

Impacts of Waterflooding Operations at TAG Oil's Cheal Field

Waterflooding

On 29 September 2016 TAG Oil provided a market update <http://finance.yahoo.com/news/tag-oil-updates-recent-operational-130000208.html> indicating that it was undertaking a programme of *waterflooding* (or water injection)¹ in three of its Cheal wells in South Taranaki north of Stratford. The programme would last at least nine months and involve Cheal-A3X, Cheal-B3 and Cheal-A9 wells. At Cheal-A9, the company announced it had 'recompleted' a water well that was now producing 4500 barrels a day. That was expected to meet the needs of waterflooding operations for all three wells over the period.

Local water impact

In total TAG's waterflooding operations for the three wells will extract *38.9 million US gallons or 147.4 million litres of water from the local aquifer during the nine month operation*. TAG was required to obtain a resource consent from the Taranaki Regional Council for water extraction and disposal of the millions of litres of 'flowback' produced by the waterflooding.



Additional demand and underground injection of waste water

The company's Q2 2017 Results and Updates released several weeks later reported plans to extend waterflooding operations to another well site in the Cheal field:

"Engineering for the waterflood project has commenced at Cheal E site, with project execution planned throughout Q3/Q4 2017. This will involve the provision of additional pumps and associated equipment, as well as converting one of the wells into an injection well... In addition, the joint venture submitted an application in early November 2016 to New Zealand Petroleum and Minerals to convert Cheal 'E' from an exploration license to a mining license. This will allow the joint venture to commence water injection into the Cheal 'E' pool upon receipt of the mining license."

Local environmental groups are pursuing inquiries with the Taranaki Regional Council as to whether TAG has in fact obtained additional consents to (a) draw *additional water* from the expanded water well at Cheal A-9 for the new Cheal E operations and what the additional impact would be on the local aquifer; and (b) whether TAG has obtained a resource consent for the proposed injection well at Cheal E, and the volume of flowback such a well was expected to accommodate.

¹ Oil recovery takes place in primary, secondary, and tertiary stages. Primary recovery relies on naturally occurring pressure within the reservoir. Secondary recovery introduces external energy when natural pressure is no longer sufficient to bring oil to the surface. Tertiary recovery introduces further methods to extract oil from the reservoir. Fracking is one of a group of methods the industry classifies as "Oil Production Intensification" which tend to be applied in secondary recovery operations. Its aim is to increase oil flow through changing the structure of the oil-bearing rock. Waterflooding is one of several oil recovery methods called "Enhanced Oil Recovery" which occurs during secondary or tertiary phase operations. It aims to change the nature of the oil and water mix, thus changing the way the fluid flows through the rock strata. Some consider it less controversial than fracking because it doesn't entail the same environmental risks. cf. Envirofluid, <https://envirofluid.com/info-library/eor-oil-recover-techniques>