

3.11 Mud System and Tracers

Mud Engineering services were provided by International Drilling Fluids Pty Ltd.

36" and 17½" holes

The 914mm (36") and 455mm (17½") intervals to 133m and 405m respectively were drilled using seawater with returns to the sea floor. Hi Vis pills were periodically pumped to aid hole cleaning, but there was no attempt at controlling the mud properties.

12¼" Hole

A Seawater/Gel/Poly mud was used to drill the 311mm (12¼") hole section to 1246m. This hole section intersected the dominantly argillaceous lower part of the Torquay Group and Demons Bluff Formation. Neither was considered prospective and evaluation was secondary to keeping the hole clean and maintaining hole stability. Solids content was allowed to build up using the natural clays being controlled and maintained at 1118kg/m³ through the addition of partially hydrolysed polyacrylamide (PHPA). Although Hi Vis pills were pumped on connections to aid hole cleaning, the hole packed off at 1017m due to the high rates of penetration and associated annulus cuttings over load. The caliper log showed that there was some washing out of the hole throughout the interval of the Torquay Group but that throughout the Demons Bluff Formation the combination of weight and fluid loss control effectively controlled the expected sloughing, resulting in a near gauge hole. Casing was set in the Demons Bluff, some 54m above the EVCN and 216m (8½") hole was drilled to total depth.

8½" Hole

Formation salinities of 40,000 to 70,000 ppm NaCl equivalent were anticipated in the EVCN and a Fresh Water/IDBond mud was utilised primarily to assist in evaluation through enhanced contrast between Rmf and Rw.

To minimise formation damage both weight and fluid loss were targeted to be kept below 1117kg/m³ and 8ml/30mins respectively. This was achieved with the mud weight rising to 1138kg/m³ for a short period only due to the barite pills associated with the numerous trips and short pumping periods during the coring period. A consistent maximum mud weight of 1120kg/m³ was achieved. Fluid loss ranged between 6.0 and 6.8ml/30mins. From 2100m wiper trips were very tight and the mud weight increased to 1129kg/m³ with barite. The maximum barite content did not exceed 1%.

The dipmeter log showed the hole to be very close to gauge throughout with only some of the coals having washed out, notably more so below 2100m. The six arm caliper also showed the hole to be nearly circular in section with no evidence of break out.

Pretest pressures from the SFT show that this interval was drilled with an ECD overbalance of between 190 to 245 psi, while the indicated permeabilities from the pretests were good to excellent. Together these indicate that there was nil or minimal formation damage caused during drilling and filtrate invasion would be close to a minimum.