careful integration planning is critical to

the success of any FPSO project but equally critical is the ability to develop and implement sound contingency plans to maintain schedule. To this extent BrasFELS, MODEC and Petrobras formed a strong alliance in overcoming many obstacles.

Through committed and dedicated personnel the close-out of construction activities was woven into the pre-commissioning and ultimately commissioning activities. These critical construction activities were focused primarily on three areas. First, close-out of the E-House and gas turbine generator modules' construction. Second, close-out of piping systems and third completion of the utility systems.

Closing

After completion of integration, FPSO will be towed by tug boats to the offshore site and installed with a spread mooring method at Iracema Sul field in Santos Basin. Once the FPSO is successful in 72 hours continuous production test, it will start 20 years of the services of lease, oil production and maintenance provided by MODEC for Petrobras.

Cidade de Mangaratiba MV24 is a significant project for both MODEC and Petrobras. It strengthens MODEC's commitment to the Brazilian offshore market as well as provides substantial growth of Brazil's fabrication facilities. We are proud to be a local partner during this current rise and development of Brazil's offshore industry and look forward to making positive contributions for many years to come.

