

## Fracking a 'massive pollution problem'

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One of SA's leading geohydrologists supported fracking for gas in the Karoo and said it posed no problem for underground water.

Now **Professor Gerrit van Tonder**, of the University of the Free State, has warned that his new research shows that there is a high risk that fracking in the Karoo could lead to one of the biggest water pollution problems in the world.

"This is serious stuff. There will be trouble, and Shell and the other companies involved must take note," Van Tonder said yesterday.

In July last year Van Tonder, of the university's Groundwater Institute, wrote in the *Landbouweekblad* that Karoo farmers need not fear water pollution from fracking. He was quoted expressing the same opinion in the Farmer's Weekly.

But that was before he and his doctoral student, Fanie de Lange, had completed their latest research – still to be published.

"Now we are 100 percent certain there will be trouble," Van Tonder said. Essentially they have established "one hundred percent" that the underground water in the Karoo basin flows upwards. They have also established that because of the Karoo's unique geology, there are vast numbers of natural "pathways" along which the water can flow upwards. And with the upward flow, the water will carry the toxic cocktail of fracking chemicals up to the freshwater underground aquifers nearer the surface.

This is the water that most of the Karoo towns and farmers depend on. One of these natural pathways is created by underground dolerite dykes. "One of the biggest problems is that the Karoo has many dolerite dykes underground. That region is unique because of that, other regions don't have this. Now these dolerite dykes create "pathways" around which the water moves upwards. All the hot springs in the Karoo are associated with these dykes. About 80 percent of the holes that Soekor drilled in the Karoo in the past hit dolerite dykes."

But as well as these natural pathways, there will also be thousands of new artificial pathways created by each fracking borehole. Once they come to the end of their 20-year lifespan, each borehole will provide a conduit to transport the cocktail of hazardous chemicals used in the fracking process, at very deep levels underground, upwards. This contaminated water could take several years to reach the freshwater aquifers – or it could take only days. "Once polluted, it is extremely difficult, if not impossible, to clean up the pollution. Given enough time, the effects that fracking chemicals will have on the environment will be detrimental," Van Tonder said.

He said this had already happened with fracking in Pennsylvania, in the Marcellus shales, where the underground water also flowed upwards.

It is not known how many fracking boreholes there will be in the Karoo, but Van Tonder said if only half of the Karoo basin were fracked, there would be around 178 000 boreholes, drilled over a period of about 10 years. If more than half of the Karoo was fracked, this could increase to as many as 400 000 boreholes.

Van Tonder said he strongly recommended that before any licences were handed out by the government to allow fracking, all companies must disclose what kind of fracking chemicals they would use and in what volumes. "There is the added problem that these chemicals are used at great depth, where there is high pressure and high temperature. These factors will cause the chemicals to change and create other chemicals – but we don't know what they will change into because the companies do not disclose what chemicals they are using," Van Tonder said.

His recommendation was that "under no circumstances must companies be allowed to include hazardous chemicals into the fracking fluid cocktail", but use other "green" options. However, he said these were apparently uneconomical, so no companies would use them.

Several chemicals include those that are known to cause cancer, such as benzene, which is a human carcinogen in water at levels greater than five parts per billion. Although fracking companies point out that chemicals make up only around 0.5 percent to 2 percent of the total volume of water used, experts say because many millions of litres of water are used, the amount of chemicals is large. For example in the US, a four-million gallon (15 million litre) operation could use 80 to 330 tons of chemicals.

The Department of Mineral Resources has commissioned a specialist report on fracking from a government-appointed task team, which has been completed. The Cape Times was unable to establish if the team was aware of this new research as the spokesperson was not available.