



Summary of tour of Geo Technical survey site of Empire Oil Company

Wannamal West Road / Boonanarring

On Thursday June 6th 2013 I was given a tour and explanation of the 3D Seismic survey being conducted for Empire Oil and Gas NL managed by Terry Grocke.

On the day of the visit the onsite project had virtually finished, with the contractor's equipment being recovered and packed for transport. The camp which held up to 60 people was about to be dismantled.

The project involved recording seismic data over an area of approximately 80 sq.kms with 23 sq.km in the Boonanarring nature reserve. Approx 1,600 shotholes were drilled, 10-15m deep with no casing installed. Each hole was loaded with a 1 or 2kg explosive charge and backfilled to surface with graded blue metal and drill cuttings (soil). The shot holes (seismic energy source) were located in a predetermined grid of north-south lines, Line spacing 400m, distance between holes, 50 or 100m. and monitored by nearly 6,000 small, portable electronic devices, 'nodes', capable of the most accurate measurement of acoustic energy, time and position.

Shotholes were detonated one-at-a-time. Generated by the 'shot', acoustic energy radiated hemispherically into the subsurface. Reflected seismic signal was recorded, amplified, digitized and stored in memory at surface by the nodes. For personnel on the surface, detonations were undetectable at any distance greater than about 50m from the shothole.

Immediately following detonation each shot point location was checked again, to be securely filled and were virtually invisible. I am convinced each site would be difficult to detect after one year.

The nodes were collected and returned to base where the recorded seismic data was downloaded in a mobile 'harvester' (caravan full of computer hardware). After preliminary assessment the data will be sent to a specialised



contractor for detailed processing which will result in a 'data cube' to be analysed and interpreted by geophysicists and geologists to identify possible reservoirs of natural gas or oil. The zone of interest in this area is typically 3,500 – 4,000m(+) deep.

The technique used was explained as being unique to Australia for several reasons. It took advantage of the most advanced technology available. Empire Oil and Gas seemed to be making a deliberate effort to impress on the authorities and local community its intention to use worlds best practise techniques to assess and develop the gas deposits of the region in the most ecologically sensitive way possible.

The use of helicopters to deliver seismic equipment including portable seismic drilling rigs into the field minimised the environmental footprint. This equipment was then lowered into place using a 'long-line'. Helicopters needed to land at base only to refuel.

Personnel walked between sites rather than driving to predetermined locations. Bentonite clay was the preferred drilling fluid additive. Drilling fluid also contained a prescribed dose of fungicide to combat possible transport of die-back spore. Special mixing techniques had to be developed to adapt this to the airborne system used. Vehicular traffic through neighbouring farms was kept to a minimum and on existing and approved access roads only. Bio-security hygiene protocols were observed and logged. Vehicle travel into the Reserve was limited to approved and specific access roads only and under prescribed dry soil conditions.

It was explained that the region being investigated was between 3500 and 4500m below ground. Of particular interest were regions of relatively porous sandstone which may contain gas under pressure. I was told the gas deposits are much deeper than the water rich layers exploited for agriculture and human consumption.



Although Terry was not qualified to speak on the technicality of the existing gas field he did give me some brief of his understanding of the current situation.

There are two gas production wells existing at a single site just to the south of Wannamal west road, at the Brand highway end. They are fenced on a footprint of less than a quarter of an acre. Visually less intrusive than a small tank or stock trough. I would be happy to have them on my farm. Stock would graze to the fence. No sound or smell. I could not reasonably argue any water aquifers down to the Yarragadee would be damaged.

The gas wells draw from a region around 4000m deep. One well goes straight down, the other goes vertical then horizontally to source. The explanation of their construction was not technical however it was obvious the most modern techniques were used in an effort to construct bores which would be as safe as science could currently demand. I would like a more detailed explanation of the procedures and chemicals used to achieve what I observed and the insurances provided to cover their lifelong safety, and what happens beyond that time. There was no sign that large quantities of water and chemicals had been used in this procedure which would need to be kept in dams for settling. I did not see any. At the end of the well's life it would be sealed with concrete and the hydrocarbon flow blocked off. I would have liked more details of this process but appreciate it could only follow the strictest guidelines of the regulatory authorities.

The gas flows to the surface under pressure and is piped to the small processing facility which was not explained to me in much detail. It obviously separated the oil which was stored on site and trucked to market. Water was also extracted and allowed to evaporate in a small lined dam. No sign of smell or oily condensate. No noise or excessive movement. No flaming burnoff.

The cleansed gas was piped in a buried line some kilometres to the west and injected into the Dampier to Bunbury pipeline.



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My thanks to Empire Oil and Gas NL for providing access to the site.

David Rickson

Chairman Gingin Water Group Inc