



# RISERLESS MUD RECOVERY

Reduced Environmental Footprint and Lower Well Cost | May 2012

## Riserless Mud Recovery reduces environmental exposure on Torosa-6 and Seraph-1 wells.

### Drilling Mud is Essential

Wells are constructed by drilling a hole in soil, then cementing steel casings in place to isolate layers of soil.

When drilling the first hole into the soil, drilling mud (used to flush the hole) is not recovered. Mud is a mixture of seawater and viscosifier like bentonite (kitty litter).

Soils aren't always consolidated. Some soils in the North West Shelf are buried beach sands.

To prevent the hole from collapsing, weighting powders must be added to the mud to increase its density and push the hole outwards. The mud density must be carefully chosen as the loose soils are easily broken down.

It takes a lot of mud to drill a well. Normally after a short hole is drilled, and the steel casing cemented in place, a blow out preventer and marine riser is put in place. This allows the next hole sections to be drilled, while circulating mud back to the drilling rig. The mud system reduces the chance of mud losses, pressure loss and hole collapse.

### A Fine Balance

The hole is in such a fine pressure balance that occasionally the additional pressure (called effective circulating density) applied by the friction in the riser can cause the hole to break down and mud is lost below the seabed. Often, where no risk of shallow hydrocarbons or water flow exists, it is preferable to drill "riserless" until the top of reservoir.

Riserless Mud Recovery (RMR) is a system that allows drilling with a weighted mud system yet retains a delicate pressure balance, allowing Woodside to save money and reduce its environmental footprint.

### Case Study 1

#### Seraph-1 Exploration Wells

The Seraph-1 exploration well top hole section was successfully drilled riserless while circulating returns to surface via a RMR system. This allowed use of an engineered mud system to control the Bare sands. The mud was circulated to surface and reused.

#### Reduced HSE Risk

An entire string of casing (20") was omitted from the well because the engineered mud could be deployed without it. This technology allowed us to make big savings in time, cost, and equipment without compromising integrity, safety or environment.

### Case Study 2

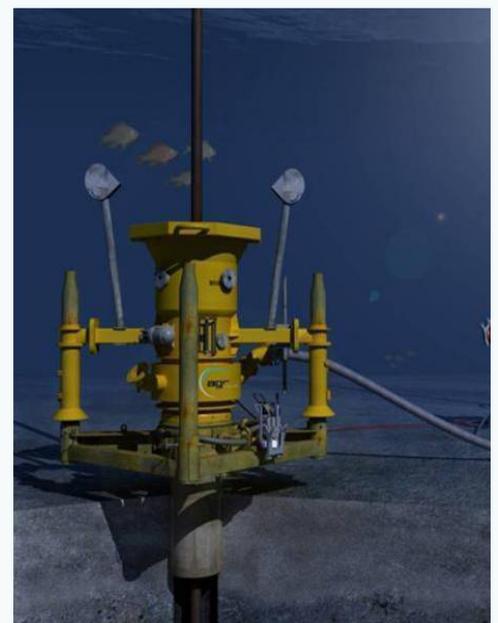
#### Torosa 6 Appraisal Well

Torosa-6 appraisal well was drilled by a jack-up rig on North Scott Reef. In order to minimise our environmental footprint to the lowest possible level, the RMR system was adapted in a world first for use on a jack-up.

This implementation resulted in Woodside winning the Western Australian Department of Minerals and Petroleum Golden Gecko environment award and achieving an outstanding environment outcome in a sensitive marine habitat.

## QUICK FACTS

- Near-seabed soils are unconsolidated and are difficult to drill without caving in.
- Drilling often requires thick water based muds to help support these soils.
- Drilled soil and water based drilling muds are disposed of near the well.
- AGR's Riserless Mud Recovery allows the mud and soil to be treated before disposal. This substantially reduces the amount of mud required.
- Woodside, through its pioneering use of this technology, is a leader in drilling within sensitive ocean environments in a way that minimises environmental impact.



AGR Riserless Mud Recovery system