

PROJECT MANAGEMENT

Project Management

International

Offshore Buoy Mooring Upgrade Project Management and Consultancy Services

Client: Tema Offshore Mooring Limited
Location: Kpone, near Tema, Ghana
Period: January 2007 - Ongoing

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Tema Offshore Mooring Limited is importing products via a Conventional Buoy Mooring system. The existing system consists of an 18" pipeline between the Conventional Buoy Mooring (CBM) and Tema Oil Refinery. The system suffers from low operability and principle decisions have been made to upgrade the existing system as well as installing a new Single Point Mooring system (SPM).

Tema Offshore Mooring approached Project Management International to perform all required services and coordinate works related to the upgrading of their CBM mooring facility at Tema, Ghana.

Evaluation of current system

In order to determine the causes of the low operability levels, PMI had to perform a full evaluation of the current system. This included the current CBM system structural review, but also a review of the environmental conditions. It was established that the current layout of the system was not suited for the prevailing wave conditions.

Approach to solutions

The conceptual approach chosen towards solutions is to minimise the



loads acting on all mooring legs.

The environmental conditions prevalent at the site were investigated. From a number of solutions, re-orientating the system to suit the incoming waves was chosen as the best suited solution for the initial upgrade.

Urgent remedial upgrade services

PMI's contract requires that full management and consultancy services for the initial upgrade are performed.

In order to keep the installation costs to a minimum, the installation of the chosen re-orientation option is being installed by the Client's operational team, performing the maintenance

activities to their current systems.

PMI as part of its scope, worked out all design engineering, but also provided the Client with detailed work method statements, in order for a fluent installation by the Client's operational team. The practical experience and contracting background from PMI's staff contributed significantly to finding successful and economical installation methodologies.

All Procurement and Installation Supervision Services are also handled by PMI, including the submissions to the certifying authorities, ABS. (cont. page 2)

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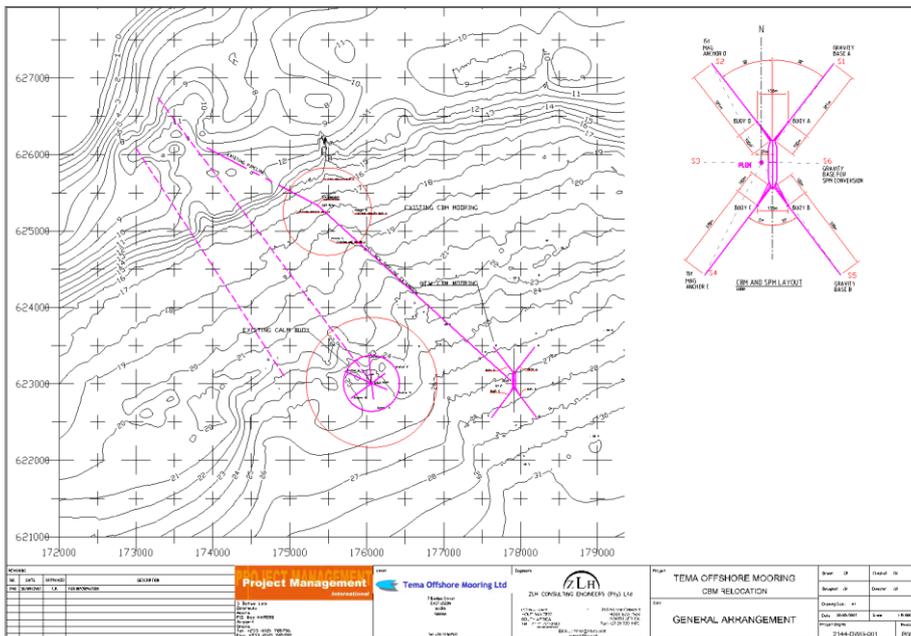
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is done in accordance with all design and certification requirements.

SPM

The final mooring arrangements will have an SPM at the relocated offshore site. This will further enhance the operability and limit mooring forces on the mooring legs.

The Client's current target to have the SPM system operational is early 2009.

PMI included in its approach to allow for import and export of petroleum products through the facility, ensuring maximum flexibility in the Client's future needs.

All aspects of the whole remedial and permanent upgrading works, both in engineering and installation, are performed according to the latest industry safety standards, ensuring a high value end product for the Client.

Permanent upgrade services

Due to increased vessel size expectations and increased demand, safe operations at the current location cannot be guaranteed. Therefore, as part of the permanent upgrading to a SPM system, the need to relocate the system arose.

In order to incorporate flexibility in the Client's expansion plans and operational needs, a possible two phased conversion to an SPM has been engineered:

- Relocating the CBM system to deeper waters
- Converting the system to an SPM

Relocation

The design engineering for the extension of the pipeline and the mooring legs has been completed.

Different installation methods are considered and engineered by PMI:

- beach pull option
- lay barge option

All procurement and equipment needs are identified and sourced. Actual installation will start upon completion of the Client's governmental discussions.

PMI will then provide full supervision services to ensure that installation



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