

Response to the House of Commons Environmental Audit Committee inquiry into the environmental risks of fracking

1. As the UK's national academies of science and engineering, the Royal Society and the Royal Academy of Engineering welcome the opportunity to respond to this inquiry. Preparation of this response was led by Professor Alex Halliday FRS, Vice President and Physical Secretary of the Royal Society and Philip Greenish CBE, Chief Executive Royal Academy of Engineering.
2. Due to the extremely short timeframe within which to respond to this inquiry, this response restricts itself to summarizing the key points from recent work undertaken by the two academies (see below) and highlighting lines of inquiry the Committee may wish to investigate.
3. In 2012, the Royal Society and the Royal Academy of Engineering published *Shale gas extraction in the UK: a review of hydraulic fracturing*, a review of the available scientific and engineering evidence to identify the major risks associated with hydraulic fracturing (or 'fracking') as a means to extract shale gas and consider whether these can be managed effectively in the UK. This report was produced at the request of the UK Government's Chief Scientific Adviser and led by Professor Robert Mair CBE FREng FRS.
4. As well as reviewing the scientific and engineering evidence, the report considered public acceptability and recognised the range of different perspectives on hydraulic fracturing; public concerns tend to focus less on a particular technology *per se* and more on how the technology is governed and regulated. The Committee's inquiry offers an opportunity to consider both risks and concerns.
5. Our report did not consider the implications of the use of hydraulic fracturing on the UK's carbon emissions reduction obligations. Neither did it comment on whether shale gas extraction should go ahead in the UK.
6. However the report did consider several areas that are relevant to the Committee's inquiry, particularly the risk of groundwater contamination and induced seismicity, proposing regulatory safeguards to manage these and highlighting areas for further consideration.
7. In particular the report concluded:
 - Fracking can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation. Ensuring well integrity must remain the highest priority to prevent contamination. The probability of well failure is low for a single well if it is designed, constructed and abandoned according to best practice.
 - Seismicity induced by fracking is likely to be of even smaller magnitude than coal mining related seismicity.
 - Shale gas extraction in the UK is presently at a very small scale, involving only exploratory activities. Uncertainties can be addressed through robust monitoring systems and research activities identified in the report. There is greater uncertainty about the scale of production

activities should a future shale gas industry develop nationwide. Attention must be paid to the way in which risks scale up.

- Risks should be assessed across the entire lifecycle of shale gas extraction, including risks associated with disposal of wastes and abandonment of wells and seismicity.
 - Decision making would benefit from further research into the climate risks associated with both the extraction and use of shale gas and into the public acceptability of all these risks in the context of the UK's energy, climate and economic policies.
8. Since publication of our report, a considerable amount of research from the US on the alleged and real contamination arising from fracking has been published which the Committee may find it valuable to consider. The US Environmental Protection Agency has an ongoing study to better understand any potential impacts of hydraulic fracturing for oil and gas on drinking water resources¹, the Committee may wish to consider the final results once published. There are also a number of recently published reviews and statements, which include full references to recent research, including
- European Academies Science Advisory Council (EASAC) *Shale Gas Extraction: issues of particular relevance to the European Union* published October 2014
http://www.easac.eu/fileadmin/Reports/EASAC_ExecSummary_Statement_ShaleGas_Extraction_combined.pdf
 - Council of Canadian Academies, 2014. *Harnessing science and technology to understand the environmental impacts of Shale Gas extraction.*
http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/shale%20gas/shalegas_fullreporten.pdf
 - Australian Council of Learned Academies, 2013. Engineering energy - shale gas in Australia.
http://mei.insights4.net.au/files/site1/docs/41/Peter%20Cook_Unconventional%20Gas_02.07.13_0.pdf
9. Professor Robert Mair would be willing to speak with the Committee in person about our report's findings.

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¹ <http://www2.epa.gov/hfstudy>