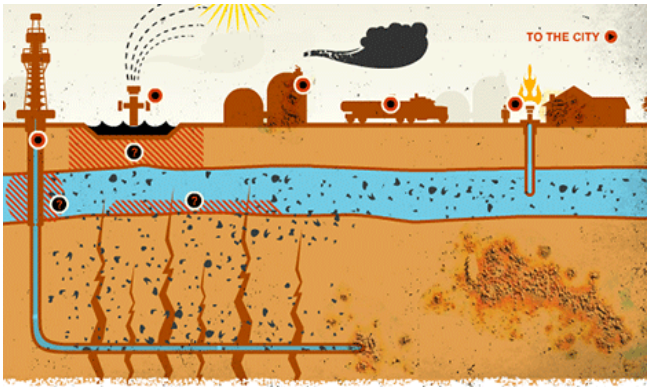
Fracking Factsheet 15 August 2012

What is fracking?

Fracking (or Hydraulic Fracturing) is used by the oil, gas and coal seam gas industry to extract oil or gas from deep underground. A mixture of water or diesel, sand and chemicals is injected at high pressure into a well, fracturing the rock to release oil or gas trapped inside (See figure from www.gaslandthemovie.com/whats-fracking).



Fracking in Taranaki

In NZ, the industry argues that fracking has been used for decades without problems, but there has been little or no monitoring of the activities. Taranaki Regional Council (TRC) did not know what chemicals were used in fracking. What's more, TRC has for decades wrongly allowed fracking as a permitted, unregulated activity because they thought it was part of the drilling process.

In June 2011, under pressure, TRC revealed a limited list of ten chemicals used in one "frack job". On 31 July 2011, TRC announced that non-notified resource consents would be required for fracking and associated discharges from then on. In Nov 2011, TRC released a hydrogeological risk assessment report, concluding that fracking is of low risk. Appendix I of that report included material safety data sheets (MSDS) of 30 "fracturing products". This was expanded in Feb 2012 to include 46 products, 38 are hazardous (i.e. explosive, flammable, acutely toxic, carcinogenic, mutagenic and/or ecotoxic). At least three are dangerous at concentrations near or below detection limits. Many have undisclosed components; stated as proprietary, trade secrete or simply not listed. The May 2012 version now includes 67 products with more hazardous chemicals, notably ethyl benzene and xylene.

Table 1. Information on some "fracturing products" based on material safety data sheets provided in TRC's hydrogeological risk assessment report on hydraulic fracturing, Appendix I (May 2012) and from NZ EPA.

Product	Composition	Physical / Health / Environmental Hazards
XLFC-1B (gelling agent)	Diesel fuel No.2: 40-45%, Guar gum 40-45%	Flammable, acute toxicity, skin corrosión. Toxic to most fish at 2-100 ppm. May cause long-term adverse effects in the aquatic environment.
X-CIDE 102 (biocide)	Glutaraldehyde 10-25%, Water	Acute toxicity, corrosive, specific target organ systemic toxicity. Toxic to fish, birds and bacteria. May evolve toxic gases when heated to decomposition. If released to soil, may metabolise and is expected to leach to groundwater. **Dangerous at concentrations near or below chemical detection limits.**
Halliburton SSO-21 (foaming agent)	Oxyalkylated alkyl phenol 30-60%, Ethylene glycol monobutyl ether 10-30%, Methanol 10-30%, Diethylene glycol 1-5%	Hazard alert code: High, **carcinogen**, acute toxicity, reproductive toxicity, ecotoxic to aquatic environment and terrestrial vertebrates. **Dangerous at concentrations near or below chemical detection limits.**
Halliburton BE-3 Bactericide	Propylene glycol >60%, 2,2-dibromo-3-nitrilopropionamide 11-30% (DBNPA)	Acute toxicity, reproductive toxicity, specific target organ systemic toxicity, very toxic to aquatic organisms (long-term adverse effects). Avoid release to the environment. **Dangerous at concentrations near or below detection limits**.
Halliburton WAC-12L Additive	Ethyl benzene 1-5%, Xylene 10-30%, 1,2,4 Trimethylbenzene 10-30% Light aromatic solvent 30-60%	Flammable, acute toxicity, **carcinogen**, reproductive toxicity, specific target organ systemic toxicity, skin corrosion, serious eye damage. Aquatic toxicity (acute and chronic), ecotoxic to terrestrial verte-brates. Prevent from entering sewers, waterways, or low areas.

Groundwater contamination & abstraction

Fracking fluids can enter groundwater aquifers via fracking fissures, leaks in drill casings, or other pathways such as natural fissures and abandoned oil/gas wells. NZ has >360 abandoned oil/gas wells onshore, with >140 in Taranaki. The documentary 'Gasland' revealed multiple US householders able to light their tap water on fire. Some houses have allegedly exploded from gas leaks through the ground. Duke University documented systematic evidence for methane contamination of drinking water in N. Pennsylvania and upstate New York.

Industry assurances consistently state that fracking in NZ takes place 2500–4500m below ground and fracking fluids are 99% water. But TRC's risk assessment report revealed that Tag Oil's three wells at Cheal site were drilled to just 1750 m depth, one extended for a further 548m horizontally and was fracked multiple times. Two Manutahi wells were drilled to 1157 m depth only, just 257m below the fresh/salt water interface. Alarmingly these wells, plus 13 others, were fracked with diesel (not water) based fluids. The lab results of frac fluid samples shown in Appendix I & III of the report revealed presence of BTEX (benzene, toluene, ethylbenzene, xylene), ethylene glycol, Glutaraldehyde and significant levels of formaldehyde and acetaldehyde.

Monitoring reports from a Taranaki Cheal site revealed power fluid leaks during 2007-09, without subsequent groundwater testing. With time and earth movements, well casings and old wells will be damaged. Soil and groundwater can also be contaminated through disposal of drilling/fracking wastes by deepwell injection, mix-bury-cover, landfarming, discharge of "treated" stormwater from contaminated sites and/or spillage. Under several Kapuni blow-down pits, groundwater has become unfit for drinking, stock-use and/or irrigation, some since 2004. No remediation has been conducted. Moreover, air pollution from drilling sites may contribute to acute/chronic health problems for those living nearby. Clearly, great uncertainty exists around the assertion that fracking is safe.

Groundwater resources in Taranaki are under increasing pressure for irrigation and urban supply, with 300% increase in the number of consents issued for groundwater takes between 2003 and 2008. Yet of the 44,022 m^3/day consented abstraction in 2008, nearly a third was for hydrocarbon exploration and petrochemical processing.

Induced Seismicity and Earthquakes

Deepwell injection of wastes has long been known to have the potential to induce seismicity. More recently in March 2012, confirmed links between deepwell injection of drilling wastes and a series of earthquakes (max 4.0) in Ohio prompt a moratorium on deepwell injection. In April 2012, two small earthquakes in Blackpool the year before were confirmed as caused by fracking. The quakes damaged the integrity of at least one well. A lot if not all drilling in Taranaki are on fault lines. GNS' assessment of the effects of hydraulic fracturing on seismicity (Feb 2012) revealed no evidence that fracking in Taranaki from 2000 to mid 2011 "have triggered, or have had any observable effect on, natural earthquake activity", bearing in mind limitations of the existing GeoNet monitoring system. Experts warn that more stringent monitoring of well integrity, pore pressure perturbations, modern 3-D seismic imaging and operational protocols are needed to ensure safety.

Government policy, regulation and capacity

The New Zealand Energy Strategy 2011-2021 says *"New Zealand's oil and gas production could be substantially increased–potentially to the point where New Zealand becomes a net exporter of oil by 2030."* The 2012 Review of the Crown Minerals Act Regime aims to further the economic contributions from petroleum and minerals. Such policies ignore the reality of peak oil and the far-reaching environmental and socio-economic impacts that such exploitation and the resulting runaway climate change would impose on New Zealanders.

From national to local levels, regulatory regimes are inadequate. The HSNO (Hazardous Substances and New Organisms) Act allows importers to self-assess and bring in chemicals under the "Additives, process chemicals and raw materials group standard". EPA currently has no control that relate to the use of a substance in hydraulic fracturing. Dept of Labour's recent HSE review says, *"the safety case regime does not currently provide sufficient legal powers to prohibit the commencement of operations where there are serious shortcomings in an operators' safety case nor does it extend to onshore petroleum operations*." TRC's track record in compliance monitoring is far from satisfactory, as demonstrated earlier. Since Aug 2011 when fracking required non-notified resource consents, at least 15 have been issued to allow the discharge of contaminants associated with fracking into land, deepwell injection and combustion of returned fracking fluids. Councils in other regions, notably the East Coast, have admitted a lack of expertise and capacity to deal with fracking issues.

What can we do?

We welcome the Parliamentary Commissioner for Environment's investigation into fracking. We support councils and organisations that have called for a moratorium or declared their areas frack-free. We urge for a nation-wide ban on fracking for further oil and gas development. Please sign our petition for the audit of TRC's regulatory processes on the oil and gas industry. We make every effort towards climate justice and a clean energy future. For more information, go to: http://climatejusticetaranaki.info