LUFENG NHSK FSOU UPGRADE AND RELOCATION

SITE DETAILS:
Location: Block LuFeng (LF) 08
Region: Pearl River basin, South China Sea, southeast of Hong Kong
Water depth: 132-m (433-ft)
FSOU: *Nanhai Sheng Kai*, operated by China National Offshore Oil Corporation (CNOOC)
Vessel: *Maersk Attender* (PIV)

SYNOPSIS:
The five-month job required project management, installation engineering and procurement for the installation of a new buoy turret mooring system.

WORK SCOPE:
The work included:

- LF 13-1 buoy and riser decommissioning and recommissioning including temporary replacement of the buoy turret mooring system in LF 13-1 field to accept the interim *Nanhai Kai Tuo* FSOU.
- The installation of the new mooring system at LF 13-2 including 8 drag anchors, 8 chain and wire mooring legs, gravity base frame and clump weight, MWA, and hooking up the buoy to the mooring legs.
- The installation of a new 8-in. flexible flowline and riser between the buoy turret mooring system and the LF 13-2 wellhead platform.

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CHALLENGES:
The *Nanhai Sheng Kai* FSOU has been in service for 20 years – eight years beyond its originally designed lifespan. Consequently, its subsea mooring system had begun to deteriorate and corrode. To facilitate continuing production from LuFeng field and the expansion of the LF 13-2 oilfield, the field's operator, CNOOC Ltd, extended the service life of the FSOU for an additional 15 years by upgrading it and relocating its mooring system to LF 13-2 oilfield. As a result of the diverse nature of the offshore work scope, the main challenge was interfacing with the lead installation vessel, the Maersk Attender, to accommodate the project requirements and a tight timeframe.

SOLUTION:
InterMoor's expertise in back-of-the boat solutions played a vital role in executing the project efficiently and successfully. The company also designed custom devices to handle the jacketed spiral strand wires. The lack of large storage reels on the anchor-handling tug supply vessel required the jacketed spiral strand wires to be spooled on the main winches using custom winch adapters.

ACTION:
InterMoor and Offshore Installation Services (OIS) developed procedures to allow the performance of simultaneous offshore operations while working with divers, Remotely Operated Vehicles (ROVs) and the Anchor-Handling Vessel (AHV) in close proximity to the buoy turret mooring system. The installation equipment used for the hook-up of the NHSK buoy involved the use of pull through rigging that allowed the initial connection of the moorings to the buoy to take place with the buoy floating on the surface followed by a step-by-step sequence to gradually pull the buoy down in a controlled manner to the final submerged position.

RESULTS:
All work was carried out safely, efficiently and ahead of schedule.

"On behalf of China Offshore Oil Engineering Corporation (COOEC) and our client CNOOC, we would like to thank you for your high-level of performance on this project, and look forward to working with you again in the People's Republic of China in the near future."

– Project and Deputy Manager, Engineering Department, COOEC

Acteon Group Offering:

InterMoor provided project management, engineering, procurement and installation.
OIS provided project management support and offshore personnel.
2H Offshore provided riser installation engineering.
Aquatic supplied offshore personnel and equipment for deploying the flexible riser.

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