

Acidising and fracking the Weald

A new, industrialised landscape

We've all heard the F word by now. But acidising has been a well-kept secret. Like fracking in shale, acidising is a 'stimulation technique' used to release oil and gas from unyielding rock – from limestone and sandstone. Here in the Weald, between the North and South Downs across Sussex and Hampshire, Kent and Surrey, oil companies are most excited right now by the Kimmeridge limestone strata within the shale. To get at that oil, they need to acidise.

What is acidising?

Acidising involves injecting solutions of acids along with other chemicals. The objective is either to clean the well, or to create passageways through the rock along which oil or gas can flow. The industry divides acidising (or acidisation) broadly into three 'tiers'. In increasing order of intensity:

- *an acid wash* is a weak acid solution that cleans the well bore at low pressure
- *matrix acidising*, injected at a pressure insufficient to fracture the rock, cleans and dissolves short pathways through the rock lying close to the wellbore
- *acid fracking* is done at pressure high enough to fracture the rock, creating longer pathways

What's the problem?

- Wells have been acidised in the Weald in decades gone by, barely regulated or monitored. What is proposed now is on a different scale. One company - UK Oil & Gas (UKOG) - has promised "back-to-back drilling of production wells" across the Weald. These are not 'just' vertical wells. They will have long horizontal bores that will be acidised section after section, again and again. And it's not just about the current sites. This could be coming your way.
- Acidising uses much higher concentrations of chemicals than hydraulic fracturing (fracking). Fracking fluids for shale typically consist of water with 0.5% chemicals. Matrix acidising and acid fracking fluids could contain 18% chemicals or more.

- Given the repetitive nature of the process, acidising may use a lot of water.
- With no precise definitions, scrutiny or monitoring, the industry make their acidising operations seem insignificant, calling everything an acid wash, or just a ‘stimulation technique’. At well testing stage they may propose an acid wash when in truth they want to matrix acidise, in the knowledge that at production stage they will want to acidise more vigorously, at pressure.
- Acidising brings most of the negatives of hydraulic fracturing: traffic, road tankers, air pollution, flares, potential water pollution via spills, leaking wells and faults, processing plants, large volumes of toxic liquid waste, stress on communities.

“This type of oil deposit very much depends on being able to drill your wells almost back to back so it becomes very much like an industrialised process”
Stephen Sanderson, CEO, UK Oil & Gas (UKOG)”

What acids and other chemicals do they use?

It depends on the geology. In limestone-rich strata, the main acid is hydrochloric acid, in sandstone-based formations it’s hydrofluoric acid, one of the world’s most toxic chemicals. Formations are rarely homogenous, and bespoke treatment formulae are used to achieve desired results. Hydrochloric acid could be used in concentrations of up to 28% but typically up to 15%, hydrofluoric acid at much lower concentrations, 0.5 to 3%. There will also be biocides, polymers to make the liquid gloopy, corrosion inhibitors, detergents, solvents and other chemicals to make it all run smoothly. There has been little research on the toxicity of these chemicals.

Are limestone and sandstone sources ‘conventional’?

This has become a very complicated question.

The government’s definition of ‘conventional’ is quite simply wrong! The national guidelines for mineral planning say that: ‘Conventional hydrocarbons are oil and gas where the reservoir is sandstone or limestone.’ Yet many limestone and sandstone sources are unconventional according to the definitions used by geologists - and indeed by the oil and gas industry when they are not dealing persuasively in ‘alternative facts’.

For geologists, a ‘conventional’ formation is one permeable enough to flow without ‘stimulation’, while an ‘unconventional’ formation is ‘tight’, insufficiently permeable to flow at commercial rate unless stimulated – by techniques such as fracking or acidising.

Oil and gas prospectors are happy to tell shareholders and potential investors that their target strata in the Weald are unconventional, while telling the public, planners and government that they are conventional. The incorrect government definition explains why, when the newly

allocated Petroleum Exploration and Development Licences (PEDLs) were announced in 2016, all the licence areas across the Weald were listed as conventional. Yet the Kimmeridge limestone (micrite) is ‘tight’ thus unconventional, and the deeper-lying oolite limestone is sometimes tight and sometimes not.

This is important – ‘conventional’ sounds safe and cosy. It soothes the public, planners and the media. What is planned for the Weald is unconventional, intrusive, polluting and unacceptable.

The industry is playing a game of words, wrongly defining the Kimmeridge limestone as ‘conventional’, and defining fracking by the amount of water used, when what matters is that enough *pressure* is used to fracture the rock

Is acidising ‘conventional’

The industry likes to call acidising ‘conventional’, sneakily meaning that they’ve been doing it for ages. But in industry manuals and literature, ‘conventional’ is used to indicate a free-flowing formation, and has come to be used for the methods used in these formations, as well as the oil and gas that emerges from them. Acidising is indeed used in free-flowing, conventional wells for cleaning purposes. But when used to stimulate flow in formations of very low permeability, acidising is unconventional.

And will they frack?

This is another wild card in the industry’s game of words. Guided by industry advisors, the fossil fuel-hungry government inserted a new definition of fracking into the complex Infrastructure Act of 2015. Once upon a time the industry considered a formation to have been fracked when the rock fractured. Pressure was the deciding factor, different within each formation. Under the new legislation, fracking means fracking only if a certain volume of water is used (over 10,000 cubic metres per well, over 1,000 cubic metres for each section of the well). That allows much old-style fracking to slip under the radar.

And it could mean that an acid frack will no longer be called an acid frack, especially if new gel and ‘squeeze’ technologies are employed to reduce the amount of water used. Recent planning applications have chosen vocabulary such as ‘low volume’ and ‘non-massive’, presumably eager to duck below the government’s new definition of fracking.

We do have oil-bearing shale in the Weald. The Kimmeridge limestone lies in shallow bands within it. A few years ago, when Cuadrilla arrived in Balcombe, fracking the shale was their objective. One day it may be their objective again. But for the time being here in the South East we need to turn our attention to fighting acidisation of the Kimmeridge limestone and the oolite.

How is acidising regulated?

Until now, acidising has hardly been regulated at all in the UK. Companies have not been obliged to provide meaningful details about the nature or extent of proposed acidisation, nor about the chemicals. The industry has been allowed to self-monitor. The Environment Agency (EA) can provide no historic data about acidising. Wells were out of sight and underground...

Finally, during 2017, new regulations on acidisation are to be introduced for England – we believe this is in response to questions from the public. So far, draft regulations look weak:

- They consider only the acid, not the other chemical additives
- They mention only acid washing, never escalating the issue to matrix acidising or acid fracking.
- They suggest that hydrochloric acid is always totally neutralised underground when it meets the limestone. This is not true. Flowback can sometimes be highly acidic.
- They should properly address the issues of waste water (flowback and produced water), which may be acidic, toxic, super-saline and radioactive. Detailed plans should specify how and where the waste would be treated.

Companies play a game of ‘grandmother’s footsteps’, getting permission first to drill, then to test, then to produce. First for this well. Then for the next. Then for the next. Planners and regulators focus only on the current application. Seemingly only we in the communities grasp the bigger picture.

In the USA, acidising has likewise been little scrutinised and barely regulated, but some states have now proposed regulation of both matrix acidising and acid fracking.

What can we do?

- Spread the A word! Pass it on – to friends and family, on trains and buses, at parties, make friends and talk about acid!
- Talk to your MP, email him or her, tell councillors, planners, National Park authorities, organisations such as the National Trust. They may know about fracking (and elsewhere in the country fracking is hugely important right now) but acidising may have passed them by.
- Object to planning applications – some are live now across the Weald, others will follow.
- Protest peacefully, or support protest.
- Join a local group. You can find a list of local groups on the Frack Off website ([here](#) if you are reading this on-line).
- Scrutinise the activities of the oil and gas industry. Not fracking, they say? Just conventional? Dig deeper! Take the long view. Today’s ‘stimulation’ is tomorrow’s industrialisation of the beautiful landscape of the Weald. It’s *our* landscape, and we’ve a right to feel emotional about it. Let’s spread the knowledge too. Acid’s the word.