

**“THE SAFETY OF THE PEOPLE IS THE HIGHEST LAW.”**

**PART FOUR: ENGLAND’S REGULATIONS UNFIT FOR THEIR PURPOSES.**

This paper gives the evidence for English regulations being demonstrably flawed:

1. **Stirling University October 2016:**

<http://www.regulatingscotland.org/report/frackingandregulation.pdf>

*The review conclusions are as follows:*

***“The evidence base for robust regulation and good industry practice is currently absent. There are multiple serious challenges surrounding location, scale, monitoring and data deficits facing regulators overseeing onshore UGE and fracking in the UK; ... evidence from peer-reviewed papers suggests fracking in the UK will not be effectively regulated. It is highly likely that regulatory agencies may lack the staffing and resources necessary to monitor and enforce effective regulation of the industry; ... findings from the peer-reviewed public health literature that already identifies significant hazards and major potential risks from the industry.”***

*This independent Stirling University report of 2016 follows another independent study by academics from the University of Bristol that, in 2015, concluded:*

*“... the system governing fracking [in England] is far from satisfactory ... current regulation does not fit the technology and processes it is trying to control ...”*

Whilst this Stirling Report is clearly damning and should be enough to suspend the industry, practical experience on the ground is equally devastating –such as the calamities outlined below by Mike Hill in the first paragraph of his rebuttal (see page 11). **There are now recent examples of failures by English regulators revealing systematic failures. The two immediately below relate to conventional drilling which, in view of its existence over so many years, one would have thought was secure by now. Such an example is West Newton, in 2014, where there was the failure of the operator, and of the regulator and, most importantly of all: such complete secrecy surrounding both failures that information was only obtainable through the Freedom of Information Act (FOI).**

<http://drillordrop.com/2015/02/19/investigation-underway-into-more-breaches-at-rathlin-energys-west-newton-drill-site/>

2. **Secondly, and only recently revealed, is the failure at Third Energy’s conventional Knapton Generation Station which, in February 2017, reported false air pollution figures, breaching its permit, and failed to use the agreed monitoring methods. These failures demonstrate systems failure with a consistent pattern: the operator, allowed to use their own process for regulation, uses the wrong methodology and is in default of the regulations – demonstrating that self-regulation fails. The regulator then gives a direction and nothing more is heard (thus the public again are forced to seek it under the FOI). The systems allowed the regulator and operator to witness a double defect in January, but none of this was ever published by the regulator. The regulators and operators conduct all their activities in secret which then can only be discovered by the public using the FOI. This is not a system of transparent regulation to protect the public. It seems to be a regulator/operator/politician conspiracy to keep the public in ignorance of all damage to their environment.**

**Further, while there is evidence that such proximity to fracking may exacerbate asthma, premature birth, migraine headaches, chronic rhino sinusitis, and fatigue, there is no English regulation stipulating how far away from homes and schools fracking needs to be such to avoid the above possible effects. The evidence that geographical distance as a major variable impact on the health of residents is simply ignored. Whereas it seems that it was this concern for what is known as the *shale gas syndrome* that recently induced the Pennsylvanian Medical Society to call for a moratorium on fracking (see below), in England, the regulations are arbitrary, capricious, partial, invariably lackadaisical and, above all, SECRET. A simple example is that the Health and Safety Executive (whose duties include well integrity) failed to visit to inspect any of the four wells recently drilled in Lancashire to ensure they were properly constructed (June 2017).**

3. **Climate Change Committee Reports:**

***“In the light of that assessment, we have concluded that exploitation of shale gas on a significant scale would not be consistent with the UK carbon budget, and the 2050 target unless three tests are met.”***

Those tests have not been met – yet fracking is poised to start.

4. This Royal Society/Royal Academy of Engineering report made ten specific recommendations and one suggestion for testing public opinion, all of which were to precede what were to be only *exploratory* activities, not full-scale *production* - only one recommendation has been implemented (as opposed to merely “accepted”). The present Fylde operation is not “exploratory” it has the capacity to be the biggest in the world using new techniques.

- a) Professor Lord Mair, on the eve of the Parliamentary hearing on the Infrastructure bill of 26<sup>th</sup> January 2015 specifically wrote:

*The government have accepted [but see immediately above] all the recommendations of our review on how to manage health, safety and environmental risks. However we cannot properly evaluate these measures until we see them in operation. If fracking goes forward in the UK, the public will need evidence that the necessary protections are in place and that they are effective.*

- b) From page 5 of the RS/RAE Report:

*An Environmental Risk Assessment (ERA) should be mandatory for all shale gas operations. Risks should be assessed across the entire lifecycle of shale gas extraction, including risks associated with the disposal of wastes and abandonment of wells. Seismic risks should also feature as part of the ERA.*

There are no ERAs being made by regulators.

Mike Hill writes:

*And this is just as 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 government 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! 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 fracking economically profitable.***

5. Messrs Mike Hill and Mike Farman write for information:

***The only RS/RAE condition fulfilled by regulators is the Seismic Traffic Light system.***

*Amount of Typical Fracking fluid – it depends on the size of the well and the number of frack stages. Our 4 wells-here (Fylde) will receive approx. 30 frack stages. This will require approx. 45 million litres per borehole – so 180 million litres for the 4 “exploratory” wells. So I would suggest the answer is NO to fracking ever happening at below 1000 cubic metres. The initial fracking due to occur at Kirby Misperton will ( I would estimate) use approx. 7,000 cubic metres if Third Energy go for 5 frack stages in a vertical borehole. In Lancashire Cuadrilla will use approx. 180,000 cubic metres. So that gives you an idea of just what I/we are facing over here.*

***Regulation Philosophy: Both the EA and HSE confirmed that they will be adopting a “risk based” approach to regulation, meaning that they will prioritize those operations defined as of most risk and concentrate on these rather than cover all possibilities. This principle will also be applied to drilling companies; they agreed that the most trusted will be less closely monitored. The “risk based” approach is less costly and resource-consuming for the regulators, but by definition is less complete and puts self-regulation responsibility onto the drilling companies.***

***[The process] ... is already 100% self- regulating as confirmed by HSE ... However, it is not happening. Cuadrilla is a good example: the brand new, in 2007, Cuadrilla Resources was immediately, without any evidence whatsoever, considered a “Most trusted” company. They were not inspected once by the HSE in 5 years for well integrity and well construction.***

***Independent Well Examiner:*** *It's no secret that this will be either an employee of the drilling company or someone hired by them. I asked an HSE representative how someone representing the drilling company could be independent and impartial in the event of an expensive problem or failure. The reply was that each examiner would be thoroughly vetted. I asked whether that meant he/she would be interviewed by the regulators, and was told no, they would read his/her CV.*

***Disposal of Flowback Fluid:*** *Drilling companies estimate that, in the active lifetime of a well, most of the fracturing fluid is returned to the surface, together with some miscellaneous toxic substances and naturally occurring radioactive materials (NORM). I asked about treatment and disposal of these flowback fluids. The regulators' representatives confirmed that there are only three approved waste water treatment plants and these are already in constant heavy use ... The EA document "Onshore Oil and Gas Sector Guidance" (Aug 2016) says: "The EA will not generally permit the re-injection of flowback fluid for disposal into any formation.....The re-injection of flowback fluid for disposal is not necessarily prohibited and may be permissible where, for example, it is injected back into formations from which hydrocarbons have been extracted and will have no impact on the status of water bodies."*

***Fugitive Methane:*** *Mandatory monitoring of fugitive methane emissions would be carried out by the drilling companies, although I was told that the agencies also have monitoring equipment and might carry out some checks. "Green completions" are not mandatory on the operators and would involve expensive additional equipment. One EA representative was unable to provide any information about the techniques used.*

- 6(a) Mr Kevin Hollinrake (MP, Con, Thirsk and Malton) has now accepted the post (PPS the Secretary of State for the Environment) to work specifically for the Environment. But he represents a constituency which is heavily licensed for fracking and, therefore, he is understandably anxious to assure his constituents of the soundness of the regulations to protect them from the increasingly well-known and increasingly large number of hazards and dangers being experienced across the world from fracking.

To this end, he made statements and wrote letters which are, in part, reproduced below, together with responses to them from experts and experience in the field.

**Mr Hollinrake tells us that “there are many differences between regulations in the US and those covering exploration in the US”. This is a most important observation to which Mr Mike Hill B.Sc. C.Eng. MIET. responds with:**

*A key difference between the US and UK on the subject of regulation is the inspection strategy and enforcement. The US makes use of independent (financially and technically) inspection agencies that use evidence to drive site visit decisions. So a new operator can expect more visits than an operator that has been shown to “do things by the book” over an extended period of time. Every operator must tell the inspector when it is planning all its various jobs (cementing etc.) The inspector then decides whether to go or not. He/she does not inform the operator. They always show up unannounced. There is much power in this. They make frequent, random, and unannounced visits to site and the operators are kept “on their toes” at all times. We have the exact opposite in the UK. Here we are entirely goal setting and self-regulatory. The US has prescription – minimum things you must do – the UK does not. As the former CEO of an operator’s account puts it: in the UK “it is a game – like poker. You have to go up to Aberdeen (they never come down). You go up and give them your minimum position. No point telling them all your cards in advance – the investors would not be impressed if I cost the company a lot of extra money needlessly. They come back with their minimum via “suggestions” (cannot say “direct” as that would be prescriptive) and on it goes till you both agree what you will do. So it is always the minimum you can get away with. It is madness. Compared to expertise in the US, the UK is so easy and so much easier than we are led to believe”. In the UK the HSE has stated it has “no intention of inspecting the wells and making random visits”. It did not visit to inspect for well integrity for the four wells drilled already for fracking up to 2012. It also does not require Cement Bond Logs (CBL). It told the Task and Finish Group of Fylde BC that it could not afford the petrol money to come down and give evidence to the council (citing “geographical” reasons).*

*The UK regulatory system is woefully inadequate compared to the US. In approach and in application. The UK government has*

*entirely failed to take into account that we are onshore (where there is a public and farming and indigenous industries to protect). It fails to take into account that this is a new industry to the UK (as stated by the DECC in a letter – only one well in UK HVHF). They have failed to take into account the new drilling techniques applied and, most importantly – it does not take into account population density, where fracking is due to happen, far greater than compared to the US.*

6(b) Mr Hollinrake offers theoretical regulatory reliance on ten bullet points: Mr Hill's rebuttals to each are shown in italics:

- (i) ● Independent scientific monitoring take place to establish the baseline and ongoing water and air quality and seismic activity, before, during, and after work takes place.

*The BGS have categorically stated this is **NOT** the case. This denial has been publicly stated with the permission of the BGS, see: [www.shalegasoffice.com/comment](http://www.shalegasoffice.com/comment) Dr Rob Ward, the BGS.*

- (ii) ● This also monitors methane in water and fugitive emissions of methane into the air, so any change due to fracking will be clearly apparent.

*Bullet 2 – This is wrong. There is no monitoring of methane on the Fylde. There is only a very basic study going to try to monitor some background levels, but the BGS and EA, when pushed about proper baseline studies that can be relied upon in the future, (maybe in court) both said there was no baseline monitoring.*

- (iii) ● We do not allow open ponds for wastewater storage to reduce risks of spills and any adverse effect on air quality through evaporation.

*Bullet 3 – We maybe not, but nobody is checking as we have no inspection strategy – so is KH himself going to check?! When he says “we do not allow”: who is the “we” exactly? What the UK is allowing (unlike the US) is to recycle the flowback (wrongly here called waste water). The US discovered this process simply does not work, and the risks are multiplied. The UK has decided to ignore US regulation and allows it here. A huge mistake.*

- (iv) ● We do not allow reinjection for disposal of wastewater, a process thought to be connected seismic activity.

*Bullet 4 – Again no such thing as “wastewater” – that’s what flows off a roof in the rain. This is fracking waste or flowback and contains radioactive sludge averaging 90x the max permissible limit: calling it “waste water” is economical with the truth. Again who is the “we” in this”? **Nobody will be enforcing this so the operators can re-inject if they want to. Pater and Baisch (Nov 2011) made it clear that fracking does indeed cause earthquakes (induced seismicity) not just re-injection. Canadian research agrees. Simon Toole (now of the OGA) accepted the P&B findings.***

- (v) ● We only allow fracking to take place at minimum depth of 1km – there is no minimum depth in the US meaning that fracking can take place close to the level of the aquifer.

*Bullet 5 – KH seems confused: it does not matter how deep your fracking is. 1km 10km or 500m. It makes no difference in terms of contamination or risk thereof. This was explained to the Ryedale meeting in Feb 2015. Prof Richard Davies agrees with this. When a borehole is drilled there is a link to the shales directly to your surface strata and aquifer via the borehole. This happens many thousands of times and UFF requires 1,000s of wells. So the risk of contaminating the aquifer is the same. KH’s statement is not accurate and misleads. **The risk is mitigated not by depth, but by well construction and well integrity. Nothing else.** As for the US – there is a very obvious reason why they allow fracking nearer the surface. This has nothing to do with risk and all to do with the depth of their shales. It is a geological issue.*

- (vi) ● We have much higher standards for environmental permits and planning applications, meaning that cumulative impact of well sites must be taken into account to protect the local economy and countryside.

***Bullet 6 – what evidence is there for this statement? The EA has allowed the Permits, in effect, to ignore EPR 2010 regulations relating to fracking waste migrating from the target formation***

(see paper by Mr Hill “The Case”:

[https://media.wix.com/ugd/b0aabf\\_8b49380dd66c44e7b614dc0f3241a5ac.pdf](https://media.wix.com/ugd/b0aabf_8b49380dd66c44e7b614dc0f3241a5ac.pdf)).

**Further the UK now allows recycling of flowback. This statement is simply wrong and, without evidence, is meaningless.**

- (vii) ● In the US, the landowner owns the mineral rights thereby offering an incentive for every landowner to have a well pad.

***Bullet 7- this is a misinterpretation of the result. Landowners may not own the mineral rights, but they do own the land. They lease it out for pad development. The number required depends on the shale play and its recoverability. Of course any operator will try to reduce costs, but the number of pads is still extensive. At the Fylde site, the operator has estimated 100 pads are needed for 60 wells on each. 60 is four times the highest number ever put on a pad anywhere in the world. So they need to use a brand new, untested, technique of laddering to achieve this density on a single pad. The regulators have no experience of this new method. Even if it works, putting so many wells on a pad massively increases the infrastructural services needed: (silica, chemicals, generators, compressors, silos, workshops, accommodation blocks, waste disposal, fracking kit, drill pipe, drill mud, roads’ and verges’ destruction, miles of pipeline, hundreds of HGVs.....) that are needed and so massively increases the disruption to any persons living in the vicinity.***

NB: The RS/RAE Report only approved experimental fracking subject to ten recommendations, of which nine are unfulfilled.

- (viii) ● All “waste water” is treated as mineral waste and must be taken to a licensed treatment plant.

***Bullet point 8 – “Waste water” treated as mineral waste. Well it is not “waste water” – it is fracking waste (as above, a huge difference). Only people ignorant of fracking or trying to propagate myths (as they have a vested interest i.e. are in the industry) about fracking would call it wastewater. Secondly, as the EA permits allow recycling of flowback (despite there being no defined process for this, no regulations and no monitoring of it – “You and us will just have to see what Cuadrilla decides Mike” – Steve Molyneaux – EA Manager to me Jan 2017) then***

*there will be very little fracking waste as in flowback. There will be drilling wastes though and these are also toxic. The plan here is to solidify the radioactive sludge and send it to landfill. (EA told me this directly in Jan 2017).*

- (ix) ● Our climate is windier, so air quality issues are much less of an issue compared to the central states of the US.

*Bullet 9 – this is pretty odd! Can KH honestly be suggesting that we are safer because we can measure how windy it is and the pollution will be more easily blown away/diluted in air? As the US insists on RECs (Reduced Emissions Completions) and no flare their air quality around fracking pads is far better (in terms of risk) than it can be the UK. Relying on gales to disperse the benzene, radon, toluene etc. from the flare gasses that are unburnt and treat as “good practice” seems bizarre and surely cannot be meant seriously ...*

- (x) ● Only 'non-hazardous' chemicals will be permitted for hydraulic fracturing fluids in the UK and the nature of these chemicals must be made available to the public.

*Bullet 10 – It is not really what goes down the borehole that is the main issue because, in the UK, nobody checks what goes down (they self-declare in the UK – unlike in the US where the EPA inspect via frequent random visits) so indeed they could use HcL at 25% and Polyacrylamide etc. in greater concentrations, but really the key is what flows back. So you can put fresh mineral water down and what flows back is highly toxic (see the EA analysis of PH1 flowback of 2011). It is pure industry propaganda to emphasise that “nothing toxic goes down”, the industry knows it is. KH seems to have fallen for this line.*

7. “The UK has one of the most stringent onshore drilling safety regimes in the world” - Church of England Mission & Public Affairs Council and the Environment Working Group Briefing paper on Shale Gas and fracking.

*Extract from: Independent Review of the Church of England Mission & Public Affairs Council and the Environment Working Group Briefing paper on Shale Gas and fracking.*

*Author: Michael Hill, B.Sc. C.Eng. MIET.*

*Date: January, 2017*

*Writes his rebuttal:*

***This is simply not borne out by the facts and is a very dangerous and highly complacent statement to make. The author, since 2010, has been examining this very issue in great detail and has worked with many partners including the UK Gov., the industry, local councils and the Joint Research Council under the EU Commission. The U.K. has the unenviable record of having two world records in the field of oil and gas; the worst ever loss of life (Piper Alpha July 1988 – 167 died) and the worst ever environmental disaster (Deepwater Horizon April 2010 – 11 died). One an American rig in U.K. waters and the other a U.K. rig in American waters. Onshore conventional exploration has been limited in the U.K. and High Volume Hydraulic Fracturing (HVHF) has been limited to a single well in Lancashire. The author was present on that single well, Preese Hall 1, during its drilling phase and understands its history. This is worth closer examination as it highlights the inadequacies of regulation and monitoring onshore. (see p ..... below for summary) Before the well was fracked to stage 5/12 in April 2011, a strong debate was held between M.Hill (Engineer), M. Miller (CEO Cuadrilla) and G. Moody (Health and Safety Executive - HSE) focusing on Cement Bond Logs (CBL). Hill has previously developed Briefing Notes on “Necessary Regulations”<sup>(9)</sup> and issued them to the Dept. of Energy and Climate Change (DECC) Simon Toole. Toole invited Hill to a number of meetings in Parliament and Whitehall to discuss the lack of onshore regulation and monitoring to find a way forward. Cuadrilla did not run CBLs on the intermediate and surface casing strings for PH-1. These upper strings offer the most protection to the public and environment. Hill insisted that on all future wells this should happen as part of setting confidence levels on well integrity. Miller wrote to the HSE seeking guidance on this issue. **The HSE wrote back to Hill and Miller stating there was no requirement (from them) to run CBLs. Miller informed Hill that annular pressure (AP) readings should suffice but Hill reiterated the need for CBLs as an AP reading represented a more serious stage of well integrity failure as it indicated an entire cement string had failed and so potentially a serious release of hydrocarbons/fracking fluids to the formations/atmosphere. Miller*****

*agreed with Hill and proposed to run CBLs as long as Hill (on behalf of the people of Lancashire) would inspect them. Hill agreed. By the 1<sup>st</sup> April 2011, the fracking had caused 48 tremors and two small earthquakes of sufficient seismicity to damage the well over a very large interval, including severe deformation of the casing.*

*The regulations state that the operator shall send a fax once per week to the HSE in Aberdeen. This is what forms the oversight by the HSE of the well. No onsite inspections for well integrity/construction were executed on any of the four wells drilled on the Fylde (see written answers to Hill) and none were planned. Cuadrilla did not inform the regulator of any damage to the well at that time. Three years later on 28<sup>th</sup> March, 2014 Cuadrilla discovered an AP (which would eventually settle at 342 psi) between the production tubing and the intermediate casing string. They informed the HSE of this well integrity failure and serious situation. The first response of the HSE was to request the CBL for the intermediate casing string as they needed to check the condition of the cement at the time of construction. The very CBL that 3 years earlier the HSE had criticised Hill for asking for and told the operator they did not need to run! As it did not exist they could not inspect it and both regulators (HSE and EA) had to rely on the operator's theories as to how the cement had failed and why they thought/hoped there would be no leakage as a result.*

*To summarise: the only well to have been fracked in the U.K., suffered an integrity failure that the HSE were not aware of for up to THREE years, suffered damage to the casing due to unpredicted induced seismicity, caused by the fracking, which the neither HSE nor the DECC were aware of for over 12 months, was never inspected once by the HSE for well integrity, which may or may not have leaked into the surrounding formations (we do not know because the EA have not checked) and which has now been abandoned.*

*This is the state of regulation and monitoring in the U.K. Taking into account the above summary, which is on the public record, it is simply astonishing for the church paper to conclude that regulations are the most "stringent" in the world. Such an assurance puts at risk the lives of the general public and environment. It also unfortunately demonstrates the contributors to the church paper clearly do not understand the oil and gas industry, unconventional versus conventional, how it operates onshore and have done little to no research on the sector. Fracking is inadequately regulated and monitored. This represents a serious risk to the public and the environment, as outlined to the Government and industry in a number of papers including the RS/RAE Report in June 2012 and the*

*follow up review in 2013 with the ten recommendations and their non-implementation.*

8. The dispute between Surrey County Council accusing Angus Energy of drilling without permission has been blamed on English regulations not being enforced by regulators.
9. **Irish Government: The Joint Committee of the Irish Parliament's report (aid before both Houses of the Oireachtas 12 April 2017) found that there were risks from fracking that would not be dealt with by regulation, even if regulation was improved:**

<http://www.oireachtas.ie/parliament/media/committees/communicationsclimatechangenaturalresources/fracking/20170412-Report-32CCAE001--FINAL.pdf>

10<sup>th</sup> July 2017, Sir Richard Storey, Bt CBE.