# MEDIA STATEMENT

6th October 2016

## BGS POSITION - FRACKING DECISION IN THE UK

The overturning of Lancashire County Council's rejection for permission to drill for shale gas means that it's possible that shale gas may be extracted commercially in the area.

The British Geological Survey (BGS) has started studies of geological conditions in the north-west before hydraulic fracturing takes place. Through the Environmental Baseline Monitoring (EBM) Survey, the BGS and partners are studying baseline conditions of groundwater, seismicity, air quality, soil gas and radon. The purpose of the EBM is to establish if changes that occur can be linked to hydraulic fracturing and will continue during any operational extraction and after completion.

In a separate study BGS has calculated the underground vertical separation between aquifers that carry potable water and prospective shale gas layers in a series of aquifer-shale separation maps intended for the guidance of planners, policy makers and shale gas exploration companies.

## QUOTES FROM PROF MIKE STEPHENSON – DIRECTOR OF SCIENCE AND TECHNOLOGY, BRITISH GEOLOGICAL SURVEY

"Britain will need a cautious approach to shale gas development if commercial amounts of gas are found"

"Regulation has to listen to the science and ensure that engineering is up to the job and that spills and leaks don't occur."

"Overall shale gas (and natural gas generally) could provide a lower carbon fossil fuel then coal when burnt in power stations, and could provide back up for the intermittency of renewables. But its exploitation must be done to very high levels of environmental assurance.

"The science being done right now will provide regulators and government with the evidence they need to achieve that environmental assurance."

## BACKGROUND INFORMATION FROM PROF MIKE STEPHENSON

The science exploring links between shale gas extraction, groundwater contamination and greenhouse gas emissions is more mature than ever, with many peer-reviewed published scientific studies offering insights.

The most important scientific studies come from North America where there is a mature shale gas industry allowing lots of data to be collected on real operations.

At least two peer-reviewed papers by groundwater experts representing studies of groundwater in Pennsylvania close to hydraulic fracturing of shale have reported contamination by natural gas of shallow water wells.

The first of these, by Osborn and colleagues in 2011, described high concentrations of methane from water wells close to active hydraulic fracturing sites and used the chemical composition of the methane to show that it was thermogenic rather than biogenic, and so likely to have come from shale rather than shallow biological action.

The study was later criticised for the rather small amount of supporting data, and for the lack of baseline data on how much methane naturally occurs in water wells in Pennsylvania. The same group of scientists (a paper by Jackson and colleagues in 2013) working on the same area in Pennsylvania showed statistically significant evidence from a larger number of data points that water wells within 1km of hydraulic fracturing wells contained high levels of stray methane.

Other workers (for example Molofsky and colleagues in papers in 2013 and 2011 showed that the methane – though clearly thermogenic shale gas – probably emanated from shale layers above the hydraulically fractured layer (the Marcellus shale) suggesting that hydraulic fracturing was not the direct cause of stray gas, but that leaking or faulty production wells were.

Large studies of areas undergoing intense hydraulic fracturing elsewhere, such as the Arkansas Fayetteville shale, have found very low concentrations of only biogenic methane in water wells, suggesting that this leakage is a local problem for Pennsylvania.

Recent tentative evidence described in a paper by Llewellyn and colleagues from study of a groundwater supply contamination incident in Pennsylvania showed that additives probably derived from drilling or hydraulic fracturing fluid were present in groundwater though it's not clear whether that was due to fracking. There are continued concerns over additives used in hydraulic fracturing fluid reaching the environment from spills at the surface or in transport, from illegal dumping of waste water, or from damage to the liners of wastewater impoundment dams.

The general consensus of the science is that leakages of methane into groundwater below the surface have happened on a number of occasions but that properly engineered wells should prevent this happening.

Early studies of the amount of gas leakage to the atmosphere (for example one carried out by Howarth and colleagues at Cornell University in 2011) studied the methane emissions from the surface installations of several shale gas wells finding high levels of methane release into the atmosphere of between 3 and 8 per cent of a well's production over its lifetime.

Howarth's paper has been contested and recent work by UK Government scientist David MacKay suggested that the high figures for emissions quoted in the paper were unrepresentative of the industry as a whole.

Other recent work from a larger number of shale gas drilling sites in the US suggests that the leakage rate is about half of one percent of gas production. The release of gas (that will never get into a pipeline) from drilling sites is clearly a big problem and again regulation and engineering must take up the challenge to reduce these to an absolute minimum.

***Ends***

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**Notes for Editors**

The following are available for interview:

- Professor Mike Stephenson, British Geological Survey

For additional information go to: www.bgs.ac.uk

**The British Geological Survey**

The British Geological Survey (BGS), a component body of the Natural Environment Research Council (NERC), is the nation's principal supplier of objective, impartial and up-to-date geological expertise and information for decision making for governmental, commercial and individual users. The BGS maintains and develops the nation's understanding of its geology to improve policy making, enhance national wealth and reduce risk. It also collaborates with the national and international scientific community in carrying out research in strategic areas, including energy and natural resources, our vulnerability to environmental change and hazards, and our general knowledge of the Earth system. More about the BGS can be found at www.bgs.ac.uk.

**The Natural Environment Research Council**

The Natural Environment Research Council (NERC) is the UK's main agency for funding and managing world-class research, training and knowledge exchange in the environmental sciences. It coordinates some of the world's most exciting research projects, tackling major issues such as climate change, food security, environmental influences on human health, the genetic make-up of life on earth, and much more. NERC receives around £300 million a year from the government's science budget, which it uses to fund research and training in universities and its own research centres. www.nerc.ac.uk