

Rebutting and Responding to Criticisms of the Medact Report on Fracking and Health

Introduction

The Medact report Fracking and Health has been challenged and [criticised by UKOOG](#): the representative body for the UK onshore oil and gas industry. A number of pro-fracking individuals have also criticised the report via social media, in person at the report launch, and in an ‘open letter’ to Medact; while a news item published by the Times falsely claimed that the Medact report had been written by an ‘activist’.

All substantive criticisms have been looked at in detail, but none give reason to change the conclusions and recommendations of the Medact report.

However, we welcome debate and feel that it’s important to respond to criticisms and challenges that are substantive and serious. Those which come in the form of unjustified ‘ad hominem’ attacks or aggressive and vulgar comments have been ignored.

Readers of this commentary should know that several aspects of the Medact report have not been criticised. For example, Medact’s concerns about the social and mental health effects of fracking appear not to have been contested.

We also note that a number of criticisms were bogus and spurious – these criticisms would suggest a failure to carefully read the Medact report; a wish to incorrectly suggest that the Medact report is full of errors; or an intention to muddy the waters and create (even more) misunderstanding about fracking amongst the public and policy-making community.

Medact wishes to promote a debate that is clear, transparent and based on evidence. While it is entirely legitimate for those who have vested interests in the shale gas industry to express their views in the debate; the general public and government officials need to be clear about which voices are potentially conflicted and which are not when considering the debate. Medact declares no vested interests in fracking.

David McCoy and Patrick Saunders (April 16, 2015)

Claims that Medact has failed to understand the regulatory system

UKOOG makes repeated claims that Medact does not understand the regulatory system. In one example, it states: “Medact’s report fundamentally fails to understand the regulatory system put in place in the UK to cover shale gas exploration. The Medact report does not recognise the UK regulatory assessment and permitting process for onshore oil and gas which has been created to protect the environment and health”. In another example, UKOOG claims that Medact has ignored “the founding principle and purpose of Environmental Impact Assessment (EIA)”.

It has also been suggested that Medact has not taken account of two documents on shale fracking in the UK that were published by the Department of Energy and Climate Change (DECC) in February 2014 and which outline the government's plans to manage the risks of fracking to water and air quality.

It has been further claimed that the Medact report is incorrect in a number of places, including making statements that: a) plugged and abandoned wells will be monitored for only one year after abandonment; b) there is no mandatory and fully independent oversight of actual construction of wells and no provision for unannounced and appropriately frequent spot checks; and c) detail about the quality, frequency, amount and comprehensiveness of pollutant monitoring is unclear.

Response

The Medact report provides a clear description of the regulatory system governing shale gas development. It does not claim an absence of regulation; and explicitly recognizes that the UK has a good reputation for sound health and environmental protection. However, the report raises a number of concerns including: gaps in the regulatory system; a lack of specificity about 'best practice' and 'minimum standards'; an over-reliance on self-regulation by the industry; a lack of mandatory and independent testing and examination of industrial and commercial processes; and inadequate staff and budgets within regulatory bodies.

The two aforementioned documents published by DECC on water and air quality were reviewed for the Medact report. And we stand by our claims that the regulatory framework for monitoring plugged and abandoned wells; for ensuring well integrity; and for the monitoring of pollutants are insufficient.

There is a great difference between the design and implementation of regulation under a hypothetical ideal scenario, and regulation as it is practiced in reality. There is also a great difference between assurances that are based on what fracking companies say they will do voluntarily; and assurances based on what fracking companies are legally obliged to do under strict and proper surveillance. These differences are hugely significant, but have been glossed over by UKOOG (and indeed, other actors).

We repeat that the concerns about regulation already mentioned do not provide assurance that fracking in the UK could or would be conducted in a manner that would ensure adequate protection to people and the environment. A [recent paper published in Environmental Law](#)

[Review](#) that examines the regulatory system for shale gas development in the UK echoes the concerns raised by the Medact report and concludes as follows:¹

There are a number of risks and uncertainties associated with fracking accompanied by a number of corresponding gaps and uncertainties in the regulation. Whilst the present regulatory systems offers a base of controls built upon conventional oil and gas experience, its suitability is limited. The inability to transpose one set of regulations from an existing context into a new context is apparent. At present gaps emerge as a result of a lack of coherence and uncertainty surrounding the applicability of regulations as well as through the application of inappropriate thresholds. These are compounded by the lack of regulatory expertise and experience and the questionable capacity of regulatory authorities to fulfil their assigned roles. Maintenance of the current approach and controls will leave areas exposed to potential environmental and health damage.

It is worth noting as well that the US regulatory system has Environmental Impact Statements that are similar to EIAs in the UK and used to inform public health considerations. Similarly, in all parts of the US where shale gas development is unfolding, while similar claims about the effectiveness of regulation have been made, problems keep occurring, even as regulations become tighter and more robust.

Claims that Medact has incorrectly extrapolated from the experience of fracking in the US

Many criticisms of the Medact report suggest that it failed to account for differences between the US and UK. For example, UKOOG states: “One of the fundamental flaws of the Medact report is that it attempts to transpose situations in other countries onto a different regulatory system, geology and geography that exist here in the UK”. UKOOG also claims that the Medact report “uses inappropriate comparison with different projects, applying different techniques and practice, under different planning and permitting regimes on different continents.” Another critic went further by stating that US-based studies of fracking should be ignored altogether.

Response

Contrary to these claims, the Medact report actually highlights and describes geological, regulatory, operational and economic differences between the UK and the US. Indeed, it notes that while some differences may increase hazards and risks in the UK relative to the US, others may do the opposite. In our estimation, differences in terms of geology, geography and population density place the UK at greater risk from the hazards associated with fracking than the US. Furthermore, claims that regulatory control is tighter in the UK than in the US require further and more careful study.

¹ Hawkins J, 2015. Fracking: Minding the gaps. Environmental Law Review, Vol. 17(1) 8–21

However, it is a fact that nearly all the available empirical evidence on the impact of unconventional shale gas development comes from the US. Suggesting that this experience should be ignored is absurd. Similarly, while the state of California cannot assume that its experience with shale gas development would be the same as that of Pennsylvania due to differences in regulation, engineering techniques, operational practices and geologies, it would be absurd for California to disregard evidence from Pennsylvania.

While differences in geology, regulation and other procedures and practices must be taken into account, the evidence from the US is both relevant and necessary to policy decisions in the UK.²

Assessing risk and impact

Throughout its commentary on the Medact report, UKOOG argues that the existence of a potential problem does not mean it will occur. UKOOG notes that “it is not sufficient to have a hazard source alone; there must be a source-pathway-receptor linkage – there must be a plausible means whereby humans may be exposed to the hazard in sufficient quantities to cause harm” and that “numerous regulations and assessments in place to reduce or eliminate adverse occurrences”.

Additionally, where reports of harms associated with fracking exist, UKOOG claims that these reports “suffer from a number of issues including self-selection of sites, lack of peer review, size of surveys, leading questions, ignoring other influences within the same geography, anecdotal evidence and short term measurements against long term thresholds”.

Response

The Medact report states categorically that potential hazards associated with fracking may not necessarily have any negative impact on human health. The report makes the very same point that exposure to hazards is a critical factor. Specifically, it states: “human exposure to the risks and hazards associated with fracking will vary from site to site depending on a host of geological, social, demographic, agricultural and economic factors. This includes the size, number and proximity of communities to fracking sites; the number and density of wellpads and boreholes; and the operating practices of fracking companies, including their adherence to safety standards and best practices”.

For this reason the report concludes that “although one can state categorically that fracking poses threats to human health, the precise level of risk cannot be known with certainty” and that “assessing the level of risk requires careful judgement based on the available evidence and

² Interestingly, UKOOG repeatedly refers to the Public Health England report as a source of assurance that fracking can be conducted safely in the UK even though its review is substantially based on evidence from the US.

an appropriate attitude towards the precautionary principle, whilst considering contextual factors *and* the potential benefits of fracking”.

However, the available science on shale gas development is at best uncertain but the evidence is undoubtedly incriminating with regard to environmental and public health risks. Given the state of the science and what we know empirically, the Medact report makes the case for precaution, rather than simply claiming or assuming that operations will be adequately and effectively regulated.

Although PHE concluded that the risks will be low *if the operations are properly run and regulated*; the Medact report concludes that shale gas development produces enough risks to the environment and public health to warrant, at the very least, further study and a more comprehensive health and environmental impact assessment. While any interpretation of evidence is unavoidably influenced by value judgments, the Medact report is backed by the weight of empirical evidence.

Climate Change

In their response to the Medact report, UKOOG claims that shale gas can act as a relatively clean source of energy that can act as a bridging fuel towards a decarbonized energy system. It makes this argument mainly on the basis of assertions that fracking will not produce fugitive methane emissions, and that methane will displace the use of coal as a source of energy.

Response

UKOOG does not respond to the arguments presented in the Medact report; and makes no reference to the paper by McGlade, Ekins, Bradshaw and Watson on the conditions required for environmentally-friendly shale gas development.

The Medact report notes that under certain conditions, shale gas could provide a cleaner (in terms of climate change) source of energy compared to liquefied natural gas and one that is comparable to conventional gas. It also notes the superiority of shale gas over coal in terms of greenhouse gas emissions (but only if fugitive emissions are kept below a certain level). However, the Medact report explains the following: a) promises that fugitive emissions will be mitigated cannot be guaranteed; b) for shale gas to act as an effective bridging or transition fuel, it must displace the use of coal permanently, not just on the UK but worldwide; c) the window of opportunity for shale gas to displace coal-powered electricity generation in the UK is limited and unlikely to be met; and d) shale gas production in the UK is at least as likely to displace renewable energy development than coal.

The case for promoting shale gas on the grounds that it offers a solution to the serious threats

posed by global warming simply does not withstand scrutiny.

Financial liability

UKOOG argues that Medact is wrong to raise concerns that too much risk is held by communities and the taxpayer relative to fracking companies. UKOOG states that “environmental regulators and planning authorities have the power to require upfront financial bonds to address these risks”. But because it “does not wish to leave this to the taxpayer or the landowner”, as a less expensive alternative to upfront bonds, UKOOG “is working with Government on the development of an industry scheme that will step in and pay for liabilities”. UKOOG also notes that “the Infrastructure Act makes clear that landowners are not liable for any loss or damage which is attributed to the exercise of the right of underground access”.

Response

The statements made by UKOOG do nothing to dispel Medact’s concerns about the distribution of risk between the public, local communities and fracking companies. If anything, UKOOG’s statement reinforces the need for greater clarity and for stronger assurances that the public will not bear a disproportionate and unfair amount of cost due to social or ecological harms caused by fracking.

Spurious arguments and claims

UKOOG makes a point of noting that the use of open pit lagoons to store fracking fluids “is not allowed in the UK, where all fluids have to be contained within double skinned tanks sitting on protective bunds”. Another critic similarly noted the fact that the Medact report stated that 33% of pollution incidents in the US have been due to ‘*overflowing pits and failures of pit linings*’ and implied that Medact was unaware that such practices were not permitted in the UK. UKOOG also notes that while flowback fluids have been used as dust suppressants on roads in some countries, this too is a practice that is not allowed in the UK.

Response

The Medact report makes no suggestion that these practices will be allowed in the UK. The use of open pits for storing fluids is only referred to as a common cause of water contamination in the US. The most substantial risk for water contamination comes from well casing failure, followed by surface spills and the accidental release of fluids, which can happen in a number of different ways. While prohibition of open pit storage lessens the risk of water contamination, risks will remain no matter how flowback fluid is stored. The use of flowback fluids on roads as dust suppressants is not mentioned at all in the Medact report.

There have also been criticisms of the fact that Medact mentions the potential dangers of benzene. This includes the claim that the emission of volatile organic compounds (VOCs), including benzene, is only a concern in “shale oil wells” and not with shale gas.

Response

Benzene is naturally occurring in shale and other hydrocarbon deposits and is released into the air throughout the oil and gas development process. Adverse human health outcomes can occur through inhalation, oral or dermal exposure; and benzene can volatilize into the air from water and soil. The Medact report discusses benzene only in the context of toxins that are generated by shale gas development processes and makes no claims that benzene is used in fracking fluid. Thus, the statement that benzene is not permitted in fracking fluid is irrelevant.

More importantly, the claim that there is no evidence of VOC and benzene emissions associated with shale gas development is simply incorrect. These emissions have been linked to shale gas operations on numerous occasions and are well documented in the peer-reviewed literature. (See McKenzie et al. 2012; Macey et al. 2014; Pétron et al. 2012; Pétron et al. 2014; Helmig et al. 2014; Swarthout et al, 2015; Colborn et al, 2014). The notion that VOC emissions are only associated with shale oil development but not shale gas development is therefore plain wrong.

It has also been claimed that the Medact report failed “to understand that a 30 stage injection frack job is like 30 separate frack jobs and is no big thing”; is “scaremongering by suggesting a 60 multiwell pad would be an issue, when the surface impact would be not much more than a single well”; and is making “references to ‘earthquake’ when this is not a significant risk and has been looked into with great detail, and academic research”.

Response

A 30-stage injection frack job (this means a single borehole having thirty separate fracking operations) in shale *is* a big thing. Each stage uses ~400,000 gallons of fracking fluid, which translates into millions of gallons of frack fluid per well (some may consume over 10 million gallons of frack fluid depending on the number of stages). What people tend to misunderstand is that the magnitude and spatial intensity of developing natural gas from shale formations is far greater than traditional natural gas development. Fracking per se is not problematic – it is the fracking of *shale* that is a problem.

There is often confusion around the differing use of terminology: a wellpad may consist of multiple vertical boreholes; and each vertical borehole may generate multiple lateral boreholes. The surface impact of a well pad with sixty boreholes (vertical and lateral) would be at least 10 acres. This is a far greater surface impact than a single well used in conventional gas extraction. Also, with shale gas, well pads are typically clustered. Shale is different from conventional gas: it

isn't the same as just dropping one vertical well into a permeable reservoir and sucking the resource out like a straw - shale gas development requires drilling and fracturing the actual source rock.

Furthermore, it isn't just about the surface impact. What is as important is the amount of underground activity (related to the number and length of lateral boreholes) and the amount of fluids used and waste produced; not to mention the air emissions, associated infrastructure, truck traffic, etc.

Seismic activity is a clear risk that has been highlighted repeatedly in the peer-reviewed literature. Most seismic activity is caused by underground injection of waste, but it has also been linked to the hydraulic fracturing process itself (e.g. Skoumal et al. 2015 available at <http://www.bssaonline.org/content/early/2015/01/01/0120140168>). For all peer-reviewed sources on seismicity and fracking see:

https://www.zotero.org/groups/pse_study_citation_database/items/collectionKey/WQVC62H5)

UKOOG states that “the (Medact) report concludes several times that fracking itself is a new activity. Even if you were to restrict the definition to high volume, this is simply not the case.”

Response

The Medact report is very clear in its definition of the term ‘fracking’. We take it to mean high volume hydraulic fracturing of *shale formations*. Fracking as a well stimulation technique has been around for over 60 years, but Medact’s report is concerned *specifically* with fracking shale formations for natural gas. This is undoubtedly a new activity, as evidenced by the fact that shale gas is only being commercially produced in three countries (U.S., Canada, and China) even though there are reserves in many other parts of the world. In the US, for instance, shale gas constituted just 2% of US natural gas production in 2000 before rising rapidly to 40% in 2012. The combinations of technologies used to produce natural gas from shale have been pieced together over the years and only within the past decade has it arrived at its current form. While the first hydraulic fracturing of the Marcellus Shale (Pennsylvania) occurred in 2003, it wasn’t until late the 2000s that shale gas was really being produced in significant amounts.

Authority and Legitimacy

On a number of occasions, UKOOG makes reference to the reports of independent and authoritative bodies, with the implication that Medact is neither independent nor authoritative. It also claims that the Medact report is “at odds with the conclusions of independent expert reports in the UK and Europe” and also insinuates that Medact has an “axe to grind”.

Response

The conclusions of the Medact report are supported by the vast majority of peer-reviewed scientific literature on shale gas development and match most other recommendations made by independent public health experts. It is true that the Medact report contradicts the conclusions of the Public Health England report. But the scope of the Medact report is much wider and also benefits from an additional year of science, during which ~ 175 new articles on shale gas development were published (see here). In our view, the PHE report is more of an anomaly.

Authorship and independence

A report in the Times made the claim that the Medact report was written by an 'activist', who furthermore, is standing as an independent parliamentary candidate on an anti-fracking ticket. Other comments have sought to cast aspersions on the Medact report by associating it with so-called green groups like Friends of the Earth.

Response

The Medact report was authored by two public health specialists, one of whom is a medical doctor. The Times report is therefore inaccurate and misleading. A number of other individuals made contributions to the report, and various other people acted as reviewers and advisors. Among the contributors is Mike Hill, a chartered engineer with many years of experience of the oil and gas industries, who was labelled an 'activist' by the Times and who is currently standing as a parliamentary candidate.

Medact has not sought to hide Mike Hill's contributions to the report; but equally, Medact has not associated itself with Mike Hill's personal political campaign. Efforts to challenge or rebut the analysis and recommendations of the Medact report through ad hominem attacks are undignified and do little to ensure rigorous and honest public debate on fracking.

Medact also refutes the insinuations that taking a strong policy position against shale gas development is somehow incompatible with scientific and evidence-based analysis. As with many areas of public policy, evidence may be limited and incomplete and positions and conclusions have to be based on judgement as well as normative principles and values. This is why we have stressed the point that Medact has no pecuniary interest in either a pro- or anti-fracking position.