



*Frack Free Balcombe
Residents Association*

Comments on Public Health England Health Review of the Potential Public Health Impacts of Exposures to Chemical and Radioactive Pollutants as a Result of Shale Gas Extraction. Draft for Comment ISBN 978-0-85951-744-7

Impacts of Shale Gas Extraction (draft consultation document, Oct 2013)

PHE requested comments on the draft proposal before publishing recommendations. We represent the committee of the 'Frack Free Balcombe Residents Association'. We would ask that PHE consider all the points and evidence that we have raised, and would welcome their inclusion in the final version of the report. We would be happy to comment further on our experience in Balcombe. It is misleading to state in the summary of the PHE report that such health risks associated with unconventional shale/gas oil extraction can be mitigated by 'good on-site management and appropriate regulation', or that the 'potential risks to public health are low...if the operations are properly run and regulated'. Based on our own experience in Balcombe, we strongly dispute the central theme of the PHE report: that the regulatory regime in the UK is sufficiently robust to remove toxic emissions and associated health risks for communities living near unconventional gas/oil fields.

- This PHE report focuses on shale gas. Both gas and oil may be extracted using hydraulic fracturing. Oil rather than gas is expected from the Weald Basin in Southern England, including Balcombe. The chemical emissions from gas and oil wells may differ significantly. Oil produces heavier and more toxic emissions.
- No long-term study has been done anywhere in the world on the health effects of chronic exposure of human populations to the emissions from shale gas/oil extraction. Hence, the long-term risk is not known. However, it is known that extended exposure to the radioactive and chemical emissions typically associated with shale gas/oil operations poses a serious mortality and morbidity risk and this should be made clear.
- Low risk does not mean safe. Emissions from shale gas/oil extraction will cause increased mortality and morbidity in the local population. This should be clearly stated.
- PHE makes unfounded claims about the mitigation of the recognised health effects from shale emissions by the regulatory regime in the UK. For example, in Balcombe

no emissions limits from flaring have been imposed on Cuadrilla by the Environment Agency for the flow-testing. Cuadrilla is simply required to self-monitor, with one monthly spot test. There is no requirement on Cuadrilla to monitor atmospheric polycyclic aromatic hydrocarbons (PAHs), particulate matter, or radon emissions from flaring.

- Fault line emissions (escape of contaminated methane via natural geological faults intersected by drilled boreholes or man-made fractures) cannot be controlled or mitigated by regulation, and nor can toxic emissions via fault lines induced by fracking. The geology of Balcombe, and indeed the rest of the British Isles, is highly faulted. Fault lines serve as permanent conduits for hydrocarbons and radon to enter the atmosphere (*Prof David Smythe www.davidsmythe.org/fracking/fracking.htm*).
- The risk to residents living within 400 meters of a well pad may be very significant due to exposure to products of flaring and radon, compressors and pipe networks, ***when these are transported by the prevailing wind***. This is exactly the situation in Balcombe, with houses at about 400-600 meters from the well and facing the prevailing wind. The long-term risk to such residents, particularly the ill and elderly, the young and the not-yet-born, is likely to be serious.
- The atmospheric concentration of highly carcinogenic polycyclic aromatic hydrocarbons (PAHs) measured across an unconventional natural gas patch in Colorado (taken to represent a typical shale gas field) was 15.5 ng/m³, 60 times that allowed in UK. This is likely to be the level of PAHs over an unconventional oil/gas field in the UK, and can be expected to have clinical significance. It is difficult to envisage how such a level could be reduced by other than the most stringent regulation – which we do not have. A number of investigations reviewed by Colborn *et al* (Human and Ecological Risk 2011 vol.17 (5) p 1039-1056) highlight the health risk for those exposed to polycyclic aromatic hydrocarbons. The best known of these is carcinogenesis. Other studies consistently suggest that babies prenatally exposed to polycyclic aromatic hydrocarbons with a total concentration at much less than 15.5 ng/m³ suffered developmentally. (Vandenberg L, Colborn T, Hayes T, *et al.* 2012. Endocrine Rev 33(3):378-455). It is not at all evident that the current regulatory regime in the UK (based on the Balcombe experience) would either detect such emissions or control them.
- The synergy of components needs to be investigated (whether they be contaminated fugitive methane or flare emissions). Laboratory investigations to determine safety limits typically measure exposure to one chemical at a time, while real-life conditions entail simultaneous exposure to a number of volatile chemicals, with interactions that cannot be predicted. Government standards are typically based on the exposure of a grown man encountering relatively high concentrations of a chemical over a brief time period, for example, during occupational exposure. They do not address the issue of low-level chronic exposure to many chemicals simultaneously.
- Extended low-level pollution from a wide range of chemicals is known to cause a variety of chronic illnesses – skin irritation, severe headache, eye irritation, sinus problems etc (Steinzor *et al.* New Solutions 2011 Vol 23(1) p55-88). Estimates of the

risk of damage for each chemical and human organ should be calculated, and the synergy between chemicals considered. Common illnesses induced by shale emissions should be listed, with likely prevalence in the neighbourhood of well pads. McKenzie, Witter, Newman, & Adgate (2012, Science of the Total Environment DOI: 10.1016/j.scitenv.2012.02.018) examined neurological, respiratory, hematologic and developmental effects in relation to proximity to a gas well and their findings are not consistent with an evaluation of 'low risk'.

- Endocrine disruption through chronic exposure to airborne emissions is not considered. National emissions standards do not apply to exposure faced by individuals (including pregnant women, children, and the elderly) experiencing chronic, low-level exposure, 24 hours a day 7 days a week in natural gas/oil neighbourhoods. Emission limits in the UK do not take account of an atmospheric cocktail of endocrine-disrupting chemicals, which can be particularly harmful during prenatal development and childhood (Colborn et al (Human and Ecological Risk 2011 vol.17 (5) p 1039-1056), Dejmeek J, Solansky´ I, Benes I, *et al.*2000. Environ Health Perspect 108:1159-64).
- Emissions and associated smog induced by ozone formed in the hydrocarbon/NOx rich atmosphere over an unconventional oil/gas field may critically affect those already ill with a chronic condition such as respiratory or cardiovascular disease.
- The risk of persistent organic chemicals/heavy metals entering the food chain is not discussed. Soil particularly will be contaminated with PAHs for long periods. Bamberger and Oswald (2012 New Solutions 22 (1) 51-77) pointed out the accessibility of toxins from gas fields to the human food chain, via meat and dairy produce, with implications for human health and agriculture.
- Cumulative risks should be estimated and statistics published for expected mortality (death) and morbidity (prevalence of emission-induced illness), using a verifiable methodology.
- Depressive illnesses for those living in oil/gas fields should be considered.
- The PHE report concludes with eight recommendations for further work. Two of these are *"Baseline environmental monitoring is needed to facilitate the assessment of the impact of shale gas on the environment and public health. There should also be consideration of the development of emission inventories as part of the regulatory regime"* and *"Effective environmental monitoring in the vicinity of shale gas extraction sites is needed throughout the lifetime of development, production and post-production"*. Regarding baseline monitoring and particularly with regard to the emphasis PHE have put on monitoring before, during and after drilling, we would like to highlight what happened in Balcombe. Cuadrilla started drilling on 25th July 2013. At this point, no baseline monitoring results had been released. We as residents understood that samples had been taken but results not published. Baseline samples were taken by Cuadrilla and the Environment Agency (EA) on 17th July, 2013 but the analysis not published. After pressure through residents speaking to the media and asking our MP Francis Maude to intervene, interim baseline results were released on

31st July 2013, but we were frustrated that we could not see the results before drilling started. The full report has not been published, and since then, no further results have been published or received. From Cuadrilla's website:

“In addition to the monitoring by the EA, Cuadrilla has appointed Ground-Gas Solutions (GGS) to complete independent environmental monitoring at the Balcombe Exploration Site. The remit set for their monitoring work was to test air quality, groundwater and surface waters and as part of Cuadrilla’s environmental due diligence and in accordance with our permitting requirements. This interim report compiled by GGS represents a summary of the environmental data obtained to date and represents pre-drill results for the site. These results will be considered against future operational programmes and help to set ambient levels at the site. The full report will be made available on our website as soon as it is published, in line with our efforts to be as transparent and open as possible.”

The Environment Agency issued one report on 13th August referring to samples taken on 17th July before drilling began. No further results have been released. In summary, since the initial results were released on 31st July, no further results have been released, and a full report from GGS has not been published. The process is neither transparent or open.

- The conclusion reached by the draft document that shale gas extraction is essentially safe is unfounded. The current regulatory regime and the trend towards self-monitoring by operators are not remotely stringent enough to prevent serious illness due to emissions from shale gas/oil extraction by hydraulic fracturing. While it is 'difficult to extrapolate from the experience in the USA' (p33 PHE report) given the different topography and geology of the UK, there are currently no grounds for evaluating lower risk, and it is misleading for PHE to do so.

On behalf of Frack Free Balcombe Residents Association Committee

Louisa Delpy BSc(Hons) MBCS

Professor Lawrence Dunne BSc, MSc, ARCS, PhD

Jackie Emery, Lecturer in Health and Social Care

Robert Greer BSc(Hons) MCIOB CEnv

Julliette Harris

James Hodgson MRICS, MSc, BA (Hons)

Dr Rosalind Merrick PhD

Charles Metcalfe, wine consultant, speaker and author

Kathryn McWhirter, wine consultant, author, translator and journalist

Professor A W Rew MA(Econ) PhD

Sue Taylor, FCA, MSc. BA.

Douglas Wragg I. Eng., A.A.E., M.I.M.I., M.I.R.T.E., A.C.M.I., F.I.Diag.E.

Balcombe, West Sussex October 28, 2013

Contact: Sue Taylor email: Suetaylorbalcombe@gmail.com