

Critique of presentation by Professor Peter Styles to SDNPA

by

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This note is extracted, with minor modifications and additions, from a submission to the South Downs National Park Authority, 25 January 2014, objecting to an application to drill in the National Park by Celtique Energie (Smythe 2014).

Professor Styles made a presentation to the South Downs National Park Authority on 15 October 2013. He is a prominent proponent of fracking, and has particular expertise in the problem of earthquakes generated by fracking activity (e.g. Green *et al.* 2012). I have no access to what he said, only a pdf copy of his slides. Based on what can be inferred from the slides, there appear to be a number of errors and omissions:

1. He appears to argue that one cannot distinguish between conventional and unconventional exploration (slides 9-10). This is incorrect.
2. He implies that fracking is not new (slides 14-15) – this is untrue. Fracking of the high-volume slickwater type in horizontally deviated wells has only been around for less than 15 years. Previous types of fracking (which are generally safe) consume only modest quantities of water by comparison with what the public is concerned about.
3. His slide no. 18 illustrating by a cross-section of a fracking well omits any depiction of faults. The geology is grossly oversimplified.
4. Micro-seismic mapping of the progress of fracking is not the whole picture (slide 20). There is evidence of frack fluid progressing up a fault to a new level; this progress is silent, i.e. unaccompanied by the tell-tale signs of microseismic tremors, because a pre-existing fracture has been used to transmit the fluid upwards (van der Baan *et al.* 2011).
5. He uncritically quotes a paper by Professor Richard Davies of Durham University (slides 21-23; Davies *et al.* 2012) on the empirical limit of how far fracks can progress upwards, which in turn refers uncritically to a questionable earlier study by Halliburton (Fisher and Warpinski 2012).
6. Styles suggests that 'good quality cementing' will protect wells from leaks (slides 23-25). This ignores the fact that all wells will degrade and leak in the long term. His attempt to use the Roman Pantheon as an example of the supposed longevity of concrete is inappropriate.
7. He suggests (I presume) that the Wytch Farm oilfield development in Dorset and below Bournemouth Bay is environmentally safe. I agree with this, but there is no valid comparison with the kind of fracking proposed in the UK shale basins. The 'extended reach' wells drilled out eastwards under the bay are through (or targeting on) the Sherwood Sandstone, the oil reservoir, and have never been fracked (Hogg *et al.* 1999).
8. He points out that the magnitude 2.3 Blackpool earthquake of 2011 is exceptionally large (slide 41), by comparing it with the thousands of far smaller earthquakes generated by fracking in the Barnett Shale of the USA. No explanation is offered (in the slides) as to why this

Blackpool earthquake is so exceptional.

9. He quotes the main conclusions of the Royal Society report of 2012 (slides 50-51; Royal Society and Royal Academy of Engineering 2012), but this report failed to discuss the differing geological regime in the UK compared with the US. The failings of this report are discussed in section 4.1 below.
10. Slide 42 states "*Characterisation of any possible active faults in the region using all available geological and geophysical data (BC always has 3-D seismic)*". This statement, citing a report of which he was a co-author (Green *et al.* 2012) is incomplete, as it should have included all faults, not just 'possible active faults'.

In summary, I find Style's views on the risks of fracking to be complacent, incomplete (because of his partiality), and in places erroneous. The precautionary principle suggests that any region or rock volume cut by faults, whether active or inactive, should not be fracked.

References

- Davies, R.J. *et al.* 2012. Hydraulic fractures: how far can they go? *Mar. Petrol. Geol.* **37**, 1-6.
- Fisher, K. and Warpinski, N. 2012. Hydraulic-fracture-height growth: real data. Society of Petroleum Engineers Annual Conference Paper SPE 145949, Denver 2011. *SPE Production & Operations*, February 2012, pp 8-19.
- Green, C.A., Styles, P. and Baptie, B. J. 2012. *Preese Hall shale gas fracturing. Review & recommendations for induced seismic mitigation*. Report to DECC, available online.
- Hogg, A.J.C. *et al.* 1999. Reservoir management of the Wytch Farm Oil Field, Dorset, UK: providing options for growth into later field life. In: Fleet, A. J. & Boldy, S. A. R. (eds) *Petroleum Geology of Northwest Europe: Proceedings of the 5th Conference*, pp.1157-1172. Geological Society, London.
- Royal Society and Royal Academy of Engineering 2012. *Shale gas extraction in the UK: a review of hydraulic fracturing*. DES2597. Available online.
- Smythe, D. K. 2014. Planning application no. SDNP/1305896/CM by Celtique Energie to drill at Fernhurst, West Sussex: Critique of environmental statement in the context of relevant geology and hydrogeology (53 + 5 pages) Available online.
- van der Baan, M., Eaton, D. and Dusseault, M. 2011. Microseismic monitoring developments in fracture stimulation. Intech open access article.