



Client
Puma Energy



Location
Luanda, Angola



Period
June 2014 – April 2015

Luanda Fishing Port – CBM Design and Installation

Puma Energy is currently constructing an onshore tank farm in the Bay of Luanda, Angola. PMI was appointed for the design and installation of a CBM (Catenary Buoy Mooring) system in order to service the on-shore terminal. Installation works included, amongst other, assembly and installation of anchors, chains and mooring buoys. The CBM terminal was designed to accommodate tankers ranging from 15 000 to 225 000 DWT.

PMI Scope of Works:

- Site investigation works, incl. vibrocore, seabed CPT, jack-up barge boreholes.
- Design, specification and engineering of complete CBM system. (CBM ABS certified.)
- Procurement and project management of works.
- Installation of CBM including:
 - 8 x 8t Stevpris drag anchors with chains and shackles (proof tested to 120t.)
 - 8 x PEM58x2000 buoys with



120t quick release hooks

Design and Procurement:

PMI was responsible for infrastructure product design, specification and management of procurement, import licensing, customs requirements, etc. Following the preliminary design and final layout approved procurement of the larger infrastructure e.g. anchors, chains, shackles, and buoys commenced in middle of 2014 as these items had long lead times for manufacturing. The anchor type and sizing were based upon the findings from the geotechnical investigation works (also performed by PMI). Throughout the manufacturing PMI was responsible for liaising with manufacturers, quality control accompanied by several factory



inspections.

CBM Installation:

The 8 anchors, buoys, shackles and chains arrived in Luanda separate shipments. Before installation of the anchors the fluke angle was set on-site according to the pre-requisite design. Through the use of a multicat the drag anchor assembled with 8 shots of chain (220m) each were placed

offshore at the install locations. Through a winch and sheave-block system connected to a load cell the anchors were dragged to its design location and proof tested to its maximum design load of 120t. Afterwards The various modules of the buoys were assembled by on site. Afterwards the buoys were attached to the chains as required. The entire operation was executed by PMI and completed within original programme.

- Start of CBM installation - end of March 2015.
- Hand-over of CBM - second week of April 2015.
- Total duration – approx. 3 weeks.

Mooring Analysis and ABS Certification:

PMI was also responsible for the dynamic mooring analyses on which the maximum wind, wave and current operability criteria was set for CBM port operations. The mooring analyses were performed for several vessel sizes ranging from 15 000 DWT to 225 000 DWT. The entire CBM system was certified by ABS in October 2015.

