Brief Review of The Royal Society/ Royal Academy of Engineering Report and the present position of Shale Gas Regulation

Based on "Shale gas extraction in the UK: a review of hydraulic fracturing" published by the RS/RAEng June 2012 and "Government response to RAE/RS report "Shale gas extraction in the UK: a review of hydraulic fracturing" published by the DECC in Dec 2012. In addition based on meetings with the DECC between the author and Simon Toole (Head of Licensing), Duarte Figueira (Head of Office for Unconventional Gas and Oil) and Naldi Hinds (OUGO – Regulation).

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Date: November, 2013.

DISCLAIMER:

THE ROYAL SOCIETY & THE ROYAL ACADEMY OF ENGINEERING: SHALE GAS EXTRACTION IN THE UK: A REVIEW OF HYDUALIC FRACTURING. JUNE 2012.

REVIEW OF PROGRESS BY MICHAEL HILL, B.Sc (Hons.) C.ENG MIET, HYDRAULIC FRACTURING REGULATION EXPERT AND CONTRIBUTOR TO THE RS/RAEng REPORT.

This review is a brief examination of progress with fracking regulations since publication of the Royal Society (RS)/Royal Academy of Engineering (RAEng) report in June 2012 plus specific comments on two of the ten RS/RAEng recommendations, to illustrate the present status of implementation of those recommendations by the DECC. It is clear that whilst the DECC claim to have acted on all of the RS/RAEng recommendations, they have in fact not been acted upon in full, as claimed by the Secretary of State (Mr. Ed Davey M.P.) in the House of Commons and to the media in general. The author sets out his reasons for this conclusion below.

MISCONCEPTIONS

High volume hydraulic fracturing is now commonly agreed to have been developed in the US between 2000 and 2003. It has not been practiced for decades. This is a misconception that has been brought about by the use of the term "fracking" meaning hydraulic fracturing. Indeed this practice started in 1947 in Kansas but the quantities of chemicals used, the volume of water, the amount of sand and the pressures bear little resemblance to fracking today. An analogy would be comparing a local grocers shop and WAL-MART. In the fracking industry size matters, a lot, because the risks to public health and the environment are much higher with what is now known as High Volume Hydraulic Fracturing (HVHF) and that is what we are discussing today in the UK. HVHF has four key elements: multiple lateral sections on a single pad, high pressures (~6000 – 20,000 psi), high volumes (20 Million litres/well) and many possible fracking chemicals (to create slickwater for reduction in friction etc.). All four were not present until the turn of the century. This is HVHF. This is what is planned for the UK.

THE RS/RAEng SUMMARY (*in italics*)

The UK's well examination scheme must be made fit for purpose for onshore activities. There have been no changes to this system. Nothing has been proposed to make the scheme fit for purpose for onshore. By this I mean amendments/modifications to the regulations that govern shale gas – DCR and BSOR. Without modification of these documents nothing is binding; all is self-regulatory and it is up to the operator whether they follow guidelines/best practices or not.

The UK's health and safety regulators and environmental regulators should work together to develop guidelines specific to shale gas extraction. This has not happened. EA has published its own guidelines which have been severely criticized for not understanding shale gas operations [(2)]. There has been no joint development between the regulators. The DECC has published guidelines but these are in contrast to the stated operational activities of the regulators [(3)]. Since the publication of the RS/RAE report the EA has been cut back by 10% (1,400 staff) by 2015. The HSE (Offshore Safety Div.) has been "streamlined" and now no longer exists in its original form and with its head, Steve Walker, no longer working in this area.

An Environmental Risk Assessment should be mandatory for all shale gas operations. Risks should be assessed across the entire lifecycle of shale gas extraction. The EU Commission proposed to the EU Parliament that Environmental Impact Assessments (a close relation but more specific than ERA) should be mandatory across the lifecycle. The UK Gov. strongly opposed this one-and-only shale gas specific guideline and informed all British MEPs to vote against it on the basis that it would cost the local planning offices and the EA too much money to regulate! [(4)] This is clearly against the spirit of the RS/RAEng recommendation and is setting the wrong priorities. The regulation/monitoring should be based on making risks As Low As Reasonably Practical (ALARP), not simply on an assessment of cost to the Mineral Planning Authorities (county councils etc.) and to the regulators (EA and HSE). If fracking is not economically viable with the appropriate level of efficient safeguards, this should not be a reason to expose the public to greater health risks and greater risk of damage to the environment in order to make it economically profitable.

THE RS/RAEng RECOMMENDATIONS

Rec 2: Guidelines should be clarified to ensure the independence of the well examiner.

This has not been actioned. The DECC refer back to old pre-fracking and pre-onshore development regs (DCR 1996) and state it's all fine.[(5)] It's not. If it was the RS would not have felt the need to make this recommendation. Independence both commercially and technically is key. The author gave this evidence to the RS. The DECC still rely on the DCR which allows for well examiners to be employed by the operators they are supposed to be independent of and then expect them to report on their own colleagues malpractice/poor performance to the directors of the same company. This is why the RS recommended well examination being made fit for purpose onshore. Nothing has changed; nothing has been developed to address this recommendation.

Rec 2:The Well Examiner (WE) should carry out onsite inspections to ensure wells are constructed as agreed.

The DECC disagree. They state that it depends on the scope agreed between the operator and the examiner! [(5)] They think that the independent competent person (ICP – same as well examiner) should use mainly documentary evidence to assess construction. This is completely unacceptable and against the RS recommendation. The operator agrees with the HSE how a well will be constructed. The ICP should physically inspect on site to ensure that what was agreed between the HSE and the operators has been actually carried out. Not rely on documentary evidence and scope limitations placed upon him by the operator!

UKOOG recognise the lack of public faith in the ICP system just as the RS/RAEng do. Hence they have suggested for the first few wells that the ICP actually do their jobs and carry out the RS recommendation and inspect certain well integrity and fracking operations in real time. The author suggested that this happens not just whilst the industry is in its infancy but throughout the lifecycle of this industry in the UK. There is no reason why this should not be the case. It needs putting into regulation and not incorporating into an industry guideline that can be ignored at any time and has zero enforcement.

Rec 2:Operators should ensure well integrity tests are carried out as appropriate such as pressure tests and cement bond logs.

The author recommended this to the RS and indeed has examined a number of CBLs by Cuadrilla for the Lancashire wells. The HSE has previously confirmed that they strongly disagree with the author as to the usefulness of CBLS.[6] By default then they also strongly disagree with the DECC and The Royal Society. The DECC have stated a range of well integrity tests will be required but it's up to the operators. This is missing the vital aspect of enforcement. It is futile to build up a body of regulations/guidelines if there are no inspections and no enforcement. Best Practice means absolutely nothing to private companies when it is not coupled with Best Compliance and enforcement as stated by the RS in their summary. (First paragraph of the report - *"as long as best practices are implemented and enforced through regulation*").

There exists a large body of work relating to drilling and construction of wells – all contained in oilfield best practices in Oil and Gas UK Guidelines. These practices need enforcing as per the RS recommendation. This is missing entirely from the present system onshore and has not been changed since the RS/RAEng report was issued. Guidelines have been produced by the DECC, but no industry specific regulation.

Rec 8: The UK's Regulators should determine their requirements to regulate a shale gas industry should it develop in the future. Skills gaps and relevant training should be identified. Additional resources may be necessary.

This has been met by the UK Gov by "streamlining"! So first we have a "streamlining" of the Offshore Safety Division. It was setup following the Piper Alpha disaster to enforce best practice and ensure the offshore industry was complying with the necessary regulations and its own self-regulatory goals. It was scrapped on the 1st April, 2013. This took most people by surprise, including Oil and Gas UK – the main source for industry best practices (UKOOG constantly refer back to O&G UK for guidance). They were "surprised and concerned at the changes to the OSD" [7]. Some of the staff have left, others have been moved and others migrated over to the Energy Dept. within the HSE. This hardly generates confidence in the HSE or in the UK Gov's handling of regulators in light of the RS/RAEng recommendations. The OSD were successful offshore and had 150 inspectors inspecting the offshore platforms. They were setup, following Lord Cullen's report on the Piper Alpha disaster, to separate out regulatory activity from the Dept. Of Energy's role in promoting oil production. The knowledge and experience of the OSD could have been replicated onshore; that opportunity now appears to have been lost. If one visits the website of the Energy Dept (HSE) one sees that their priorities are very much still exclusively offshore. Indeed they state in their first paragraph "HSE's Energy Division (ED) is responsible for the offshore oil and gas industry." [8]
It is clear there has been little effort to determine the requirements to regulate the shale gas industry as it starts to develop now in the UK. Instead people have had to fight for their jobs and move into a new organisational structure away from the OSD.

On the EA side, this regulator has been found by the author to have little understanding of the oil and gas industry. It has not had to regulate this industry before to any significant extent and has never regulated HVHF. When asked about inspecting wells it has responded by stating that as the well is below ground there's nothing to inspect. [9] This astonishing lack of understanding of just how a well is constructed and the tools available for inspection, the instruments available for inspection, the use of SCADA etc. is something of great concern. The EA's own guidance document [2] for operators does not mention green competitions once. It does not mention wireline tools once. It does not mention SCADA or PLC or data logging once. It fails to grasp the basic principle that when wells leak they can do so at some depth and in fact in the case of HVHF wells on shore in Lancashire then potentially up to 6 miles below the surface. You cannot rely on outdated EA documents [10] based on a completely different industry sector (refining) to advise fracking operators on how to protect groundwater – but the EA thinks you can! It is clear that there is a skills gap and resources gap at the EA. Instead of additional resources being made available, the Treasury has insisted on a 10% cut by 2015. Instead of additional training and an acceptance by the EA that they need training/recruitment of specialists (engineers brought in from the O&G industry) they are in denial.

In addition to the resources cut, the EA have been told to reduce the time it takes them to issue permits under the Mining Waste Directive (MWD) to operators from the present average of 3-6 months (allowing for public consultation and expert opinion) to 14 days from February 2014! [12]. This is clearly directly against the spirit of the RS/RAE report and recommendations, and treats the public consultation process with contempt.

GLOSSARY

iHVHF:	Intensive High Volume Hydraulic Fracturing
UFF:	Unconventional Fossil Fuels
EIA:	Environmental Impact Assessment
DECC:	Dept. of Energy and Climate Change
EA:	Environment Agency
HSE:	Health and Safety Executive
OSD:	Offshore Safety Division
CBL:	Cement Bond Log
BSOR:	Borehole Site and Operations Regulations. 1995.
DCR:	Offshore Installations and Wells (Design and Construction). 1996.
MSDS:	Material Safety Data Sheet (standard availability across Pharma/Chem industry)
MWD:	Mining Waste Directive
SCADA:	Supervisory Control And Data Acquisition
UKOOG:	United Kingdom Onshore Operators Group
RS:	The Royal Society
RAE:	The Royal Academy of Engineering

REFERENCES

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4. The UK Representation at the EU Commission. DOC Ref 2012.0297 (COD). E-mail from Lowri Lloyd Hughes Second Secretary EP Sections UKREP.
5. Dept. of Energy & Climate- Government response to the RAE/RS report. Ver Final A04- 10th Dec 2012.
6. Mail to Mike Hill from Donald Dobson (HSE) 8th Sept, 2011.
7. The Scotsman - Frank Urqhuart – 29th March, 2013.
8. HSE Web site: http://www.hse.gov.uk/offshore/index.htm (there is not an /onshore tab)
9. EA Meeting – Mr. Steve Molyneaux and Mike Hill. July 2012.
10. EA Environment Agency – Onshore oil and gas exploratory operations: technical guidance published August 2013 - Groundwater Protection. (Sec 2.2.5 IPPC S1.02 Gasification, Liquefaction and Refining Sector – March 2006)
11. EA publication – Commitment to streamline and simplify environmental regulation of onshore oil and gas exploratory activities – 27th June 2013.

AUTHOR

Michael Hill is a Chartered Electrical Engineer. He studied Electrical and Electronic Engineering at Loughborough University following sponsorship by Marconi Avionics Ltd. and his successful apprenticeship. Mike worked in oil and gas as a wireline engineer and then as the engineer on seismic survey crews in the 1990s. He's now a director of a small engineering consultancy specialising in process automation of oil and gas rig equipment. Since, March 2010 Mike has been researching regulations into onshore exploration and development.

He has written several papers on regulating shale gas and has also been published in local and national medial including The Guardian, The Times and Private Eye. Mike has also worked on news articles with the BBC, Bloomberg, RTL (German TV) and the Dutch national broadcaster – NOS.

He has consulted/advised/given evidence to: The Dept. of Energy and Climate Change (U.K. Gov.), The European Commission (DG-ENV), Office for Unconventional Gas and Oil, the local councils (FBC, WBC, LCC), The Royal Society, the UK Regulators (HSE, EA), NGOs (FoE, COOP, RAFF, EKAF, REAF, FFF), the British Geological Survey and the industry. He has spoken at numerous conferences, Q&A Panels, public meetings, professional bodies and in the media. He lives in Lytham St.Annes, Lancashire, England.