

# PROJECT MANAGEMENT

# Project Management

*International*

## Cone Penetration Testing (CPT) for the Onshore Tank farm, Lekki Free Trade Zone, Nigeria

Client: Puma Energy  
Location: Lekki, Nigeria  
Period: April 2009

### Cone Penetration Testing (CPT) for the Onshore Tank farm, Lekki Free Trade Zone, Nigeria

The Client, Puma Energy requested Project Management International (PMI) to execute a CPT campaign to reduce engineering uncertainties regarding the feasibility of constructing a tank farm, an on- and offshore pipeline and offshore mooring facility in the Lekki Free Trade Zone, Nigeria.

The main objective of the onshore project is the development of an effective storage and distribution system of three petroleum products namely Gas oil, Gasoline and DPK.

#### The Works

PMI mobilized shortly after contract award and completed 27 Electric Piezocone Penetration Tests (CPT's). The tests were executed on the proposed tank locations to a maximum depth of 30m or refusal.

A 20 tonne Capacity Stand Alone CPT equipment was used with a 220 tonne capacity Hydraulic Ram set. The CPT equipment has been installed on a skid which is filled with sand to reach the required counter weight to carry out the tests.

After the desired depth has been reached or refusal, the Piezocone equipped with a friction sleeve of the same diameter as the cone and a



surface area of  $1.5 \times 10^4$  takes continuous measurements of:

- Resistance of penetration of the cone tip ( $q_c$ )
- The frictional resistance ( $f_s$ )
- The pore water pressure ( $u_c$ ), on a surface sleeve set immediately behind the cone end assembly



These measurements were then used to interpret and derive the values for the design.

After the successful completion of the works, the CPT equipment and personnel demobilized.

The CPT data was analysed by the engineers and a full report was prepared and used as basis for the conceptual design.