

## **Think, Innovate, Deliver, Learn ...**

### **Two Well Exploration Programme**

**Summary** - One Summit principal functioned in a technical/engineering capacity for these two wells. The wells were simple to drill, being normally pressured and not too deep. One well was deviated to avoid a hydrocarbon pipeline in the area. The other well was on an island in a large lagoon, accessed by a motorised barge.

**Highlights** – there was a productive Drill the Well on Paper exercise, a successful logistics exercise transporting the rig from Port Gentil to southern Gabon, and an enterprising solution for disposal of the mud cuttings. There were HSE issues to be managed with the road construction crews when working in/around the rig but there. There were no incidents.

#### **Logistics**

- General – sea, land, and air transport
  - Sea - 2 off LCTs (flat bottom self-propelled barges with drop ramps)
  - Land – a fleet of 4&6 wheel drive tractors with normal and “lo-boy” trailers
- Air – charter and scheduled service between Port Gentil and the field
- Land location – a laterite quarry was dug to build road spur and to provide the pad for the rig and camp
- Island location – same as for the land location in terms of the laterite pad. However, it was necessary to engage a Flexi-float (land transportable powered ramped barge) to transfer the rig/camp from the land to the island in the lagoon

#### **Rig**

- Mid-size land rig on sub-let from oil major
- Excess of 100 loads to transport from location to location
- Drill the Well on Paper (DWOP) exercise to encourage Teamwork, Communications, and decision making was held in the week preceding spud. A draft programme was provided and the step-by-step procedures were projected in front of all drilling and well services contractor personnel. A score sheet was handed out. Attendees expressed general satisfaction with the exercise and gave several points of further improvement

#### **Drilling services**

- On secondment from oil major – the challenge was to get the contracts in order
  - Well position surveyor
  - Mud
  - Directional drilling
  - Casing/tubing and casing running services
  - Cementing
  - Logging While Drilling (LWD) and Measurement While Drilling (MWD) BHAs
  - Drill bits
  - Cuttings handling/disposal
  - Wireline logging
  - Mud logging
  - Well testing (in case of discovery)

### **Drilling programme**

- Normally pressured but with severe lost circulation problems
- Cement pad and cellar construction for the rig was a key item
- 20" Conductor was driven to 60 metres with a locally sourced hammer. No particular problems
- 13-3/8" Surface casing – drilled without circulation to 200 metres, not very fast but no real problems
- 9-5/8" Intermediate casing – set at 575 metres. Drilled without circulation. Not very fast but no particular problems
- 7" production liner – not run as neither of the wells was a success
- Producing formation – projected to be a very porous/permeable, non-cemented sandstone. The mud system was converted to a water-based, salt-saturated system upon encountering the salt. The salt is toxic to flora and fresh water fish and thus posed problems for disposal of the cuttings and liquid mud. The cuttings/mud were stored by a disposal firm until a unique solution was found (see below).

### **Governmental authorities**

- Meeting spud date – the government set a tight spud deadline which was met without problems
- Outlining well objectives – the government has to be satisfied with the well objectives and ensure they are met. A local specialist was engaged to ensure this was handled well

### **Local population**

- Local jobs – mostly labourers from the local area
- Local impact – in case of a discovery

### **QHSE**

- Rig safety
  - Rig crew – had a good safety management system. The challenge was to ensure that they kept focus
  - Road transport crew – they did not have a good safety system. The challenge was to ensure they complied with the rig safety management system
- Cuttings/mud disposal – there were severe lost circulation problems in the first land well. Though this was considered a problem, it provided a solution for mud disposal. After some thought and planning, the mud and cuttings were disposed by pumping them into the 20" X 13-3/8" annulus. This was not only environmentally friendly but typified turning a "problem" into a solution.
- The two exploration wells were within time and budget.

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