Undermining devolution at depth: the implications for the devolution of environmental powers of the Infrastructure Act 2015 and the practice of hydraulic fracturing [1]

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J.P.L. 2 It is not hyperbolic to state that the process of hydraulic fracturing or "fracking" has become one of the most controversial methods of hydrocarbon extraction in the world. [2] Alongside other sources such as the oil sands of Alberta, Canada and drilling within the Arctic circle, it has become known as an "extreme energy" source and emblematic of our continued reliance on oil and gas for energy and material production. [3] There is considerable debate amongst States internationally about the validity of using such sources, and indeed the use of oil and gas at all, particularly in relation to energy production. These debates also come at a time when pressure on the use of plastics, the production of which is reliant on hydrocarbon supply, is at its utmost. As such, the question of whether we should be using such sources at all or striving to wean ourselves from this multi-faceted resource is at the forefront of policy debates the world over. This complex argument is, however, not exclusively supranational. The policy of devolved governments in the UK varies on the utility of hydrocarbon resources found in shale rock formations and the validity of opting to extract them. Policy variance, the nature of the hydraulic fracturing extraction process and existing legislative provisions regarding its licensing have inadvertently created a standoff over the use of these oil and gas resources. This is one which might be broken by undermining (literally and metaphorically) powers devolved to the Welsh Government by that in Westminster. This piece hopes to outline the nature of this potential loophole which emerges from legislation created to assist in the development of hydraulic fracturing projects in the UK. Following from this, it will consider the wider issue of the inadequacy of the existing regulatory framework for these projects which this loophole highlights. Finally, it assesses what is needed to ensure that this complex and fragmented licensing process does not result in an abuse ***J.P.L. 3*** of environmental justice, as well as the powers constitutionally afforded to the devolved Government of Wales.

The nature of the extraction of oil or gas via the process of hydraulic fracturing means significant areas of land might form part of a single project. [4] This is because whilst a single drilling rig on the surface might be easily placed on one relatively small plot of land, the pipes which reach the subsurface shale rock formation can run for in excess of a mile. Following the decision in *Star Energy Weald Basin Ltd v Bocardo SA*, [5] this might have presented an issue for the development of a new sector of the oil and gas industry based on hydraulic fracturing from emerging. The case was concerned with whether rights to subsurface land had been breached by the presence of oil drilling operations. The Supreme Court held that the commonly referred to maxim of land rights existing "to heaven above and the centre of the earth below" was limited by a number of factors in reality. One

of these was the practicality of being able to exploit land at significant depth for the average individual. In *Bocardo*, the depth of 240m below the surface was, however, said to be far from the depth at which such a judgment would be made. As such, the individual retained ownership rights over the land to this depth. [6] No specific depth at which it would become "absurd", as the court put it, to suggest an average landowner would become unable to utilise their land was suggested, however. Whilst hydraulic fracturing operations would drill horizontally at depths below this level, the lack of certainty over the point at which they would be exempt from automatically breaching land rights would have been problematic for a fledgling industrial sector. In order to facilitate the potential emergence of the use of the practice to extract valuable oil and gas resources, provision was made in the Infrastructure Act 2015 ("the 2015 Act") to clarify the position of both extractors and land owners where horizontal wells ran below land other than that on which the drilling rig was sited.

The 2015 Act created the category of "deep level land" in relation to the "exploiting of petroleum or deep geothermal energy" within the landward area. Deep level land is defined in the 2015 Act as that which is 300m or more below the surface. [7] This land is devoid of the burden of the corresponding surface land rights for those seeking to exploit the listed resources. Essentially, the aforementioned question which remained following *Bocardo*, was answered in respect of land where it was being drilled under to access petroleum or geothermal energy. This constraint on the rights of landowners above also creates considerable issues in relation to actions in response to any potential harm caused to that land by the extraction process. [8] The piece will however focus on the issues this Act creates in relation to the approval of hydraulic fracturing operations by local authorities via the planning permission system which might allow actions by firms beyond those intended to be authorised.

In order to facilitate this discussion a brief summary of the relevant aspects of the approval and licensing processes is necessary, though more comprehensive discussions of this composite and complex regulatory framework are available. [9]

The process

The exclusive right of searching and boring for and getting petroleum in the UK belongs to the Crown. [10] This right is granted by licence to those firms wishing to extract oil and gas (onshore and offshore). Those hoping to extract so called shale gas utilising hydraulic fracturing must have a Petroleum Extraction and ***J.P.L. 4*** Development Licence ("PEDL"). These are currently issued in relation to defined geographic areas by the Oil and Gas Authority ("OGA"). The OGA has been a government company since October 2016 and with operational independence from any government department since April 2015. Licences are issued in licensing rounds and assignment decisions made on applications for licences offered within each round based on financial and technical viability and capacity of the applicants.

Following the assignment of a PEDL, a firm will identify a suitable location for exploration and potentially extraction dependent upon the potential viability and productivity of wells drilled there. Such a site, whether it is developed to the point of commercial extraction or abandoned and the licence relinquished, requires planning permission granted by the relevant Mineral Planning Authority ("MPA") within a County Council, Unitary Authority or National Park Authority and landowner access. Access to the land would be acquired in the form of a lease or licence (assuming the firm did not opt to simply purchase the title to the land). These are private arrangements, but would be negotiated upon the condition that the requisite planning permission was granted. MPAs decide whether or not to approve projects, and aspects thereof such as seismic monitoring stations, based on criteria set within the National Planning Policy Framework ("NPPF"), National Planning Policy Guidance (minerals section) and local planning and development policies. A single list of criteria is outlined only by the local authorities themselves, but common factors considered include noise, visual impacts, archaeological and heritage features, traffic, and risks of contamination. Procedurally this aspect of the decision-making process is governed by the Town and Country Planning Act 1990 and the Town and Country Planning (Development Management Procedure) (England) Order 2010. [11] A mechanism for national level intervention by the Secretary of State for Communities and Local Government is provided however, and has been used. [12] Whilst each authority regardless of type has its own planning policies, it is worth noting the NPPF is broadly supportive of hydraulic fracturing. [13] This has, to date, been by far the most controversial part of the process of developing a hydraulic fracturing site. Decisions by the MPAs concerned on two potential extraction sites on the Fylde Coast in Lancashire and in Ryedale, North Yorkshire have both been subject to appeals. The former resulted in the intervention of the Secretary of State for Communities and Local Government to reach a conclusion under the aforementioned national level intervention mechanism. [14]

The detailed workings of MPAs and the various conditions they might place upon an extraction site are not the focus of this piece. However, it is worth noting the conditions placed upon the acquisition of planning permission would vary between MPAs dependent upon factors both specific to each site and operation, but also the surrounding area. Burdens placed upon local traffic

routes and noise were, for example, crucial factors in the initial rejection of the site at Preston New Road in Lancashire, whereas such issues may not be decisive elsewhere. Extractors would also need to seek permission for each stage of the life cycle of a site and the impacts each would have, including for regulatorily necessary features such as seismic monitoring equipment. As such, a number of planning permissions would be required to progress from geological investigations and exploratory drilling to commercially productive extraction on a single site.

Each site would also require further permits and authorisations dependent upon the environmental conditions surrounding the site and the exact processes to be used to facilitate extraction there. These might include inter alia, and prior to drilling of any form, authorisation from the Coal Authority for sites in areas where mining had previously occurred, meeting Control of major Accident Hazards ("COMAH") ***J.P.L. 5*** and Control of Substances Hazardous to Health ("COSHH") regulations, and conforming to British Geological survey standards. Further to these authorisations, water abstraction licences would be required for sites utilising water from natural courses. Permits for the handling of waste, radioactive material, and any use of gas flaring or venting during the life of a site would also have to be granted by the Environment Agency, Scottish Environment Protection Agency or Natural Resources Wales. Once any drilling activity had begun, an extractor would also have to comply with Health and Safety Executive standards, and their rules relating to the flaring and venting of any gas escaping from the wellhead or which is not fit for commercial use. As such, regulation for each site could vary significantly, and all approvals evidenced before final authority to drill could be sought from the OGA, whether for commercial or merely exploratory purposes.

This highly partite process is further splintered by the devolution of powers applied in the process to the nations comprising the UK. Whilst the process outlined above is that which would be followed in those nations,[15] their policy positions on the use of hydraulic fracturing present a complex legal issue. This is owing to the provisions of the 2015 Act. These were intended to enable the development of a shale gas industry reliant upon the use of hydraulic fracturing within the UK as a whole, but now present a potential conflict with the policies of the devolved governments. Both Scotland and Wales have outlined differing policies in relation to the use of hydraulic fracturing to those seen in England. The devolved government of the former has been challenged on the legal status of the supposed ban it had placed on the practice in Scotland. Note should be made that, although the issue which will be outlined by the piece is potentially applicable to both devolved nations, the existence of an immediate concern arising from the assignment of a licence which straddles the border between England and Wales dictates the initial focus before moving on to highlight the potential for wider issues.

Wales Act 2017: the devolution of environmental powers to Wales

Prior to October 2018, the Oil and Gas Authority[16] was responsible for petroleum licensing in both England and Wales.[17] Ownership of, and exploration for, oil and natural gas is listed as a matter reserved to the UK central government under the Wales Act 2017,[18] but "the granting and regulation of licences" (to search and bore for and get petroleum on Welsh land) is a prescribed exception. Significantly for the piece, under se.23 of the 2017 Act, control over the grant of petroleum extraction and development licences has now been devolved to the National Assembly for Wales, along with control over existing licenses that apply to Welsh land.[19] Furthermore, certain powers which are relevant to proposed fracking sites have now been explicitly devolved to the Welsh Government and Welsh Assembly. For example, where hydraulic fracturing is proposed to take place in the "Welsh onshore area", in a manner which constitutes "deep-level use of land"[20] (for the purposes of exploiting petroleum), the Welsh Government now has ***J.P.L. 6*** powers in relation to notice and payment schemes,[21] which could also include the provision of specified information about the proposed exercise or exercise of the right of use of deep-level land.[22] These provisions allow Wales to create its own licensing regime in relation to both the extraction and exploration of shale gas, if it chooses to do so. In relation to existing cross-border licenses (previously issued by the UK Government), the Wales Act 2017 s.24(3)(a) makes it clear that when an existing license applies to a "licence area", where only a part of that land falls under Welsh territory, it will be treated as having the "effect" of two separate licenses in respect of the relevant separate parts of land. Indeed, this has recently by confirmed in a ministerial direction by the Department for Business, Energy and Industrial Strategy in relation to two existing licences (Petroleum Exploration and Development Licence Number 147 and Petroleum Exploration and Development Licence Number 184) which states:

"The cross-border licences shall have effect as a licence in respect of an area comprising that part of the licence area which is within the Welsh onshore area and a separate licence in respect of an area comprising the rest of the licence area."[23]

The impact of this direction is, however, unclear. This is because these licences are not completely split into legally separate licences, but instead have the "effect" of being. This creates an issue in relation to sites which are sited close to the administrative

borders which create this "effect" which will be discussed later in the piece. As has been outlined, further to a licence, planning permission for an actual site where fracking is proposed to take place is also required. Planning permission for specific sites that it is proposed will be located on Welsh land are currently granted by local councils/administrative areas (unitary authorities) in Wales. This is also, currently, [24] the case in England, where local MPAs determine (with the power to grant or refuse) planning applications at a local level and at each phase (exploration, appraisal and production). [25] According to the Government of Wales Act 2006 Sch.7 Pt 4, the Welsh Assembly can fix its own Planning Policy Framework. The current Welsh position on planning permission applications for unconventional oil and gas development has been set out by the Welsh Government in the Town and Country Planning (Notification) (Unconventional Oil and Gas) (Wales) Direction 2015, in accordance with the Town and Country Planning Act 1990 s.77. [26] According to s.4 of this Direction: "Where a local planning authority do not propose to refuse an application for unconventional oil and gas development, the authority must notify the Welsh Ministers". This was emphasised by the late Carl Sargeant (the former Minister for Natural Resources), in a letter to Chief Planning Officers of Local Planning Authorities in Wales. The letter stated that all unconventional oil and gas planning applications are to be referred to ***J.P.L. 7*** Welsh Ministers: "where local planning authorities are minded to approve them". [27] It is interesting to note this is not a requirement that all applications regarding hydraulic fracturing must be referred to Welsh Ministers, only those which the local authority is minded to approve. [28] According to paras 6 and 7 of that Direction, the time limit for a response from Welsh Ministers is set at 21 days and local authorities are only allowed to proceed with a decision in that time period if notice is received. This policy has not changed and would seem to apply indefinitely. [29] It is, however, noted in the guidance accompanying this direction that:

"the Welsh Government will closely monitor the number of applications that are referred to the Welsh Ministers resulting from this notification requirement, and the numbers of applications that are consequently called in. Its effect will be reviewed when the new Direction has been operating for an *appropriate period of time*." [30]

In the guidance document accompanying the Town And Country Planning (Notification) (Unconventional Oil And Gas) (Wales) Direction 2015, [31] and from other correspondence from the former Minister for Natural Resources, [32] it is clear that the rationale for this requirement (direction) is based on a "precautionary approach" to hydraulic fracturing and the development of unconventional oil and gas resources in Wales. This precautionary approach is based on environmental and public health concerns, such as addressing the causes of and solutions to climate change and the preference for onshore wind turbines as a more sustainable source of energy. [33] In terms of the context to this policy, this has, in part, been driven and informed by the goals set down by the Well-being of Future Generations (Wales) Act 2015 (which includes the need for "a globally responsible Wales") and the Environment (Wales) Act 2016 (which focuses on the sustainable management of Welsh natural resources and action on climate change), supplemented by the Natural Resources Policy Statement, issued in 2017. [34] Thus, this government policy has established a de facto centralised decision making process regarding planning permission for any hydraulic fracturing site. The use of this mechanism creates a policy position for the Welsh Assembly government which is prima facie based upon a lack of certainty about the impacts of the process. This position is thus unlikely to be altered without a significant shift in either the political makeup of the Assembly (and hence Welsh Government) itself or in the science surrounding the risks of the process. [35] Until such a shift occurs, hydraulic fracturing to extract shale gas in Wales is therefore, *in effect*, subject to an undefined moratorium. ***J.P.L. 8*** [36]

The problem

Notwithstanding the powers devolved to Wales outlined above, ss.43 and 44 of the 2015 Act still apply in Wales. [37] According to s.43(1) and (4), a person (natural or legal) has the right to use deep-level land in any way for the purposes of exploiting petroleum or deep geothermal energy. Such a right of use even includes the right to leave deep-level land, in a different and altered condition, from the condition it was in before an exercise of the right of use (including by leaving any infrastructure or substance in the land). The focus of this paper is that deep-level land in Wales might still be exploited if an extraction site is established on English land, and a well extended below 300m close to Welsh subsurface land. This issue as will be discussed highlights a challenge to the wider regulatory system, but nowhere is it so crucial that it is resolved than here, where powers with constitutional weight are potentially brought to bear.

Prior to the aforementioned ministerial direction by the Department for Business, Energy and Industrial Strategy in relation to border licences, a firm might conceivably place an extraction site within the English onshore area and run a well to extract gas from the Welsh onshore area provided this was below the deep level land threshold set in the 2015 Act. A local planning authority

on Welsh land could not stop an application or the well, if it entered the land below 300m on the English side of the border. The horizontal aspect of wells is thus the significant point here. By way of example, in April 2018, Cuadrilla drilled the UK's first horizontal shale gas well at Preston New Road, in Lancashire. This well was drilled through at a depth of approximately 2,700m and it extended, horizontally, for around 800m (around half a mile). [38] Thus, any encroachment upon Welsh land may have been significant. Given that available and granted Petroleum Exploration and Development Licences ("PEDLs") straddle the border between England and Wales, this is not a fictious scenario but both a source of considerable uncertainty for all stakeholders and an increasingly likely conflict between devolved and reserved powers. The current position established in the ministerial direction prima facie removes the potential for devolution to be undermined, and neighbouring land rights removed or limited, by the provisions of the 2015 Act in relation to deep-level land use. However, it is in the ambiguity over how the "effect" of two licences would operate in practical reality which is the central tenet of the paper.

Under present regulations, wells created for the extraction of oil or gas must not run within 125m of the border of a PEDL block. Licences issued do not, however, conform to the boundaries of the administrative jurisdictions of MPAs or indeed that between English and Welsh authorities. This is because permission is based primarily on the administrative jurisdiction in which the drilling rig is situated. In England, this does not present an issue of circumventing higher authorities as a national level regulation on the approval or otherwise of hydraulic fracturing projects does not exist. [39] The Welsh Government has, however, de facto created such a regulation by using authority granted under the Wales Act 2017 to call in all planning permission requests relating to hydraulic fracturing, "where local planning authorities are minded to approve them", with a clear intention to subsequently reject them. [40] The practical application of the ministerial direction on licences which straddle this border is therefore crucial in ascertaining whether the position of the Welsh Government might be undermined. ***J.P.L. 9***

Establishing the "effect"

The application of the direction would determine the extent to which encroachment on resources underlying the Welsh onshore area might be exploited by extractors from the English side of the border. The confusion here arises from the lack of clarity regarding what is meant by the "effect" of two licences, rather than them being formally split into two licences. Whilst the latter seems agreeable and would presumably award both such split licences to any firm holding that which was split, this would only be palatable until such a point as fees for renewal or variance of said licences doubled for those holding them. This would also prevent pipelines (below 300m) from being run by a firm from one newly created licence block into the other on the opposite side of the border. Thus the reasoning for not splitting licences until they are relinquished or renewed is somewhat understandable. This approach does, however, create a category of licence which lacks sufficient clarity to support the operations of extractors. In order to outline the difficulties posed by this issue and highlight the continuing problem even if this is clarified, two potential positions will be explored by the authors. The first is that the direction refers only to the positioning of surface sites under those licences, and the second is that it refers to both the surface and subsurface implications of the licences.

The suggestion that the direction might only be intended to apply to the positioning of extraction sites at the surface of land is based upon two suppositions. First, the direction is a response to the entry into force of licensing powers for the Welsh Government under the Wales Act 2017 and subsequent policy in relation to proposed hydraulic fracturing sites of the Welsh Government as outlined in the letter to Chief Planning Officers of Local Planning Authorities in Wales from the Minister for Natural Resources. [41] Without this clarity, firms holding licences straddling the border would not be able to identify the relevant regulatory authorities and might see such licences as unattractive prospects as a result. Secondly, the existence of the classification of deep level land in the 2015 Act would allow for a firm with an existing licence to extract oil and gas from within the Welsh onshore area provided that the extraction site and all vertical well portions were not within it (i.e. were in the English onshore area) above 300m. This practice would not breach either the provision of the Wales Act 2017 granting licence issuing powers to the Welsh Government as these licences have already been issued and would not infringe upon the planning policy powers devolved by the Wales Act 2006. Such a proposal would thus only be applicable until the licence was revoked and might be split formally prior to two licences being issued in its place. Further to this, it is worthy of note that taxation of petroleum products is not a devolved fiscal power and as such the authority which collects the duty on extractors in this regard would be the same regardless of whether the oil was extracted from the English or Welsh onshore area. There is therefore merit to an argument that there would be no financial loss incurred by Welsh authorities (should no other harm occur) as a result of extraction conducted according to this interpretation of the approach to licences straddling the border.

The application of the Wales Act 2017 to existing licences in this manner would allow for the extraction of oil and gas situated under the Welsh onshore area without any need to seek permission from a Welsh authority or landowner owing to the new classification of deep level land. The 2015 Act would allow such a practice provided a well which began in the English onshore area only entered at or below, and remained below, 300m from the surface. This would also have to be within 125m of the

boundary of the PEDL, but where the PEDL was in in "effect" only split at the surface to reflect the devolution of powers to Wales, then this would remain a possible scenario. The provision of notice or payments to surface landowners might be required from extractors, but an ability to prevent this occurring is precluded. [42] Extractors would therefore be able to avoid regulation and policies established by Welsh authorities in order to access resources in an area over which they had licensing authority and the power to set planning policy for ***J.P.L. 10*** mineral extraction. This could also be argued to indirectly undermine Welsh energy policy which has only relatively recently been devolved in the Wales Act 2017. In effect, a temporary lex specialis would be created in relation to these licences straddling the border (assuming that such a reality would exist only for the remainder of the term of such split licences), allowing regulatory conditions unique to them. Such an eventuality would almost undoubtedly be contested by the Welsh Government and local planning authorities as a flagrant abuse of the legislative framework on the part of the extractor, and central government authorities in the Department for Business, Energy and Industrial Strategy to facilitate extraction. Given that PEDLs contain provisions regarding subsurface activity (and specifically the limit on wells to remain within 125m of the PEDL), separating this aspect of the licence area from the surface considerations would appear, to use parlance attributed to legislation interpretation, inconsistent and absurd. As a result this is the more unlikely of the two interpretations of the direction clarifying the impact of the Wales Act 2017 s.24(3).

The alternative, and more likely, approach would therefore be to treat these licences as in "effect" being separate and distinct both in terms of their surface and sub-surface impacts. This would mean current regulatory processes would be retained and would not create the aforementioned lex specialis for such split licences. The administrative border between England and Wales would be treated as though it was the border of the licence from each side. Thus, the end of a well could not be drilled to within 125m of the border. The sites from which said wells were drilled would be situated in, and thus have to be approved by, the relevant authorities on either side of the border where their powers have been devolved. Such bifurcation of powers may deter some firms from bidding for existing licence blocks. This is particularly so given the stated position of the Welsh Government in relation to hydraulic fracturing. Under the terms that would be imposed as a result of this position, firms would be highly unlikely to seek to be granted a licence within that jurisdiction. In the interim, this would leave those firms who have already been granted a licence which straddles the border in the position of having a potentially large portion of that licence unusable. As licences which have been granted and are straddling the border would also only be in "effect" (and not legally) two licences, a firm would be left in the position of having to retain that licence in its entirety or revoke it. Whilst this approach would preserve respect for the powers granted under the Wales Acts 2006 and 2017, and prevent the cost of retaining the licensed area from being doubled, firms in such a position could be understandably of the opinion that this was unfair treatment. Nevertheless, if we consider a number of consequences which might result from the alternate outcome, it becomes apparent that this is the more likely approach to be adopted. First, this approach avoids questions regarding respect for the powers devolved to Wales. Secondly, any potential uproar from the industry which would result from the arbitrary removal of part of a licence area owing to legislation which entered into force after the licence had been issued would be negated. Note here should be taken of the inclusion of "likely" here, for in reality how exactly the "effect" outlined in the ministerial direction will be manifested is not clear.

This lack of clarity presents issues for firms, policy makers and regulators alike. The selection of sites and bids for licences are dependent upon clarity on this issue. Similarly, for local stakeholders, knowledge of the potential existence of subsurface wells, regardless of potentially unopposable right of firms to use deep level land, is likely to be deemed necessary. [43] This is, however, provided by the submission of publicly available fracture plans as part of the process for granting of environmental permits under the Environment Agency in England (and its equivalents in the devolved nations) which are approved by the Oil and Gas Authority before any operations may begin. [44] Thus, were licences which straddle the border to be treated as having the "effect" of two licences, as it is suggested they are likely to be, there would be no possibility of individuals within Wales having their land drilled under without any notice. Further to this it has been ***J.P.L. 11*** recognised that, "Operators have an incentive to carefully monitor and ensure fractures propagate in a controlled manner and remain within the target shale formation". [45] The outcome of the application of such an approach would therefore be the provision of highly desirable certainty for all stakeholders. However, whilst logical, its application is not certain without clarity on the "effect" proposed in the ministerial direction in relation to existing licences in this situation.

Fine … but for the fractures

Whilst a decision between the two approaches suggested above would mark progress towards certainty over the distribution of powers between central government and the devolved nation of Wales, it would be far from a complete resolution to the issues which this position highlights. Commercial scale extraction of shale gas via hydraulic fracturing in the UK would undoubtedly promote considerably more in-depth discussion of the more nuanced aspects of regulation which the process necessitates beyond those at present applied to conventional oil and gas extraction. Such discourse is, however, welcomed by the authors, but also

might not be opposed by regulators were it to promote progress on the development of existing sites by way of an agreed regulatory stance. As it has been noted:

"Government lays particular stress on the 'new' benefits of shale gas, setting it apart from conventional energy sources. The greater the perceived differences, the easier it is to justify a new regulatory approach." [46]

As such, the initiation of debate on a single issue within existing regulation might facilitate wider consideration of the framework governing hydraulic fracturing.

A distinct approach involving the splitting of existing cross-border licenses, in relation to an existing licence area, is highly problematic in itself. However, it would likely operate only for the remainder of the term of such licences. In the event that the licences in such a position were either revoked or their terms expired, it would seem logical that to avoid this issue they would be split at the border. The broader issue this raises in relation to the devolution of powers governing the life cycle of onshore oil and gas extraction sites would thus be avoided. However, whilst the existing provisions of licences prevent a conventional well being drilled within 125m of the border of the licence area, the nature of fracking is to intentionally create fractures which may extend beyond the end of the well. Indeed, fractures may extend up to 350m from the well itself, and as such might extend across the border. [47] Whilst the position with regards to the well itself is contained within the licences granted, the question remains as to whether this also applies to fractures. As such, whilst the infringement of borders via conventional wells would be relatively easily resolved, the consistent use of fractures to promote gas flow into a central well reignites many of the issues highlighted above, and not simply in relation to the borders of the nations comprising the UK.

Hawkins notes that:

"Whilst there have been arguments based on the assertion that fracking is, in fact, not a new technology, such arguments are misleading as technological advances and changes in intensity and depth mean that, in the present context, the current fracking techniques are novel. ***J.P.L. 12*** " [48]

This "novelty" means that there are justifiable reasons for both the inclusion of fractures and their exclusion from being bound by the provision included within PEDLs relating to the limitations on the proximity of wells to the borders of the licence area. First, the exact length and direction of fractures can only be ascertained once they are created. Whilst plans are submitted by firms showing their intended extent, the reality is that there are innumerable variables which might impact upon this. [49] As such, to expect precision beyond a certain degree would inhibit the progress of this fledgling industry. This is an eventuality regulators wishing to allow the process, if sufficiently regulated, would want to avoid. [50] Indeed as the Department for Communities and Local Government (now the Ministry of Housing, Communities and Local Government) itself stated, "at such depths it is often not possible to identify the exact route of any lateral drilling". [51] In conformity with the precautionary principle which is well-established in environmental regulation, a process deemed safe from an environmental perspective within regulatory parameters would not need to be limited in terms of its scope. For example, unless a fracture plan submitted by a firm suggested an environmental risk which could not be sufficiently justified or mitigated, it might be too onerous to demand that all firms keep fractures within 125m of the licence boundaries (as is currently the case for the well itself) and effectively monitor that constraint. This is especially true given that, "[c]haracterising shale to better understand its behaviour before, during and after hydraulic fracturing remains difficult". [52]

By contrast, a lack regulation of the location of fractures, beyond their environmental impact, would ignore a fundamental aspect of the OGA's licensing process, that is to attribute rights over a geographical region in relation to the extraction of oil and gas to a firm or firms. To fail to respect the borders of the licence would call into question the basis for demarcating them at all. This would also undermine any local or devolved regulatory authorities who would have been involved if conventional drilling alone was used. A firm would potentially be able to extract oil and gas from another licence area, whilst remaining within the conditions of their own. A fracture extended beyond the current limits set for conventional wells might draw in oil and gas from beyond the borders of the licence area. Such a reality would make all licences issued to firms neighbouring those in use for hydraulic fracturing less valuable. This would predicate a licensing system which favoured those who established their sites first in proximity to borders of licences. [53] Once extracted, the exact subsurface location of an oil or gas resource would not often be ascertainable and as such attribution to a particular licence would not be possible. In short, the rights granted by licences for access would also be undermined by those of neighbouring licences regardless of the devolved jurisdiction in which each sat. Such a reality would not be desirable for any stakeholders, including the extractors themselves. First, "[e]xcessive,

uncontrolled fracture growth is uneconomic, wasting resources on the extra chemicals, pumping equipment and manpower needed". [54] Secondly, and more importantly in this regard, infringing upon the licensed area of another firm, or simply into an unassigned licence area, risks embedding this as common practice and having negative impacts upon the extractor themselves in relation to their own licences. ***J.P.L. 13***

Extracting a solution

Whilst the scenarios outlined above are speculative, and unlikely to occur in practice in the near future, they highlight an issue which regulators must resolve should the process of hydraulic fracturing be used to access oil and gas resources in the UK. In short, this is owing to the inadequacy of existing regulatory mechanisms in relation to the technical facets of this process. This lack of regulation which reflects the idiosyncrasies of hydraulic fracturing, places the wider regulatory framework and all of the authorities which contribute to its application at risk of being undermined. The solutions to the issues outlined are, for the most part, clear and self-defining. They require only clarification of existing rules applied to hydraulic fracturing from the wider regulatory framework for oil and gas extraction. The presence of devolved powers in relation to the process, and potential clashes of those with powers retained by central government, adds a degree of gravity to the issue beyond merely a lacking regulatory structure. However, these issues, as it has been shown, require rectification even within the jurisdiction of England alone. [55]

The use of hydraulic fracturing to access gas resources is being considered for inclusion into the category of nationally significant infrastructure projects ("NSIPs"). This would remove the power of local MPAs to approve or reject applications for planning permission for extraction sites. [56] However, the Welsh Government might still refuse to issue licences to those firms wishing to do so from sites on land within their jurisdiction. Without clarity on the issues laid out above, there is the possibility that such powers might be undermined by a firm in possession of a licence which currently straddles the border between England and Wales or is proximate to it. Such a reality does not benefit firms or regulators. Firms would lack clarity in relation to their own licence rights. Public perceptions of the practice of hydraulic fracturing are already fragile at best. The suggestion that activities at depth might ignore or circumvent regulations would not improve matters. To some extent, as **Pearson** and Lynch Wood suggest:

"[t]o create proper legitimacy around the process, there may be a far greater responsibility on the part of industry, who hold greater knowledge of the process themselves, to allay those concerns without losing focus on the concerns omitted or less common in civic campaigns." [57]

However, there is also a responsibility on regulators themselves "to garner the support and confidence of industry and external stakeholders". [58] The response must, therefore, be formulated by both extractors and regulators as little assurance could be given to stakeholders of the validity of the licensing regime if questions, though unique to hydraulic fracturing and based on technical aspects thereof, are not answered.

Various technical amendments in relation to the wording of existing licenses and the model clauses for them would need to follow from a decision to address these issues. [59] This would not, however, require the redrafting of all existing PEDLs, or their revocation, in the short term. Direction akin to that issued by the then Welsh Minister for Natural Resources regarding decisions on sites employing hydraulic fracturing might be given to all planning authorities within England. Such a direction could refer to any decisions to the Secretary of State where approval of a project might be deemed to pose concerns regarding devolved powers. It might even be extended to decisions on wells crossing any planning authority borders regardless of the likely outcome. However, this would likely be deemed an excessive constraint on firms and planning authorities, given that the control over petroleum resources being accessed in each case remains a national governmental power. ***J.P.L. 14***

The potential permutations of the lack of clarity in relation to the licensing of projects involving hydraulic fracturing as the main method of extraction of petroleum resources are considerable. It is conceded that the proposed resolution to the potential issues is a relatively simple one and somewhat predictable. However, it is easily achieved within a very short time frame, and as such is the seemingly logical interpretation of the existing regulation and statements considered in the piece. Despite this, the reality remains that it is not in fact in place, nor is any alternative approach. In short reform is needed as: "Existing structures are seen as inappropriately ill-suited, or in the least hopelessly incoherent, to the current predicament." [60]

The provisions of the Wales Acts 2006 and 2017 have therefore created a fragmented regulatory structure and one which would potentially apply alternative approaches to almost identical applications relating to sites within mere metres of one another.

Although the authors may be accused of hyperbole in their suggestion that questions of constitutional gravity might result from this not being addressed, the longer the period for which this issue is left unresolved the greater the potential that this, at present, unlikely scenario would occur.

The piece does not question the validity of devolving these powers, but instead that of the regulation of hydraulic fracturing more broadly. The potential for the regulatory framework to produce outcomes which do not account for features of hydraulic fracturing is of concern to all stakeholders. This is regardless of their views on the validity of the use of the process from a policy perspective. Some variance in the regulation of sites is inevitable, as regulation should be bespoke to sites in so far as is possible whilst remaining within the policy goals of said regulation. This is apparent in the regulatory decisions which have reached, or are approaching, conclusions for hydraulic fracturing sites in Lancashire at Preston New Road, and in North Yorkshire at Kirby Misperton. The former was rejected at the first instance over concerns regarding traffic and noise produced which were relative to that site. Such consideration of the features of sites is not contested here. More broadly almost all regulatory frameworks must accept a certain degree of risk as perfect information on every potential eventuality will never be attainable:

"This is even true in the context of drilling for oil on offshore rigs, a method with which the industry has considerably more experience and has made far greater investment in research and technological developments than most." [61]

However, regulation of an industrial process must take account of features of that process which are relevant to all instances of its use. It is this which the piece argues is absent and is starkly illustrated by the regulatory divergence at the border of England and Wales.

Whether the use of hydraulic fracturing to extract oil or gas will become commonplace within the UK industry or not remains unknown. However, the questions raised in the piece need answering, and can be answered now. Without a regulatory system which adequately reflects the nature of, and issues arising from, the use of this technique on a commercial scale, there is the potential for unintended environmental consequences to arise. However, it is not these on which the piece has focused, but instead the impact such inadequacy has on perceptions of the regulatory framework and the authorities which comprise it, even when compared to other highly similar processes. As the House of Commons Environmental Audit Committee noted in their report into the risk of hydraulic fracturing:

"Many of our witnesses acknowledged that the existing UK conventional onshore industry has a generally safe history, with over 200 producing wells and no pollution incidents from well design, ***J.P.L. 15*** although well integrity and monitoring issues at Preese Hall act to undermine this position for new fracking technology in the UK." [62]

Whilst the law is, and always will be, chasing technological advancements in a variety of industries, it has to be seen to respond to the challenges such progression creates to maintain confidence in its efficacy to prevent harm and protect individuals.

A licensing system which cannot establish defined geographical areas for oil and gas extraction via hydraulic fracturing will not retain the support for extractors themselves or other stakeholders. Individual firms may even be incentivised to exploit regulatory flaws for individual advantage, which once recognised would further decrease public perceptions of the industry. The presence of a robust regulatory framework is central to ensuring that the industry itself can be allowed to provide evidence of its capacity to extract oil and gas safely. Such a reality is key to the facilitation of a fledgling industry should governmental policy be aimed at doing so. The introduction of bespoke aspects to regulation in relation to a particular method of oil and gas extraction undeniably increases its complexity. It is also conceded, that the regulation of this industry is already riddled with complexity as a result of the devolution of some aspects of the framework to the nations comprising the UK. This has been compounded by the addition of ill-defined additions to regulation in the form of ministerial directions on both sides of the border aimed, ironically, at providing some certainty for stakeholders. As Stokes notes, there is a fallacy in the fact that, "the policy preoccupation with regulatory coverage has a tendency to produce conclusions of regulatory adequacy". [63] Indeed this has been one basis for calls for a "consolidated regulatory regime specifically for fracking". [64] However, regardless of how it is achieved, without clarification on the issues raised in the piece, it is posited that the regulatory framework for the use of hydraulic fracturing to extract oil and gas and the devolved powers connected to it may, like the borders of its own planning authorities, be irreversibly undermined.

John Pearson

Richard Brant

Footnotes

1 This piece was written prior to the decision of the UK government to withdraw support and impose a moratorium for projects using hydraulic fracturing to extract oil and gas following an Oil and Gas Authority report published on 2 November 2019. The arguments put forth in the piece remain relevant however, both until such a point as the statutory provisions considered are repealed or an outright ban on such projects is announced, and more generally with regards to the need for regulation to reflect the processes it governs.

2 Note should be made that whilst some choose to use "fracking" and "hydraulic fracturing" interchangeably, it is noted by the authors that the term "fracking" bears inherently negative connotations about the practice and so will be avoided in the piece as the focus is not on the validity of the use of the practice itself. See in this regard, C. Hilson, "Framing Fracking: Which Frames Are Heard in English Planning and Environmental Policy and Practice?" (2015) 27(2) Journal of Environmental Law 177 and Evensen, Jacquet, Clarke and Stedman, "What's the 'fracking' problem? One word can't say it all" (2014) 1 The Extractive Industries and Society 130.

3 Extreme energy is another term used in a manner to construct immediate negative connotations about a practice, and like fracking will be avoided in the piece as the focus is not on the validity of the use of the practice itself. See in this regard, D. Short, J. Elliot, K. Norder, E. Lloyd-Davies and J. Morley, "Extreme energy, 'fracking' and human rights: a new field for human rights impact assessments?" (2015) 19(6) The International Journal of Human Rights 697.

4 A more in depth description of the process and issues surrounding it relative to the audience intended for the piece can be found in L. Williams, P. Macnaghten, Ri. Davies and S. Curtis, "Framing 'fracking': Exploring public perceptions of hydraulic fracturing in the United Kingdom" (2015) 26(1) Public Understanding of Science 89.

5 *Star Energy Weald Basin Ltd v Bocardo SA [2010] UKSC 35; [2011] 1 A.C. 380*.

6 *Star Energy Weald Basin Ltd v Bocardo SA [2010] UKSC 35* at [27].

7 Infrastructure Act 2015 s.43.

8 See in this regard, Infrastructure Act 2015 s.44(3) and s.43(5).

9 J. **Pearson** and G. Lynch-Wood, "Concern and Counter-Concern: The Challenge of Fragmented Fears For The Regulation of Hydraulic Fracturing" (2017) 4(3) Journal of Extractive Industries and Society 672.

10 Petroleum Act 1998 s.2.

11 Town and Country Planning (Development Management Procedure) (England) Order 2010 (SI 2010/2184).

12 Town and Country Planning Act 1990 s.77.

13 Note that this has recently been challenged in *Stephenson v Secretary of State for Housing and Communities and Local Government [2019] EWHC 519 (Admin); [2019] J.P.L. 929*. In the case, the consultation taken in relation to the formation of this policy was held to be illegal. However, the policy itself was not deemed illegal.

14 Secretary of State for Communities and Local Government, Decisions on Appeals referenced APP/Q2371/W/15/3134386 APP/Q2371/W/15/3130923 APP/Q2371/W/15/3134385 APP/Q2371/W/15/3130924 (2016) at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/778144/16-10-06_DL_Cuadrilla.pdf [accessed 28 October 2019].

15 Environment Agency (in England), Scottish Environment Protection Agency or Natural Resources Wales.

16 An executive agency of the, former, Department of Energy and Climate Change—now, the Department for Business, Energy and Industrial Strategy.

17 Petroleum Act 1998 s.45A.

18 Wales Act 2017 Sch.1 s.97 and Sch.6 Pt 2. This amended the Government of Wales Act 2006. See the exceptions mentioned in the Government of Wales Act 2006 Sch.7A (new) Pt 2 s.D2, as amended by the Wales Act 2017.

19 Wales Act 2017 ss.23 and 24(3)(a).

20 According to Infrastructure Act 2015 s.43(4): "Deep-level land is any land at a depth of at least 300m below surface level". Previously, prior to the introduction of the Infrastructure Act 2015, the case of *Bocardo SA v Star Energy UK Onshore Ltd [2010] UKSC 35; [2011] 1 A.C. 380*, which was a case concerning ownership of land and common law trespass (in the context of an oil and gas operation and the grant of a licence to search

for, bore and get petroleum), had suggested that ownership of land below the surface extended to a depth much further than 300m (at which point, operations would constitute a trespass) and to a depth of up to 2,800 feet (which equates to approximately 883/884m). Indeed, at [13B-C], per Lord Hope of Craighead DPSC: "… Bocardo's title certainly extended to the strata (other than the petroleum) to be found at the depth of the wells up to 2,800 feet" and at [15G-H], "The depths to which the wells in question were drilled in this case do not get anywhere near to approaching the point of absurdity" and at [27B-C], "… the wells that are at issue in this case, extending from about 800 feet to 2,800 feet below the surface, are far from being so deep as to reach the point of absurdity".

21 Wales Act 2017 s.25.

22 Infrastructure Act 2015 ss.45 –47, as amended by, and read together with, Wales Act 2017 ss.25(2)(b) and 25(3)(b).

23 See Department for Business, Energy and Industrial Strategy, "Directions in respect of existing Cross-Border Petroleum Licences partially within the Welsh onshore area" issued by the Minister of State for Energy and Clean Growth, Claire Perry MP (10 September 2018) para.3 at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739482/direction-under-section-24_3__a_-wales-act-2017.pdf [accessed 28 October 2019].

24 This is subject to a proposed consultation over whether fracking planning applications should be brought under the Nationally Significant Infrastructure Projects ("NSIP") regime, which would remove decision making powers in respect of planning applications from local authorities. This formed a part of the 2017 Conservative and Unionist Party Manifesto, which stated that: "when necessary, major shale planning decisions will be made the responsibility of the National Planning Regime" p.23 at https://s3.eu-west-2.amazonaws.com/conservative-party-manifestos/Forward+Together+-+Our+Plan+for+a+Stronger+Britain+and+a+More+Prosperous….pdf [accessed 28 October 2019]. Government ministers outlined this proposal in May 2018 in a written Ministerial Statement at https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2018-05-17/HCWS690 [accessed 28 October 2019].

25 Planning proposals will be subject to the Town and Country Planning Act 1990, as well as the Town and Country Planning (Development Management Procedure) (England) Order 2015 (SI 2015/595). Applications for planning permission must also be determined in accordance with the relevant guidance, see *Ministry of Housing, Communities & Local Government, "Guidance on the planning for mineral extraction in plan making and the application process" (October 2014)* at https://www.gov.uk/guidance/minerals [accessed 28 October 2019].

26 According to the Town and Country Planning Act 1990 s.77(1): "The Secretary of State may give directions requiring applications for planning permission, or for the approval of any local planning authority required under a development order a local development order or a neighbourhood development order, to be referred to him instead of being dealt with by local planning authorities."

27 See the letter from the (late) Carl Sargeant, the former Minister for Natural Resources, in a letter to all Chief Planning Officers, dated 13 February 2015. The letter also states that this direction will apply to any application for planning permission registered as valid on or after 16 February 2015. See https://gov.wales/docs/desh/publications/150213unconventional-oil-and-gas-dear-cpo-letter-en.pdf [accessed 28 October 2019].

28 Note should be made here that such a policy could be questioned in relation to its procedural fairness. To demand only that those which an MPA is minded to approve be referred on would inevitably influence decisions of said MPAs and effectively centralises decision making power on such projects.

29 See the Town and Country Planning (Development Management Procedure) (Wales) Order 2012 (SI 2012/801) s.31(1).

30 See para.17 of the Guidance—The Town and Country Planning (Notification) (Unconventional Oil and Gas) (Wales) Direction 2015 (13 February 2015) at https://gov.wales/docs/desh/publications/150213unconventional-oil-and-gas-guidance-document-en.pdf [accessed 28 October 2019].

31 Guidance—The Town and Country Planning (Notification) (Unconventional Oil and Gas) (Wales) Direction 2015 (13 February 2015).

32 See the letter from the (late) Carl Sargeant, the former Minister for Natural Resources, in a letter to to planning stakeholders (including local planning authorities), dated 14 August 2015 at https://gov.wales/docs/desh/publications/150213unconventional-oil-and-gas-dear-cpo-letter-en.pdf [accessed 28 October 2019].

33 See paras 7 and 8 of the Guidance—The Town and Country Planning (Notification) (Unconventional Oil and Gas) (Wales) Direction 2015 (13 February 2015). See, also, the letter from the (late) Carl Sargeant, the former Minister for Natural Resources, in a letter to to planning stakeholders (including local planning authorities), dated 14 August 2015.

34 See Welsh Government, "Natural Resources Policy Statement" (2017) at https://gov.wales/docs/desh/publications/150914-natural-resources-policy-statement-en.pdf.

35 This assumes somewhat that all political parties have a defined policy on hydraulic fracturing. Whilst this is of course subject to change also, at the time of writing for the majority of political parties represented in both the Welsh Assembly and UK Parliament this is true.

36 Note here the particular use of the term moratorium and not ban, these being legally distinct, as shown in *Ineos Upstream Ltd v Lord Advocate [2018] CSOH 66; [2018] J.P.L. 1211*.

37 Specifically, s.56(6)(c) of this Act makes it clear that this Act, including, esp. ss.43 –48, apply to both England and Wales.

38 *Cuadrilla Resources, "Cuadrilla completes UK's first shale gas horizontal well" (3 April 2018)* at https://cuadrillaresources.com/media-resources/press-releases/cuadrilla-completes-uks-first-shale-gas-horizontal-well/ [accessed 28 October 2019].

39 Whilst it could be noted that the problem at the focus of the paper might also occur between different MPAs, where one would refuse a site within a PEDL block and one would not, this is not the central concern of the piece. Many of the points made herein would however be relevant to such an argument and are briefly considered later.

40 See the letter from the (late) Carl Sargeant, the former Minister for Natural Resources, in a letter to all Chief Planning Officers, dated 13 February 2015. The letter also states that this direction will apply to any application for planning permission registered as valid on or after 16 February 2015.

41 See the letter from the (late) Carl Sargeant, the former Minister for Natural Resources, in a letter to all Chief Planning Officers, dated 13 February 2015. The letter also states that this direction will apply to any application for planning permission registered as valid on or after 16 February 2015.

42 Infrastructure Act 2015 s.47.

43 Indeed such provision of information regarding risks is a human right. See *Guerra v Italy (1998) (14967/89) (1998) 26 E.H.R.R. 357; 4 B.H.R.C. 63*.

44 *Oil and Gas Authority, Consolidated Onshore Guidance (June 2018)* at https://www.ogauthority.co.uk/media/4959/29112017_consolidated-onshore-guidance-compendium_vfinal-002.pdf [accessed 28 October 2019].

45 The *Royal Society and Royal Academy of Engineering, Shale gas extraction in the UK: a review of hydraulic fracturing (June 2012)* at https://www.raeng.org.uk/publications/reports/shale-gas-extraction-in-the-uk [accessed 28 October 2019].

46 E. Stokes, "Regulatory Domain and Regulatory Dexterity: Critiquing the UK Governance of 'Fracking'" (2016) 79(6) Modern Law Review 961, 978.

47 Department for Communities and Local Government, *Revised requirements relating to planning applications for onshore oil and gas: proposals paper—Summary of responses and government* response (January 2014) 7 at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/274955/Revised_requirements_relating_to_planning_applications_for_onshore_oil_and_gas_-_proposals_paper_-_Summary_of_responses_and_government_response.pdf [accessed 28 October 2019].

48 J. Hawkins, "Fracking: Minding the Gaps" (2015) 17(1) Environmental Law Review 8, 9.

49 R. Westaway and P. Younger, "Quantification of potential macroseismic effects of the induced seismicity that might result from hydraulic fracturing for shale gas exploitation in the UK" (2014) 47 Quarterly Journal of Engineering Geology and Hydrogeology 333.

50 A similar debate rages at present in relation to the acceptable levels of induced seismicity during hydraulic fracturing operations.

51 Department for Communities and Local Government, *Revised requirements relating to planning applications for onshore oil and gas: proposals paper—Summary of responses and government* response (January 2014), 7.

52 The *Royal Society and Royal Academy of Engineering, Shale gas extraction in the UK: a review of hydraulic fracturing (June 2012), 39* at https://www.raeng.org.uk/publications/reports/shale-gas-extraction-in-the-uk [accessed 28 October 2019].

53 Note should be made that this is to some extent inevitable as oil and gas resources may be located within a reservoir which itself straddles licensed areas, but a system such as this described would exacerbate this and undermine the regulatory system significantly.

54 The *Royal Society and Royal Academy of Engineering, Shale gas extraction in the UK: a review of hydraulic fracturing (June 2012), 31*.

55 This assumes that the positions of both the Scottish and Welsh Governments in relation to hydraulic fracturing remain fundamentally opposed to it and thus imposing (at least de facto) moratoriums on the practice.

56 Town and Country Planning Act 1990 s.76A.

57 J. **Pearson** and G. Lynch-Wood, "Concern and Counter-Concern: The Challenge of Fragmented Fears For The Regulation of Hydraulic Fracturing" (2017) 4(3) Journal of Extractive Industries and Society 672, 679.

58 J. **Pearson** and G. Lynch-Wood, "Concern and Counter-Concern: The Challenge of Fragmented Fears For The Regulation of Hydraulic Fracturing" (2017) 4(3) Journal of Extractive Industries and Society 672.

59 Onshore Petroleum (Consequential, Transitional and Saving Provisions and Model Clauses) Regulations 2018 (SI 2018/980).

60 O. Pedersen, "The Rhetoric of Environmental Reasoning and Responses as Applied to Fracking" (2015) 27(2) Journal of Environmental Law 325, 329.

61 J. **Pearson**, "Hydrocarbon Hysteria: Differentiating Approaches to Consumption and Contamination in Regulatory Frameworks Governing Unconventional Hydrocarbon Extraction" (2015) 1 Journal of Planning and Environment Law 3.

62 *House of Commons Environmental Audit Committee, "Environmental Risk of Fracking" Eight Report of Session 2014–15, 33* at https://www.publicinformationonline.com/download/68249 [accessed 28 October 2019].

63 E. Stokes, "Regulatory Domain and Regulatory Dexterity: Critiquing the UK Governance of 'Fracking'" (2016) 79(6) Modern Law Review 961, 973.

64 *House of Commons Environmental Audit Committee, "Environmental Risk of Fracking" Eight Report of Session 2014–15, 37.*

