



Environmental Audit Committee

Oral evidence: Environmental risks of fracking,
HC 856

Wednesday 14 January 2015

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Written evidence from witnesses:

- [The Environment Agency](#)
- [National Physical Laboratory](#)
- [UKOOG](#)

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Members present: Joan Walley (Chair), Peter Aldous, Neil Carmichael, Martin Caton, Zac Goldsmith, Mark Lazarowicz, Caroline Lucas, Dr Matthew Offord, Mrs Caroline Spelman, Simon Wright.

Questions 42–172

Witnesses: **Dr Tony Grayling**, Director of Sustainable Business and Development, Environment and Business, Environment Agency, **Mark Ellis Jones**, Environment and Business Manager, Climate Change Energy and Emerging Issues, Environment Agency, and **Jane Burston**, Head of Centre for Carbon Measurement, National Physical Laboratory, gave evidence.

Q42 Chair: Thank you for coming along this afternoon. We have a very tight schedule, not only in our evidence this afternoon but also in the time we have available for this report altogether. We have come to this report quite late because other Select Committees were considering fracking in one way or another. I am sure you will appreciate that we have a lot of questions that we wish to get through. We have a second session later this afternoon and a vote at 4 pm, so we have a lot to get through.

We are attempting to concentrate on the climate change commitments and aspects of fracking but also on the regulatory aspects. We are framing our work in respect of the Infrastructure Bill that is going through the House at the moment. There is a lot of interest in this inquiry and it is not possible for us to take oral evidence from everybody. We are attempting to put issues that have been raised to us, not least by community groups. I say for the public record that if there are groups out there who wish to give evidence, there will still be a very late opportunity for them to do so in written evidence, hopefully by the end of this week.

I would like to start by asking Dr Grayling about the whole issue of the regulatory regime. We have been told that the current regulatory framework contains many gaps. It is suggested to us that it is not fit for purpose and there is a whole question about enforcement as well. In our session this morning, one of the witnesses was an economist and the point was made to us that there is the economist point of view of all of this but obviously we have to defer to those who are responsible for the regulatory regime. The real issue is the current status of the regulatory regime in terms of how fit for purpose it is currently. That is what we want to try to get a greater understanding of. Would you like to respond to that in the first instance?

Dr Grayling: Thank you, and thank you for the opportunity to talk to you. I lead the Environment Agency's work in relation to developing our regulatory approach on the extraction of onshore oil and gas, including shale gas. My colleague Mark Ellis Jones leads the team of people who do the work.

We take the potential environmental risk from extracting shale gas extremely seriously, and indeed the public concerns there are around this agenda. We have taken a very careful approach and undertaken a thorough assessment of the environment risks that can be associated with the industrial processes involved in particularly the exploratory stages of development of this industry. We have assessed those risks against the regulatory controls available to us. Our conclusion is that the current regulatory regime is satisfactory to enable this industry potentially to develop in a way that protects people and the environment, at least for the exploratory stage of the industry's development. But we are keeping that under review and we recognise that if the industry develops to a larger scale, to a commercial scale of development, that there may be some further cumulative impacts that we will need to take account of and there will be other industrial processes involved, for example in refining and processing the gas, which we will need to take account of. But for the time being we think that the regulatory framework is satisfactory.

Q43 Chair: There are two issues arising out of that. The first is that just as this Committee is a cross-cutting committee—we do not look at what one Government Department but at Government Departments across the whole spectrum through the environmental lens, if you like—it strikes me that you have so many different aspects of regulatory regimes. There are the PEDL licences that DECC gives; the strategic environment assessment that should be needed in respect of that; the specific permitting that the Environment Agency does; the specific local planning application regime that local applications for both exploration and future drilling go through; and also the Health and Safety Executive, not to mention the public health aspects of all of this. How does the Environment Agency balance and make sure that cross-cutting perspective is all channelled through one fit for purpose regulatory regime?

Dr Grayling: I would say that we play complementary roles to each other as regulators.

Q44 Chair: But who has overall responsibility for this?

Dr Grayling: I do not know. I think we collectively have overall responsibility, and that is the same as applies to many other industries. If you take the role of the Department of Energy and Climate Change, it is primarily the economic regulator in this sector seeking to ensure that the nation's mineral resources are deployed and used in an effective way. It does also under licensing have other powers that enable it, for example, to control seismic risk, but it is primarily the economic regulator. We are the primary environmental

regulator but we also work alongside the Health and Safety Executive who are the primary health and safety regulator. That is the case with other industries as well and as with other industries, all of these activities require local planning permission, or if they are nationally significant—

Q45 Chair: You have mentioned planning. Just to take planning, for example, in respect of health and in respect of waste, you as the Environment Agency cannot really influence or determine what conditions there would be in a planning application relating to some of those. It is for the planning authority, isn't it? You only have that consultative role.

Dr Grayling: We have two roles in that respect actually. One is that we directly regulate extractive wastes produced from these activities through the environmental permitting regime under the Mining Waste Directive. That enables us to put conditions into permits to ensure that the wastes that are produced, whether they are solid, liquid or gaseous, are safely managed and disposed of at appropriate facilities. We are also, as you alluded to, a statutory consultee in the planning system and can advise the local authority as to whether there should be particular conditions attached to planning.

Q46 Chair: But you were just suggesting that the way in which all the different regulatory regimes apply the work that they do is done by understanding. There is no process there, is there, that allows for all of that to happen?

Dr Grayling: There is quite a formal process of us having dialogue with each other. We are, as you know, a statutory consultee for the Planning Authority, so we talk to each other and work together closely. We have a working together agreement with the Health and Safety Executive, particularly on shale gas developments, so that we share information and we will undertake joint inspections at key stages of the process.

Q47 Chair: How does that then link in with the responsibility that somebody has with strategic environmental assessment, which presumably takes place at the planning stage in terms of the economic appraisal that has been done?

Dr Grayling: The strategic environmental assessment is related to the licensing rounds that the Department of Energy and Climate Change undertakes. As you will know, they are currently in the middle of the 14th licensing round.

Q48 Chair: Sure, but how does the Environment Agency's concern relate to that strategic environmental assessment?

Dr Grayling: We are a consultee in the strategic environmental assessment process and we have fed our views into that strategic environmental assessment.

Q49 Chair: In respect of the current applications that are outstanding, have you had an input into all of those in detail on strategic environmental impact?

Dr Grayling: We are not party to the negotiations around the individual licences. We were part of the strategic exercise on the environmental assessment. Of course, as you have described earlier, in order for a developer to undertake an operation they do not just need a licence from the Department of Energy and Climate Change; they also need planning permission from the local authority, relevant permits from the Environment Agency, and

they need to demonstrate to the Health and Safety Executive that the way that they design, construct and operate their well will meet the standards set out in the regulations governed by the HSE. So there is a set of safeguards around this industrial activity.

Q50 Caroline Lucas: A question about how your environmental regulation applies to some of the climate change impacts of fracking. We heard some evidence this morning that would suggest that in many ways fracking is not compatible with some of our climate change objectives. Is it within your remit to make a judgment about that or do you leave that to the Committee on Climate Change or someone else?

Dr Grayling: It is within our remit to ensure that, in the process of potentially extracting shale gas, emissions of methane, a potent greenhouse gas, are prevented and kept to an absolute minimum. We can regulate that because it is counted as an extracted waste within the remit of the Mining Waste Directive and so we can put conditions on the permit to ensure that there are not any unnecessary fugitive emissions of greenhouse gases. What it is not within our remit to do is to decide whether or not it is appropriate to exploit a particular fossil fuel resource. On that front, I would defer to the advice of the Committee on Climate Change whose role it is to advise the Government on that. They, of course, have advised that it is possible that domestic production of shale gas could play a role in our energy system.

Caroline Lucas: With some pretty ambitious constraints, but yes.

Dr Grayling: It is on the basis that their analysis suggests that natural gas is going to play a significant role in our energy system for some decades to come, even if it is a diminishing role, and even beyond it being used in a significant quantity for electricity generation because of its role as a heating fuel. In their analysis you could therefore substitute some of the gas that may be imported, for example, as liquefied natural gas from the Middle East with domestic production of shale gas.

Q51 Caroline Lucas: But it is not your role to make a judgment on that assessment?

Dr Grayling: No, I take their advice very seriously and I am passionately concerned about climate change. In general terms, I lead the Environment Agency's work on climate change. We are a major greenhouse gas regulator but in this specific regard it is not for us to decide whether or not shale resources should be exploited. It is for us to ensure that if they are going to be exploited it is done in a way that is safe and environmentally sound.

Q52 Chair: What is the extent to which the Environment Agency takes account of costs and economic issues in the regulatory decision-making?

Dr Grayling: We operate under what is called the best available techniques approach. That means that we expect an operator to demonstrate to us that the activities that they undertake are using the best available techniques for environmental protection at the time that they are undertaken, but there is an economic component within that judgment. I will give you an example of that. If you are considering whether we regulate for what are called reduced emission or green completions at the stage of the waste fracking fluids

returning to the surface after hydraulic fracturing, then we would allow there to be controlled flaring of the gas that is produced during the exploration stage. At that stage it is not necessarily reasonable to require that the operator puts what would be quite a large investment into the infrastructure that would be necessary either to pipe the gas off a field or to use it for electricity generation on site. By contrast, at the production stage we would require reduced emission completions, or green completions as they are called, because we would not expect at that stage that there would be any justification for flaring.

Q53 Chair: You said at the outset that you had sufficient expertise in place in terms of the exploration stage but there was more attention needed to the regulatory framework for a later stage. How can you give the go ahead or approval for an exploratory stage without looking at the process in its entirety and having everything in place right from the very outset as part of the process?

Dr Grayling: Each site is permitted on an individual basis, but what we are doing some further work on—and Mark might be able to add to this—is we do not yet know whether this industry is going to develop to a large scale and, if it does, it is going to be some years ahead. We are doing some work on scenarios as to what the industry might look like at that stage—

Chair: But that is not completed?

Dr Grayling: —and how we might regulate a field of development rather than just individual wells. I do not know if you want to add to that, Mark?

Mark Ellis Jones: I would just add one thing, which is that the exploration sites that we are seeing coming forward at the moment are self-contained so if an operator explores for shale gas they can prove that the economic reserve is commercially viable. They may or may not decide to continue at that particular site, in which case they may decommission that site and bring forward a bigger field development plan where they will be able to exploit the whole reserve underground. That is the work that Tony is alluding to, that we would look to be trying to permit that as a whole rather than in individual sites.

Q54 Chair: Should people be concerned about the sequential nature of that development going ahead? You see it all the time with small planning applications; before you know where you are, you have something that is much bigger and it just becomes a process that is inevitable. I do not see how you can start without having the whole process clearly defined.

Dr Grayling: What I would also add to that is most of the processes that are involved at production stage are the same as the processes that are involved at the exploration stage. We are just reserving our judgment on whether there are specific aspects that will mean we need to adjust our regulatory approach. We are doing due diligence in undertaking the work necessary to ensure that if that happens we will be prepared for it.

Q55 Chair: Finally from me for the moment: what assessments have you done of the impact that this is going to have on the staffing resources of the Environment Agency and the skillset?

Dr Grayling: We have looked closely at that and we are satisfied that we have put sufficient resources into it to enable us to look at our approach.

Q56 Chair: So how many staff are going to be needed to deal with that?

Dr Grayling: At this stage we have I think it is about 40 folk who work at least part or full-time on this activity. One of the important points about our regulatory approach is that ultimately we will expect cost recovery, so if and when the industry develops, we will seek to set our permit fee levels. You have to pay application fees for our permits and annual fees. We will set them at a level that enables us to recover our regulatory costs. If the industry scales up, we will receive more permit income and we will be able to employ more staff to undertake the necessary regulation, and we will have in place mechanisms to ensure that those staff are properly trained to enable them to do their work.

Q57 Chair: Do you have the skillset that is needed in place?

Dr Grayling: We do have that skillset. We are increasing our skillset as we go along and learning as we go. We are at the late stages of determining the first applications for permits for hydraulic fracturing at two sites in Lancashire. We have learned a great deal through that very careful process that we have undertaken over a period of six months. That learning is being disseminated across the staff that need to understand it through the organisation.

Q58 Chair: Just on that point, in respect of those sites in Lancashire that you referred to, I understand that the organisation Medact, which is a public health charity, has expressed concern about the absence of an authoritative and comprehensive assessment of health-related costs and risks associated with fracking. How do you square their concerns about this not having been done, from a public health perspective, with the way in which the planning applications are currently going ahead in terms of that timeframe?

Dr Grayling: We are also very concerned about the potential for public health impacts from these activities. It is part of our responsibility to be concerned about that. We have worked very closely with Public Health England as the statutory body in that remit and between us we have satisfied ourselves that, provided best available techniques are deployed and it is regulated in the way that we are seeking to regulate it, then this activity can go ahead in a way that protects public health. That is also the conclusion of other authoritative pieces of work, such as by the Royal Society and the Royal Academy of Engineering. In relation to the specific permit applications in Lancashire, we have worked very closely with the Director of Public Health for Lancashire County Council, who commissioned a health impact assessment in relation to the two specific sites in question. We very carefully took account of the findings of that impact assessment during the permit determination process, which we are in the final stages of completing.

Q59 Chair: You would not accept the criticism that the Public Health England assessment was inadequate and incomplete?

Dr Grayling: I would not, although that question is probably more appropriately directed to Public Health England than the Environment Agency.

Q60 Chair: Not if you have a role in terms of the fit for purpose aspect of the regulatory regime.

Dr Grayling: I said at the beginning I would not accept that criticism.

Q61 Zac Goldsmith: While we are talking about the overall regulatory approach, we heard in the session this morning from our witnesses that it is expected that we would need somewhere between 33,000 and 67,000 wells in this country to have any kind of meaningful impact on gas prices in Europe. You are looking at a very large industry before it has the effect that the Government is talking about. The question for the Environment Agency is: do you have a view as to how far this sector can expand before the environmental costs become unacceptable? If you do not have a view yet on that, do you not think you ought to develop a view as to how far sustainably this industry can grow?

Dr Grayling: That sort of number of wells is not consistent with any of the scenarios that have been developed, even if this industry does develop to a commercial scale within the UK. Although again it is not the remit of the Environment Agency, I think it is generally accepted that whether or not the UK exploits its shale gas resources is unlikely to have a significant effect on international gas prices, simply because it is not going to reach the kind of scale that you are alluding to. The sorts of scenarios that we have been looking at are consistent with the ones that were in the strategic environmental assessment associated with the 14th licensing round or in the Institute of Directors' report. At this stage, we think that those sorts of scenarios for the issues that we deal with are manageable. There are other issues that are not within our remit that matter to people, such as impacts on landscape and issues, for example, related to traffic to and from these industrial sites. But they are properly matters that are considered through the planning processes rather than through the Environment Agency's permitting processes.

Q62 Caroline Lucas: Even if the total number of wells is significantly less than the figure we have just heard, we are still talking about several thousand. Just remind me about the number of staff you said you had looking at this: 40, was it?

Dr Grayling: That is 40 at a time when we are receiving only a very small number of applicants.

Q63 Caroline Lucas: If we meet some of the scenarios that the Government has talked about, how many staff would you imagine that you would need?

Dr Grayling: I would not want to give you a number off the top of my head but it would be more than we currently have certainly.

Q64 Chair: I think it would be very helpful if you could provide the Committee with the appraisal that you have done of the staff capacity that you need. That might be very helpful.

Mark Ellis Jones: It is worth bearing in mind that we have a core programme team that is looking at the regulatory framework, so those are people working full-time looking at how the regulatory framework is developing. But for our regulation of the sector operationally on the ground, we are using bits of people's time who are technical experts. Essentially we have a big team of groundwater experts. We have a lot of expertise dealing with waste management issues. We have a whole team looking at radioactive substances regulation. In those senses, what we are using is the technical specialist we already have but to this

sector, and they will regulate lots of different sectors in their patch, be it cement works or sewage treatment works, oil and gas installations—

Q65 Caroline Lucas: Presumably they would have to do less of that to make the time to do more of this. It does not completely answer the question, does it, because presumably they are fully employed at the moment? They are not just sitting waiting for a new technology to come along. So if they are going to have to have the kind of intensive involvement in this, the proper monitoring that is being talked about—I was involved in talking to the Environment Agency around Balcombe and they had tens and tens of people who were just looking at one exploratory well. It was incredibly labour intensive and it does worry me that there is an underestimate of the number of staff that would be required even if you were using people who have other roles as well to fulfil that kind of objective.

Mark Ellis Jones: Where a site is what we call of high public interest like the sites in Lancashire are, there is an intensity in terms of dealing with the community engagement groups, doing the public meetings and making that reassurance.

Q66 Caroline Lucas: I would suggest that everywhere that you are going to put a well there will be that kind of public intensity of interest, therefore it would be interesting to have some kind of estimate of the numbers of staff you might need because I do not have any sense that this public concern is going away anytime soon.

Chair: That is why I think it would be very helpful if you could let us have a copy of the work that you have done that you referred to just now in respect of the appraisal of what staffing capacity you would need.

Dr Grayling: We can certainly write to you about that.

Q67 Simon Wright: I have several questions, many of which are factual, so if it were possible to get some short snappy answers that would be very helpful for the Committee to progress. Is baseline monitoring, for example in relation to water quality and air quality, conducted in advance of permit applications for fracking?

Dr Grayling: Yes.

Q68 Simon Wright: It is mandatory, is it?

Dr Grayling: It is. It is written in the condition of the permit. If you were to look at the draft permit that we have published for each of the sites in Lancashire you would see that we have put in mandatory conditions for baseline monitoring.

Q69 Simon Wright: Once work begins on the site, who conducts the bulk of onsite monitoring of environmental impacts?

Dr Grayling: We require the operator to undertake monitoring as a regulatory requirement. They must, in doing so, meet the standards of our monitoring certification scheme. That sets out the standards of equipment they must use, the training of the staff they must use, and the accreditation of the laboratories where the analysis is done. They must present us with the results in the format and the frequency that we request from them.

Q70 Simon Wright: How desirable is it for the operator themselves to be conducting that monitoring?

Dr Grayling: It is very important that they do. It is absolutely essential that they take responsibility for their work. That is not to demur from the desirability of some independent monitoring at this stage of the industry's development. That is why the Environment Agency was very pleased that some money was allocated in the autumn statement for some independent monitoring next year. We also understand that the Department of Energy and Climate Change is developing some independent monitoring in relation to methane emissions as a potent greenhouse gas to fulfil a commitment that came out of the response to the report by their former chief scientist, Professor David MacKay, and Tim Stone, looking at the carbon footprint of shale gas.

Q71 Simon Wright: Is that funding in the statement sufficient to provide for the extent of independent monitoring that is desirable?

Dr Grayling: It is enough to make a good start.

Q72 Simon Wright: How regularly would you expect the Environment Agency to visit an operational fracking site during exploration and subsequently then if the site moves on to production?

Dr Grayling: We have made a commitment that we are doing more than our usual amount of site visits and inspections to the sites because of public concerns and the public interest around them. We will do that often jointly with the Health and Safety Executive. We could give you some numbers around some of the wells that have already been drilled, for example Preese Hall and Balcombe.

Mark Ellis Jones: Preese Hall we visited 16 times in a period of three years, seven of which were unannounced spot checks and the others that were planned with the operator, as an example.

Q73 Simon Wright: If you are looking at doing this on a wider scale; that obviously does have the staffing implications.

Dr Grayling: That comes down to having the permit fee set at the right level to enable us to employ the number of staff that we will need to do those inspections.

Q74 Simon Wright: How are the cumulative impacts of fracking emissions considered within the regulatory system?

Dr Grayling: First of all they are considered within the strategic environmental assessment undertaken for the 14th licensing round recently. But as we have also alluded to, we are looking at how we could take them into account in the permitting, not just of an individual site, which is the stage we are currently at, but in relation to how we might permit a field development. If an operator, having done exploration, decides that there is potential for commercial exploitation of the resource, it then has to develop a field development plan, which has to be agreed by the Department of Energy and Climate Change under the

petroleum exploration and development licence. We want to see how we can work with that system to enable us to take account of potential for cumulative impacts, for example, in relation to issues such as air quality.

Q75 Simon Wright: Thank you for your succinct answers. There is just one more question, which others may wish to comment on also. We have had several submissions to the Committee that have raised concerns about lack of transparency and perceived cosy relations between government and industry. How can the public be reassured that there is no conflict of interest in the regulatory system?

Dr Grayling: Our processes are very transparent. For fracking sites we undertake extra public consultation because we know that they are sites of high public interest. We publish the permit applications for the community and interested parties to review and then we subsequently publish our draft terms, as we have done for the two sites in Lancashire, alongside a decision document, which is written in plain English, which explains how we have reached our draft regulatory decisions. Again there was the potential for public comment on that. All that information is available on our public register. We also participate in local public engagement meetings. We organise drop-in sessions. We are also developing some materials that will enable us to explain our role to local communities in an accessible format.

Q76 Mark Lazarowicz: The Environment Agency permits include provisions for post-closure monitoring to ensure sites are restored to an acquired condition, as I understand it. Who covers that post-closure monitoring? Is that your own staff or do you use outside agencies or is it the—

Dr Grayling: I will bring in Mark to add some more detail but again it is a regulatory requirement, so it is a requirement on the operator to carry out the monitoring. But I emphasise they have to carry it out in accordance with the standards that are set in our monitoring certification scheme.

Mark Ellis Jones: That often involves a third party, so they will often use a third party contractor who is certified under our MCERTS accreditation scheme. Again in cases, for example, at Preese Hall and in Balcombe, we also did our own monitoring from their groundwater monitoring boreholes. We will sometimes go and do a spot check. We will take our own sample or we will go with them and as they take a sample we will also take a sample and we will analyse those independently to verify the results.

Q77 Mark Lazarowicz: Is it not a bit concerning then that it is not the agency that ultimately carries out the monitoring and basically goes along to make sure it is all okay? It is left to the operator subject to some checks from yourselves. Is that not a bit concerning if you do not do it yourselves?

Dr Grayling: It is very important that the operator takes responsibility for the things that they do and undertakes the necessary monitoring to demonstrate what they are doing is being done in a way that is safe for people and the environment. I do not think we should take that responsibility away from them. But I do accept, particularly at the early stages of the industry, there is an argument alongside that for some independent monitoring, and we are going to see that developed as a programme.

Q78 Mark Lazarowicz: Are you saying you are looking at independent monitoring being developed?

Dr Grayling: Yes, and I said that in an answer to an earlier question as well.

Q79 Mark Lazarowicz: What about long-term monitoring? We are talking about obviously the immediate post-closure period. What if something happens some time in the future? Do you have any plans or proposals to monitor for long-term consequences, on an occasional basis?

Mark Ellis Jones: The process of decommissioning the borehole is that we will essentially not allow the operator to surrender their permit until we are satisfied, first, that the site has been returned to a satisfactory condition and, secondly, that there is not a long-term environmental risk posed by the site. As long as the permits stay in place, the requirement for post-closure monitoring remains with the operator. The timing around those may vary, so at the point of closure we would expect a closure rehabilitation plan to be presented to us. That has to be approved by us in writing. With that will be a post-closure monitoring plan that we would also approve. Then we would expect that monitoring data to inform our decision to accept any permit surrender from the operator.

Q80 Mark Lazarowicz: Does the National Physical Laboratory have any role in this process of post-closure monitoring and long-term monitoring?

Jane Burston: Our role is the National Measurement Institute and we have a large group of people who measure fugitive methane emissions from a range of industries. Our role has tended to be to help set the best available techniques, guidelines and international standards. As yet we have not done any monitoring on post-closure sites.

Q81 Mark Lazarowicz: Do you intend to?

Jane Burston: It is something that we have the capability to do, yes.

Q82 Zac Goldsmith: On that point: would you need to be asked to do it, commissioned by Government or by another body, or is that something you would elect to do as an organisation?

Jane Burston: We could do either. With industrial emissions we tend to be asked by the industry body because there is regulation in place to measure the emissions. I do not know whether that is the case and will be the case for methane emissions post-closure for shale gas sites or as part of research. If industry will volunteer a site we could do it that way.

Q83 Mark Lazarowicz: If something does go wrong either during operation of a well or at closure or beyond that, how can the public be reassured that the current liability arrangements will protect them from footing the bill or the public generally being required to foot the bill? What are the liability arrangements in place?

Mark Ellis Jones: As long as the operator is holding the permits and is responsible for the site, at any time before, during or after operations we have the powers to take enforcement action if there was a pollution instant event of any kind or a breach of permit compliance. So those powers remain with us. We will hold operators to account for any breach of their

permit conditions and we do that through a mixture of enforcement processes, including, as I have already mentioned, spot checks. We do audits, we require the monitoring data to be supplied to us and we will make sure that the operators are operating within the environmental parameters as set out in their environmental permits. Particularly after the sites have been operated and then decommissioned, we would not allow the operators to surrender their permits until such a time as we felt that the sites had been restored to a satisfactory environmental condition or there was no long-term risk to the environment.

Q84 Mark Lazarowicz: I understand, but one of the issues that came up in evidence this morning was a concern that a number of the companies or whatever who are considering or preparing their fracking in the UK have a very low level of equity. The concern of this witness, an economist, was that—to put it bluntly—if something does go wrong, you might well hold him to account but there would be nothing there to pay for the consequences. Is this something that concerns you?

Mark Ellis Jones: There are two aspects to that. One is that, under the Environmental Liability Directive, we can hold companies to account for any environmental damage, even after they have surrendered their permit. So we can take enforcement action even after permit surrender and would do so. The second point is that we understand that DECC and the industry are in the process of talking about longer-term insurance arrangements to cover off that potential eventuality.

Q85 Mark Lazarowicz: It was also a point that you may have all the accounting mechanisms to hold them to account but if they go bust because something has gone wrong and they have no money, that is not going to be much good in terms of getting them to do anything about it, is it? How far are these insurance discussions developed at the moment?

Mark Ellis Jones: That is not something we, as the Environment Agency, are party to but I understand that there are ongoing discussions between the industry, Government and the insurance industry around that.

Q86 Mark Lazarowicz: Is it something the agency would regard as a good idea?

Mark Ellis Jones: It is a good idea if any industry wants to take that proactive step. I would go back to the point that we feel we have the right powers in place already to ensure that the checks and balances can be put in place, either while an operator holds a permit or even after permit surrender through the Environmental Liability Directive.

Q87 Chair: Can I just pick up very quickly on the timespan that you are talking about? It could clearly take quite a long time for there to be seepage, perhaps long after the permit had been surrendered. What is the timescale that you are working to on that?

Dr Grayling: Until such time as we are satisfied that the well is abandoned—

Chair: How long is the time taken for you to be satisfied?

Mark Ellis Jones: The conditions in the permit are indefinite, so we have essentially, under the Environmental Permitting Regulations, in theory indefinite powers to not accept an operator surrendering its permit to us if we think there is an ongoing risk. What we would have to do is take every site on a case-by-case basis, depending on the extent of

operations, how long the operations have been lasting for, and that will vary. An exploration site that may only operate for three or four years would be very different, for example, to a full production field that may be in operation for 25 or 30 years. The requirements of post-closure monitoring would vary very differently on those two types of site because the scale of activity has been very different.

Q88 Peter Aldous: What links are there, if any, between the Environment Agency and the National Physical Laboratory?

Dr Grayling: We collaborate together on a number of pieces of work. We have been recently in discussions in relation to the development of monitoring, for example.

Q89 Peter Aldous: You see it as a relationship that is evolving. Are those links where you want it at the moment or is there somewhere you want to get to?

Dr Grayling: Certainly from my perspective it is a good relationship.

Jane Burston: Yes. On the shale gas extraction in particular we have fed into Environment Agency information reports around the potential monitoring techniques that are available and the different pros and cons of those.

Q90 Peter Aldous: Just keeping with yourself, what are you doing to develop new technologies to detect and measure fugitive methane emissions in fracking?

Jane Burston: There is a range of technologies that already exist to detect fugitive emissions and there is a continuum from low cost sensors with lower accuracy and precision at the one end and then more expensive with higher accuracy and precision at the other. The area where technologies are most lacking is in low-cost, high-accuracy instruments, so that is what we are looking at developing.

Q91 Peter Aldous: You are confident that you will be able to develop that?

Jane Burston: There are technologies available at the moment. It is not that you cannot monitor fugitive methane emissions because the technology is not there; it is. It is just which combination of which technologies you want to deploy and how much you want to pay for that. We have two projects specifically on shale gas and part of one of them is looking to develop a boundary fence methane monitoring device that could be left on a site to continuously monitor emissions. One of the issues with using a monitor that sits on the boundary fence is that it is just monitoring the methane emissions that will blow across its path. It is difficult to know whether that is quantifying the emissions from the whole site and you cannot pinpoint the source of the leak using those kind of technologies. So there are trade-offs and it ought to be used in conjunction with other technologies.

Q92 Peter Aldous: Are you satisfied at the current time that you are in a position to adequately evaluate and mitigate the risk of fugitive emissions?

Jane Burston: Yes, the technology is there. Zac earlier was asking about the resources and I think Simon was also. At the moment there has been a commitment from DECC through

the MacKay-Stone report to fund an independent research campaign on the measurements, and it is not clear exactly at what point or for how long the funding will come through for that. Some of this £5 million from the autumn statement will be dedicated to methane monitoring but not all. It will be important to have an independent, credible and transparent research campaign that looks at a representative sample of shale gas sites because for the two projects that we have are aimed at, one of them, as you say, is aimed at producing new technologies to monitor methane. The other is looking at developing a means of testing monitoring technologies, but measuring two fracking sites simply will not be enough to understand the emissions profile in general from shale gas extraction. From our experience of other industries and from the research that is shortly due to come out in the US, there is not a normal distribution of fugitive emissions from sites. What that means is if you take a sample of sites, there are going to be a few sites that represent a large amount of emissions, so it is important to do a representative sample.

Q93 Peter Aldous: Is there an acceptable level of methane release, from your perspective?

Jane Burston: It is not really for us to determine what is acceptable. We would say it is just important to find out what the level of methane release is in the first place. The range of studies that have come out of the US so far vary considerably in what they say the fugitive emissions are.

Mark Ellis Jones: From a regulatory point of view, our expectation is full containment. Any industrial process will have fugitive emissions of some kind, but our starting point is the expectation that there is 100% containment.

Q94 Peter Aldous: Who would be responsible for what might be acceptable emissions management?

Dr Grayling: In terms of sites, that is our responsibility. I go back to what Mark said, there are expectations. The operator demonstrates to us how they are ensuring complete containment of methane, not just at the well completion, which is where green completions are concerned, but at every stage of the process and ensuring all of their equipment is properly maintained and there are not leaky valves. A very key issue is that the borehole itself is properly constructed and cemented, and we work jointly with the Health and Safety Executive to ensure that that happens.

Q95 Peter Aldous: If I can just make a final observation, it does strike me that you are very much learning as you go along and yet this is an industry in America that has been around for 30-odd years and one might hope to have picked up some best practice from there along the way.

Dr Grayling: A couple of comments on that. One is that we have an established onshore oil and gas industry that we have been regulating for some decades, so we do have quite a lot of experience. The other is, of course, yes, we have looked at and learned from the US experience. We have regular dialogue with the US Environmental Protection Agency. I have been over to the US and spoken to policymakers in Washington and visited operating sites in Pennsylvania and Texas. There is good practice and bad practice to learn from in the United States. What I would say is that on the whole our regulatory regime is more robust than you will find in the States.

Jane Burston: I would like to come in on that point. I think we are obviously not learning as we go as far as measuring methane emissions goes. We have been doing it for decades in various industries. I think the US research has limited applicability in the UK. We have a good understanding of what it is saying and the research that is due to come out up until March next year. There are a few reasons why it has limited applicability. One is that the process to some degree will be quite different when deployed in the UK. It is unlikely or not possible that there will be venting and evaporation pools, which is one source of methane emissions. The geology is also potentially quite different, which has an effect on the level of methane emissions. Also one of the big difficulties with any of the US studies measuring methane leaks is the lack of a baseline to compare it to. It is very hard to say, especially for the flyover or tall tower emission studies, to what extent it is the shale gas industry versus other industries that have produced the emissions. That is something we have the opportunity to avoid in the UK by taking a baseline.

Q96 Caroline Lucas: On the previous point that Tony Grayling was making about working closely with the HSE, there were problems at the only well that has been test fracked to date up at Preese Hall where the HSE documents revealed poor cement in the lower section and crucial checks not being carried out. While the documents did not conclude there was a well failure as such, can you explain why Cuadrilla was allowed to frack a well with so-called poor cement, which presumably increases the risk of well failure?

Dr Grayling: I will bring Mark in here because he is probably more on top of the detail of this, but the issue you are talking about there was a detected pressure increase within the concentric rings of steel casing of the borehole, so there was no potential for there to be a leak into the wider environment. It was within the design parameters of the well, as I understand it.

Mark Ellis Jones: I don't think I have anything more to add to that.

Q97 Zac Goldsmith: I am going to come back to talk about the US experience and I would like to ask Tony first: based on the US experience and given what you were saying earlier about your expectations of a full containment scenario, do you have any idea what proportion of wells and installations in the States would come even close to meeting those expectations?

Dr Grayling: I am afraid I am not carrying that information in my head, although I have read reviews of reports around the occurrence of issues with well integrity. Where there have been problems with wells—and of course the United States and Canada are really the only places where this industry has developed to a significant extent—it has not been with the hydraulic fracturing process per se. It is because the well has been poorly constructed and poorly cemented.

Q98 Zac Goldsmith: But presumably you know that there is a significant proportion of installations in the States that would meet the regulatory requirements that you are advocating.

Dr Grayling: I don't have the figures in my head, but you are right. I think there would be examples of wells constructed in the United States that would not meet the standards that we would expect.

Q99 Zac Goldsmith: The only point I am making is that in order to be able to set the standards where you want to set them and be confident that they could be met, someone in

your organisation must know that those standards have already been met in the country where this is most common, where the industry is most advanced.

Dr Grayling: What we were very careful to do was to review the regulations that are overseen by the HSE that govern the design, construction and operation of boreholes onshore within the United Kingdom, and England in particular where we have our remit, to make sure that we were satisfied that they would not only be good enough in terms of protecting safety for the workforce on site but they were doing a good environmental job. We concluded that they were. It is very important to understand that under the Water Resources Act the operator has to notify us if they intend to drill a borehole and in notifying us they have to present to us the plans of what they are planning to do, including how they are going to design, construct and operate the well. We will assess those plans alongside the HSE to ensure that we are satisfied that it has been done.

Q100 Zac Goldsmith: I am going to move on to another issue but I would suggest that if the industry is to have any hope at all of winning people's confidence it will need to be able to show best practice, not just with the shooting stars of the sector but that there is a significant number of players within the fracking industry in the States who are able to meet the standards that you have just described. Without that kind of evidence, it is hard to imagine anyone believing that we are going to see that best practice normalised throughout the United Kingdom. That is what I was looking for in the answer, but maybe that will come later

Mark Ellis Jones: I think the evidence for that is on the existing onshore industry. We have an existing onshore industry with over 200 producing wells already and those wells have all been built and designed to those HSE standards. That is common between the conventional industry and the shale gas industry. The standards are extremely high. For example, under the Environment Agency regulations I don't think we have seen any pollution incidents from well design from existing wells.

Q101 Zac Goldsmith: Just staying on America, most of the concerns that are aired around fracking are based on stories from the United States, the experience there. I have not read the full report because I have only just been sent it, but this is a report by the New York State Department of Health in December last year, on "High Volume Hydraulic Fracturing for Shale Gas Development". This is just the executive summary and I was struck by their conclusion. They say that current scientific information is insufficient to justify proceeding with fracking in New York. In other words, the department is advocating a moratorium, not an absolute end but a moratorium, at the very least a pause, having looked at methane emissions, groundwater contamination, community impacts and a long list of other concerns they have. Again, I am just questioning the confidence that you exhibited right at the beginning of this session, almost an absolute confidence that it is possible to imagine this sector expanding across the UK while adhering to those standards that you were discussing at the beginning. It clashes so violently with the experience, verdicts and opinions of experts in areas where fracking has existed for a very long time. Are you aware of this report and have you seen it?

Dr Grayling: I have not seen that particular report although I was aware that New York state had introduced a moratorium. I think it is very important to understand that we have a very different regulatory regime within the UK than exists in the States and you need to look at the UK regulatory regime, which is significantly more robust. It is not just our own analysis that we are relying on, although we have been very careful about this. There are

other authoritative bodies such as the Royal Society, the Royal Academy of Engineering and Public Health England who have come to similar conclusions.

Chair: There is a lot that we would like to explore in detail but we are very pressed for time now, so I will move on to Caroline Lucas.

Q102 Caroline Lucas: I am going to move to water in just a second, but off the back of what Zac was saying and taking you back to Preese Hall just for a couple of seconds, as well as talking about whether or not that cement was done in a poor way, nonetheless the HSE did say that crucial checks were not carried out. They said that well integrity tests were not carried out. Given that Preese Hall is the first and only well that has been test fracked to date, that does not reinforce the confidence that you are assuring us that the UK is so much better than the US. The HSE has said that there were problems in the one place where we have looked at it so far.

Dr Grayling: It is very important, though, that there were no problems that would result in an impact on the environment.

Caroline Lucas: Luckily this time around, but it does sound incredibly complacent.

Dr Grayling: The regulatory system is robust in having levels of protection within it.

Q103 Caroline Lucas: Would you not accept that it undermines public confidence if at one of the first places that we have looked at, Preese Hall, there were significant checks that were not carried out, even if on this particular occasion it did not lead to any long-lasting harm?

Dr Grayling: It didn't lead to any harm. That is the important point.

Q104 Caroline Lucas: Okay, any harm. Do you still agree that it undermines public confidence in the first well you have checked that there were significant integrity tests that were not carried out and should have been?

Dr Grayling: I think it is very important that the integrity tests are carried out by the operators.

Q105 Caroline Lucas: Do you think it undermines public confidence if they are not?

Dr Grayling: If they were systematically not, of course it would undermine public

Q106 Caroline Lucas: Thank you. On water, the Environment Agency has stated that current regulations are sufficient to protect water but Water UK, for example, has been saying very strongly that they believe that amendments should be made to the Infrastructure Bill to further protect water. Many NGOs are also raising concerns about risks of water contamination. Can you explain why there is that kind of inconsistency between the Environment Agency position and Water UK and the other NGOs?

Dr Grayling: I am not sure those positions are inconsistent. My understanding is that the Government have conceded that water companies should now be statutory consultees in the planning process for planning applications for hydraulic fracturing and we would

welcome that. Fundamentally, if an operator wants to abstract water from the environment they will need an abstraction licence from the Environment Agency if they are going to abstract more than I think it is 20 cubic metres per day. Hydraulic fracturing certainly involves far larger volumes of water than that. We will not license that abstraction unless we are satisfied that it will neither damage the environment nor interfere with the abstraction rights of other water users and we will base our judgment on a catchment management abstraction strategy that looks at the whole catchment. Of course, operators can alternatively, and I believe mostly are at the moment, seek to obtain their water from a water company but then that water company in turn has to have the relevant abstraction licences from the Environment Agency. First, the fundamental regulatory safeguards are in place and, secondly, if you look at it at a strategic level, as we have discussed before, we do not consider that the amounts of water that this industry could use if it scales up to a large scale are likely to cause us, at an aggregate level, major problems that could be issues at particular localities at particular times. They can be dealt with through the regulatory safeguards that we have.

Q107 Caroline Lucas: I still think there is a slight difference because Water UK and others are asking me and others—and indeed I am putting some amendments to the Infrastructure Bill—precisely to increase the level of regulation, whereas your position at the Environment Agency is that the existing regulatory regime is sufficient. Am I right?

Dr Grayling: We certainly think that we have the powers that we need.

Q108 Caroline Lucas: Thank you. Is there a definitive acceptable distance for separation between shale gas extraction activities and aquifers?

Dr Grayling: In relation to source protection zones, which are the zones where there are abstraction boreholes for drinking water, there is a prohibition by the Environment Agency on drilling in those areas. They are actually defined by pollution travel times rather than by metres.

Q109 Caroline Lucas: Do you think from the perspective of the precautionary principle that that ought to be extended to cover all source protection zones?

Dr Grayling: You have to understand that our permitting system is such that we will only permit an activity if we are satisfied that there is no significant risk of harm to the water environment or water resources. There is an absolute prohibition in protection zones 1. Outside protection zones 1, we would take a very rigorous case-by-case assessment.

Q110 Caroline Lucas: I am suggesting do you think there is no case in that latter scenario for there to be the use of the precautionary principle that could lead you to a position of saying that all fracking operations require, for example, a groundwater permit or—

Dr Grayling: Our technical advice, as an independent regulator, would be that the regime that we currently have is sufficient.

Q111 Caroline Lucas: It sufficiently incorporates the precautionary principle?

Dr Grayling: Yes.

Q112 Peter Aldous: Are flowback fluids and contaminated muds classified as hazardous waste?

Dr Grayling: There are two separate things there. I will bring Mark in I think, but the drilling muds, if they are oil-based drilling muds, are classified as hazardous and therefore if they are included in any waste products, the waste materials are themselves hazardous. In terms of waste fracking fluid, it is not automatically a hazardous material, not least because we do not allow the inclusion of substances in fracking fluid that we would deem to be hazardous to groundwater. But it is likely that waste fracking fluids will contain a sufficient but low level of naturally occurring radioactive materials that would invoke the radioactive substances regulations and therefore require permitting on that front and require that those waste fracking fluids are disposed of at an appropriately licensed wastewater treatment facility.

Q113 Peter Aldous: Are you happy with those classifications as we move forward?

Dr Grayling: I believe so.

Mark Ellis Jones: Yes, we are.

Dr Grayling: It is not an individual assessment, incidentally. It is something that we undertake jointly with the other environmental regulators in the UK and Ireland.

Mark Ellis Jones: It is the responsibility of the operator as part of the permit application to make sure that they can classify all of their waste streams before any operations begin. That is a classification that they do and then we will check as part of the permit determinations.

Q114 Peter Aldous: Do you feel that the presence of naturally occurring radioactive materials is a significant risk or not?

Dr Grayling: It is a risk like all the other risks but it is a risk that can be managed with good regulation.

Q115 Peter Aldous: Do you think we have sufficient understanding of that risk at the current time?

Dr Grayling: Yes, we do.

Peter Aldous: You are happy with that?

Dr Grayling: The background levels of naturally occurring radioactive materials are relatively low but we expect them to cross the threshold in which they will come into regulation. We consider that we do have the capacity in terms of the waste treatment facilities to deal with that waste in the current stage of development that the industry is at. This is a permissible activity so they will have a permit under our radioactive substances regulations that require that waste be managed in very specific ways to make sure that it is dealt with on site in bunded tanks, for example, and then disposed of at a properly licensed facility. So it is a risk that can be managed.

Q116 Mrs Spelman: The Government's written submission tells us that major development of shale gas in national parks, broads and outstanding areas of natural beauty should only be allowed in exceptional circumstances when the public benefit can be proved. The Prime Minister said, "We have not really defined what they would be but, clearly, there is a much higher threshold to be crossed". What could constitute exceptional circumstances that would allow fracking in such areas?

Dr Grayling: I feel that that is beyond our remit to answer because that is a matter that will be dealt with through the planning system. I would say that is the remit of the Department for Communities and Local Government.

Q117 Mrs Spelman: So that will be determined by the planning system?

Dr Grayling: Absolutely.

Mrs Spelman: But you would be a statutory consultee to the decision?

Dr Grayling: We would, and we have our own criteria for taking into account the distance between industrial activities and environmentally sensitive receptors. In our permitting process we would take it very seriously, of course, and take on board the advice of Natural England as a statutory body and also environmental organisations. On issues of whether or not there is an absolute prohibition in particular zones for reasons of landscape protection, that is a matter for the planning system rather than for the Environment Agency.

Q118 Mrs Spelman: Do you have a view as to whether there is enough protection afforded to sites of special scientific interest? The 2014 additional planning guidance steered developers away from World Heritage sites, AONBs and national parks but made the distinction and failed to steer development away from SSSIs. Do you have a view about the protection that is available for SSSIs?

Dr Grayling: Natural England is the main body responsible for policy with DEFRA on sites of special scientific interest. It is not something that we have taken a particular view on. I can only go back to we have our own criteria for ensuring that sites of special scientific interest are protected from industrial developments.

Q119 Mrs Spelman: Are those criteria in the public domain?

Dr Grayling: I believe so.

Q120 Dr Offord: Does the industry have the geographical knowledge to enable fracking to be sited in sites where it is considered safe? Do we have good 3D models and geological maps to do so?

Dr Grayling: For any individual site, we and the Department of Energy and Climate Change between us require detailed seismic surveys and detailed hydrogeological surveys as part of an application to undertake any drilling activity or any hydraulic fracturing activity. We would expect that information will come to light through those surveys, but it needs to be done ultimately on a site-by-site basis.

Dr Offord: Sorry, I just caught someone photographing something from behind you.

Chair: Yes, I thought I saw a flash. Could I say for the purpose of those present that it is not allowed under the parliamentary procedures to have photographs taken while in a Select Committee. Could I ask for everybody's agreement with that, please?

Q121 Dr Offord: There was a case back in the 1990s at the Wheal Jane tin mine down in Cornwall where once the pumping had stopped, following the decision not to continue mining there, a lot of waters and metals flowed out. The question I asked of you was in regard to monitoring of seismic activity before, during and after activity. Who would be responsible for that, particularly afterwards when the drilling has concluded?

Dr Grayling: The simple answer is that it is the Department of Energy and Climate Change, through the petroleum exploration and development licence, that is responsible for regulating seismic risk and putting in place the regulations rather than the Environment Agency. Our monitoring responsibilities relate to issues such as groundwater, surface water and air quality.

Mark Ellis Jones: Can I add to that that under the mining waste permit we need comfort that any fracturing fluid that is injected into the shale formation at the point of decommissioning will stay in the target formation. There are very strict permit conditions around making sure that the fracturing operations stay within the shale zone, the target formation, that none of the fractures will intercept with natural faults or fissures, and that at decommissioning of the site the fracturing fluid will stay in that formation and not migrate into overbearing formations.

Q122 Dr Offord: There would not be full reinstatement of the site. There would still be some physical evidence of the drilling?

Mark Ellis Jones: There would be no physical evidence, but there would be a deposit of fracturing fluid left underground and at decommissioning we would require the reassurances that it will stay there. Obviously the principal pathway for that fluid to go anywhere is back up through the borehole, which is also why the decommissioning point in the regulations, as we have discussed a number of times with the Health and Safety Executive in relation to the decommissioning of boreholes, is so important and why, as Tony said, we have done our review of their regulations to make sure that they are fit for purpose for our own environmental standards.

Q123 Dr Offord: I understand there were two earth tremors in 2011 in Lancashire following drilling just outside of Blackpool and the Department of Energy and Climate Change decided to introduce a traffic light system that would go through the process and give the appropriate stops. Do you consider that system adequate? Does it work?

Dr Grayling: Yes, and of course there has been no hydraulic fracturing since there so it has not been tested in anger, but the threshold they have set of 0.5 on what I old-fashionedly would call the Richter scale, although I don't think it is called that anymore, is very low and I think provides a very strict safeguard.

Chair: I am very conscious of time, so I thank the three of you for coming along and giving evidence this afternoon. I understand that our next witnesses are already in the room, so I invite you to take your place and thank our witnesses again.

Examination of Witnesses

Witnesses: **Lord Chris Smith**, Chair of Task Force on Shale Gas, and **Steve Thompson**, Director, UK Onshore Oil & Gas, gave evidence.

Q124 Chair: Thanking you, Lord Smith and Mr Thompson, for coming along this afternoon. I think that you have sat in throughout the session we have just had and I am sure that you will be aware that we may well be constrained by the Division bell. I will ask each of you very quickly to share with the Committee what the objective and purpose of the organisation that you represent is, starting with you, Lord Smith.

Lord Smith: Chair, thank you very much. I chair the relatively newly created Task Force on Shale Gas. The purpose of the task force is to try to reach an independent view for the public on a range of public concerns and issues relating to fracking and shale gas. The funding for the task force comes from six companies, all engaged in the shale gas industry, but—and this is a very crucial point—they have guaranteed the independence of the task force itself. They can have no influence on what we decide to have a look at or what we say. We started our work in September. Our intention is to issue a series of interim reports over an 18-month period and a final report in the early part of 2016.

We will be looking at a range of issues. The first cluster of issues we are looking at currently is what I would call the local impact issues about the operation of the planning system, community engagement, lorry movements and disturbance and disruption. The second cluster of issues we will be looking at is local environmental impacts. That is the potential issues about groundwater contamination, what happens to waste fluids, methane escapes and so forth. The third cluster of issues will be the much broader environmental issues about climate change impact and what the development of a shale gas industry here in the UK would mean for our carbon footprint in both the short term and the long term. The fourth cluster of issues we will be looking at, perhaps particularly pertinent now, is the economic issues: does this make economic sense for the provision of energy but also for the UK as a whole, and also what are the local economic impacts for jobs and the local economy? That is the spread of issues that we are looking at. We are very early days yet, so a lot of what I suspect I will have to say is, “We are looking at that” rather than that we have come to any particular conclusions.

Q125 Chair: Thank you. Mr Thompson, just a very brief summary in respect of UK Onshore Oil & Gas, please.

Steve Thompson: I am a director at UK Onshore Oil & Gas. I am an environmental scientist, just to be clear on that. I am not an economist or an expert in the drilling process. I have a background in dealing with water-related environmental issues, going back some 20 years. In UKOOG I spend a lot of time working with the operators in the industry to

bring forward a coherent approach to how we as an industry represent environmental issues.

Q126 Caroline Lucas: The first question is about climate change. To what extent do both of you believe that fracking is compatible with the UK's climate change commitments?

Steve Thompsett: I think the challenge here is that we need gas as a country. You have to recognise that about 83% of homes are heated by gas and 25% or thereabouts of our electricity is generated by gas, but gas is also very important for a number of things beyond energy. We use gas as a key component in the manufacturing of fertiliser and to manufacture many other products. I think it is very important that we recognise that gas is needed.

Q127 Caroline Lucas: Sorry, just to be slightly provocative, surely the first thing we need to make sure is that we have a liveable planet that is not undermined by climate change and then we can work out how much gas is compatible with that rather than start, as you just have, with how we need gas and therefore how we are going to produce it.

Steve Thompsett: Yes, but I think we have to put all things in perspective and gas is part of our energy mix. Coal is considerably more challenging in terms of its carbon input so we have an opportunity with gas to push some of the coal out of our system.

Q128 Caroline Lucas: Could I just challenge you on that? We had evidence this morning that was suggesting that by the time shale gas comes online in any significant quantities, 2025, that is exactly the time when we need to be decarbonising, getting coal off our grid, so by that time it is not actually displacing coal. It has a much stronger likelihood of displacing renewables, which is not so good.

Steve Thompsett: I guess there are many angles to take on this but—

Q129 Chair: Are you disputing that?

Steve Thompsett: Am I disputing it? No, I don't believe so. I believe gas will have a role to play.

Q130 Caroline Lucas: You did just say that it was going to displace coal and that is what I was—

Steve Thompsett: Not all of coal. It would help contribute to the displacement of coal but not its entirety, I am sure. We will still need gas in a lot of the activities we undertake.

Lord Smith: This is precisely one of the issues that we will be looking at later on this year and we will be seeking evidence from a wide range of sources on it. The issue has to be our aim for carbon and climate change as a country is that we should have decarbonised our electricity supply completely by 2050. There are issues about domestic heating and cooking that have not yet been fully addressed in the climate change objectives. The question will have to be: how do we make the best progress from where we are now to there? That will involve issues about what happens to coal, what the balance between

domestically produced shale gas and imported gas from elsewhere around the world is in terms of carbon impacts, issues about the stimulus to renewables or a deterrent to renewables, and issues about whether carbon capture and storage is seriously going to develop. Those are all parts of the equation that we will want to include in the analysis that we make.

Q131 Caroline Lucas: Would you accept that at the earliest, in terms of making a significant contribution to our energy use, it will be around 2025? Is that about the earliest that we could see significant shale gas coming on?

Lord Smith: In terms of significant quantities of shale gas production, I suspect you are probably right in that assessment. I would imagine that if all the relevant planning and environmental considerations are met there will probably be some shale gas development happening a bit before then, but for any really significant impact I think that is probably a fair assessment.

Q132 Caroline Lucas: That is just five years from 2030 when, according to DECC, most domestic heating should be on a low carbon grid, in other words DECC is at the same time, it seems to me, being somewhat inconsistent. On the one hand it is saying by 2030 we want to have most domestic heating on a low carbon grid and yet basically saying we would be having a thriving shale gas industry for five years and then it would have to stop.

Lord Smith: This would not be the first time that a Government Department has been inconsistent.

Q133 Caroline Lucas: That does not fill me with a great deal of reassurance, I have to say. Could I ask you about stranded assets and the carbon bubble? You will know that there is more and more research suggesting that we need to leave anything up to about 80% of known fossil fuel reserves in the ground if we are to have any hope of avoiding the most dangerous climate change. If you accept that—and maybe you can say if you do first—how is that compatible with launching a whole new fracking industry?

Lord Smith: Again, that is one of the factors that we will be seriously studying. One of the issues that we will need to try to analyse is what kind of carbon are you leaving in the ground. One of the perverse consequences at the moment of the development of shale gas in the United States is that it has dramatically reduced the United States' dependence on coal. That has led to the United States offloading its coal cheaply around the rest of the world, which has increased the use of coal, including here in the UK. We are currently burning more coal than we have burned for decades in the generation of our electricity. If it is a case of extracting gas rather than extracting coal, then that may be beneficial in terms of carbon resources, but if it is a case of extracting gas when you could be developing renewables then it would not necessarily be the same.

Q134 Caroline Lucas: But would you accept that the former of those two scenarios is by the far the most likely if we are accepting that we are not going to have significant shale gas coming on stream until 2025. By the time we have got to that point it will not be likely to be coal that you are substantially replacing. It is more likely to be renewables.

Lord Smith: A lot of our coal-fired power stations will have been phased out by then.

Q135 Caroline Lucas: Exactly. That is my point. You will not be displacing coal at that point, so you will be displacing renewables.

Lord Smith: The calculation that you need to make—and remember this should not just apply here in the UK; we need to be looking at what is happening in the rest of the world as well—is what the circumstances are going to be not just now, not just in 10 years’ time but what is going to happen in 25 years’ time and beyond.

Q136 Caroline Lucas: Exactly, but that seems to me to be reinforcing my point that it is far more likely that shale will be displacing renewables rather than coal. Would you agree? Yes or no would be really handy.

Lord Smith: No, because the imperative on the growing development of renewables has to be a sine qua non of energy policy.

Q137 Caroline Lucas: In the new Infrastructure Bill there is a duty to maximise economic recovery of oil and gas, fossil fuels essentially. To what extent do you think that is compatible with our climate change objectives?

Lord Smith: I have to say that is not an issue that will be the subject of debate by the task force. If you want a personal view, it is that it is potentially a dangerous addition to a piece of legislation.

Q138 Neil Carmichael: It is not surprising that the industry is fairly optimistic about the possibilities of shale gas and it clearly has thought about the implications, both good and bad. Steve, what do you think are the main threats and main concerns that the industry has in mind?

Steve Thompsett: The main threats to the development of the industry?

Neil Carmichael: Yes.

Steve Thompsett: A main threat to the development of the industry is establishing a social licence to operate, and we have heard that mentioned as quite a fundamental thing for the industry to achieve. That is only achieved by being transparent and open and establishing a strong threshold for baseline environmental information so that people can see that it is an industry that can work in the UK and with the environment. I would see that as perhaps one of the bigger challenges.

Q139 Neil Carmichael: What do you think can go wrong environmentally with shale gas?

Steve Thompsett: Under the current permitting and regulatory arrangements not very much, if we are honest. I think there are the controls and mechanisms in place that enable the industry to operate effectively and efficiently and in an environment that is well regulated and well controlled. I don’t actually believe that there are fundamental issues that can arise.

Q140 Neil Carmichael: But you must do some risk analysis. You must have a worst case scenario situation. What kind of scenarios or what kind of risks would you set out?

Steve Thompsett: Like any industrial activity, there is always a risk of maybe a spill on the surface or some component needing to be maintained, a small failure or a small issue. If you think that we have had a well established onshore oil industry for many years, with very few environmental issues associated with it, that kind of puts the context in which we are able to regulate oil and gas onshore in the UK.

Q141 Neil Carmichael: If you had a bottomless pit of research capacity, where would you go in terms of pushing o

Steve Thompsett: It is a very interesting question. We already have a framework of monitoring and various elements that come together to ensure that the industry is well controlled, so I am not sure you would target money at any particular element. You perhaps would look at maybe modifying and improving the best available techniques such that you have a framework that is able to capture the information from each site, but I think that there is probably not one panacea that would unlock the environmental monitoring requirements.

Q142 Neil Carmichael: Chris, is your task force thinking about this sort of issue?

Lord Smith: We are definitely thinking about this sort of issue. We will probably need to do some thinking above and beyond the existing level of research, partly because a lot of the existing research is from the American experience and the circumstances in America are different in terms of geology, regulatory regime and landscape. We have a much more crowded island here in the UK. One of the areas where I think the issues are going to be most stark is in relation to well integrity, because it is so important. Well integrity is so crucial for protection in terms of groundwater, waste fluids and impact on the environment; do we have the right regimes and techniques in place to ensure well integrity? That is one set of issues. The other set of issues that I don't think has been sufficiently researched up to now is in relation to health impacts where there are conflicting bits of research emerging from the United States. In that respect—and I am sticking my neck out a little bit here and probably pre-empting one of the things that we are likely to be looking at—I think personally one of the major important things is baseline monitoring on health for any well development.

Q143 Neil Carmichael: The well integrity issue is an important one. The Environment Agency seem to rely quite a lot on existing water permit regimes and so forth. Do you think that is sufficient or do you think there is more needed?

Lord Smith: Again, this is one of the things that we are looking at. If I had to express a personal view, it would be that if you add up the range of environmental regulations that are currently in place, mostly in different European directives, you probably have a range of protections that are sufficient for the various issues that we can currently envisage. However, it is all rather diffuse across a range of different directives and it is the responsibility of a range of different public bodies to undertake the regulation. One of the key issues that we are tussling with at the moment is: does that make sense? Would it be better to have a bespoke regulatory regime that had the expertise, the knowledge and developed it, especially if we are going to see a lot of new applications coming online? At

the moment you have only a few handfuls of applications and the current regime appears to be reasonably well geared up to be able to deal with that. If that were to expand dramatically, I think there are serious questions about whether it is.

Q144 Neil Carmichael: The capacity issue was looked at before. It is possible, isn't it, for two regulatory agencies or two structures or whatever to effectively not quite be seen as enough and let something go through? Have we seen that happening in the United States?

Lord Smith: The problem in the United States is that the regulatory regime differs from state to state. Much of the regulation is undertaken by the state authorities rather than by the federal authorities, so it is different from one place to another. Especially in the early days of development in the United States, the regulatory protections were perhaps rather more rudimentary than they are here. I think we can learn a lot from the United States about how not to do it. We can also pick up some bits of best practice and learn how to do it as well.

Q145 Neil Carmichael: Do you think the technology behind this industry is mature enough to deal with some of the challenges that you have outlined and, Steve, you are probably thinking about as well?

Steve Thompsonett: I believe so. I think the technology is there to enable us to do this very efficiently and effectively. I suppose what we face is whether all of that technology is available on the scale that we may need to apply it. That is where, if we are to do research, maybe looking at particular techniques that may be available for treating water on a site to minimise transport activity, those kinds of things, could add value. The technology is there; it is whether it can be developed and scaled to a level that would enable production.

Lord Smith: A lot of the technology has been deployed in conventional forms of drilling for decades now. I think the application of the technology rather than the technology itself is the thing we need to be seriously looking at.

Q146 Martin Caton: Tamboran Resources, operating in Ireland, have pledged zero chemical hydraulic fracturing. Is that possible or economically attractive to the industry?

Steve Thompsonett: There is a whole range of techniques that can be adopted. It is a case of whether they actually work in the formation that you are looking to stimulate and this is part of the challenge. We are not dealing with shale rock that is the same everywhere and therefore you have to use a range of tools in order to recover the hydrocarbon resources. There is a range of techniques; it is whether they will work where you are currently pursuing it.

Q147 Martin Caton: Is alternative technology something your task force would look at?

Lord Smith: I would certainly want to look at what the Irish proposal is and to see how robust it is and whether it could be applied here. I don't know at the moment because I have not seriously looked at that but I would certainly want to.

Q148 Mark Lazarowicz: My question is really for Mr Thompsonett. The Government have introduced various tax regimes to encourage fracking and there are obviously the measures in

the Infrastructure Bill to make fracking easier as well. How important have these changes been to the industry to allow it to develop fracking in the UK?

Steve Thompson: It is worth recognising what the tax regimes are. We pay a corporation tax of 30%, which is 9% above what normal industry and other activities pay. Then there is a supplementary tax, which is again another 30%, and it is that that has been packaged together such that there will be some modifications and some benefits that enable the industry to go forward. That is the set up, this supplementary tax.

Q149 Mark Lazarowicz: It is about half the tax rate for oil, isn't it?

Steve Thompson: As in the supplementary tax?

Mark Lazarowicz: Yes.

Steve Thompson: It is for Treasury to determine what that threshold is. It would effectively be a reduction of that element. I couldn't tell you exactly what the number is off the top of my head.

Q150 Mark Lazarowicz: It is half as much as oil exploration has to pay.

Steve Thompson: In the context of offshore?

Mark Lazarowicz: Yes.

Steve Thompson: I don't know off the top of my head but maybe it is in that area, yes.

Q151 Mark Lazarowicz: How important to the industry are the changes brought in by the Infrastructure Bill? Would fracking go ahead to the same degree without those changes?

Steve Thompson: I think it probably would go ahead. What we have to recognise is that we are just seeking to stimulate rock at a great depth, which quite obviously has no impact at the surface. I guess we could debate the seismicity issue if we believe that is a major concern. The ability to stimulate and to drill very deep ground that does not impact the benefit of the use of the surface is something that is very useful to a number of industries and not just oil and gas—geothermal for example.

Q152 Mark Lazarowicz: As you know, the Government have highlighted both the relative tax advantage and the changes in the Infrastructure Bill as being part of a way of encouraging a shale well revolution in the UK. If that is what they think, presumably you must also think that it makes a great difference to the industry.

Steve Thompson: In developing an industry, clearly if you want to attract investment you have to make it attractive for the investors to move forward and get involved. But we must remember that the supplementary tax in due course would be removed. It would go back up 30%, not be removed, so we would be paying 60%, and the right time for that would depend very much on how exploration and production progresses. We would expect the Treasury to be looking over our shoulder to determine exactly when the time was right.

Q153 Mark Lazarowicz: Give us an idea of how long you would expect the favourable tax rates to apply.

Steve Thompsett: That is very interesting. I guess we would need to do some more exploration and drill some more wells before we get the feeling for how productive UK shale is likely to be. It would no doubt be a number of years. If we consider that production may be five to 10 years away, even at a reasonable scale, then it would be of that sort of timescale. That is a guess, obviously, because we don't yet have that.

Q154 Mark Lazarowicz: So you are talking in the context of many years not just a couple of years?

Steve Thompsett: Yes, but of course we are not subsidised. We do not get a payment from Government in order to develop this.

Q155 Chair: You get tax concessions, don't you?

Steve Thompsett: We get tax concessions but that is only the supplementary element to it. We are not actually producing any gas and selling any gas, until we get to a point where we are producing it.

Q156 Mark Lazarowicz: I know it is early stages from your point of view, but have you seen people rushing into the market because of the tax concessions?

Steve Thompsett: We know that a number of big players, Centrica, Total and GDF Suez, have joined us in the last year or so, and of course we have the 14th round and we know that that has been quite attractive and a good number of operators have come through. It has been announced publicly that about 95 operators have come forward for about 295 licensing blocks. There is quite a significant amount of interest, but that is due to be completed in the next few months and we will see the outcomes.

Q157 Mark Lazarowicz: I don't know if you heard the earlier session when I raised a point that had come from the morning evidence session. There were concerns that a lot of the operators potentially had a relatively low equity base, so if anything did go wrong with a particular well they would not have the capacity, bluntly, to necessarily pay to clean up the mess because they did not have many resources. Is that something you accept?

Steve Thompsett: No. I think it is important to recognise the kind of framework that sits around this. In order to become a competent operator and be able to bid for a licence you have to show that you have financial capacity to undertake the operation and explore and do the things you need to do.

Q158 Mark Lazarowicz: It is also the clean-up if something went wrong, which is obviously different from the finances for the operation, isn't it?

Steve Thompsett: I think it is important to look at the framework. We have the licensing arrangements and well consent. DECC would not let well consent, consent to drill, unless the company had the financial rigour to enable that to be undertaken and then the well to be closed out. The Environment Agency has powers to require a certain sort of conditions and enforce those conditions, as we heard in the last session. The Minerals Planning

Authority can ask for bonds or financial mechanisms to be established as part of planning conditions. With all that sort of layering in place, it is already fairly robust and of course operators will have environmental liability insurance. UKOOG has been working on a captive mechanism to see if we can make something more collectively cheaper for the industry to be able to buy into to help manage some of these elements. It is already a fairly comprehensive framework at many levels.

Q159 Dr Offord: The whole issue of fracking has become very polarised between those who are pro and those who are anti. What steps do you believe that both the Government and the industry should take to introduce a more objective assessment of the pros and cons of the practice?

Lord Smith: I will have a first go at that. One of the problems with this whole debate is that it has tended to polarise too much. Quite a few people in Government and elsewhere are saying that this is going to solve most of our energy problems as a country for decades to come; others in the broader environmental movement are saying that this is an unmitigated environmental disaster. I happen to believe that neither of those two propositions is true. Trying to find where the truth lies in between them is precisely what our task force is going to be seeking to try to establish. What we are going to try to do is be as open as we possibly can about what we are doing, publish everything on our website about the evidence we receive, the reports that we do, the people we have talked with. We have already been to talk with people in Lancashire and West Sussex about their views and concerns. Illumination, transparency and as evidence-based as we can make it is the secret to trying to establish genuine public confidence in what is happening.

Steve Thompson: I entirely agree. The problem is there have been an awful lot of mixed messages and the public would find it very difficult to understand which of them is correct. The industry, with UKOOG, promoted a discussion campaign called “Let’s talk about shale” and this was undertaken in the north-west. What we found from there is that people really wanted to openly discuss the issues without feeling pressured. We received 800 questions covering different things and what it showed us was that people are willing to engage but they want to engage in a non-confrontational manner, so we didn’t have people from the industry involved. It was purely a go in and you can discuss, write your question down kind of arrangement, and I think it was very well received by the communities and there were very interesting questions that the industry will certainly benefit from.

Q160 Dr Offord: What about more wide-scale public consultation? In the last few days I am sure other members here have received e-mails from a campaigning group talking about fracking underneath their homes. The reality is that there will not be fracking in north London, in Hendon in my constituency, but I do accept that people have a concern away from their properties and in other parts of the country. How do you get those people more involved?

Steve Thompson: I think the challenge is that you need to be able to let them understand what the scale of the activity is and the risks that that potentially poses. We are talking about stimulation at great depth, several thousand metres in some cases, and a process that

opens fractures that are a millimetre in size, held open with a grain of sand. We are not talking about drilling a large tunnel or something. I think people don't fully understand that that is the actual operation itself. Nobody has done a national campaign to say, "This is what it is."

Q161 Caroline Lucas: I can't speak for other people, but I would have thought that someone hearing you saying that one of the big problems here is that others don't understand the level of risk is exactly what is going to make them even more annoyed and frustrated. The people that I have met have spent an awful lot of time getting their heads round this stuff and, although some things that some people say might not be true, the vast majority of the analysis that these groups are doing is pretty rigorous stuff. To say that the problem is that they simply do not understand it risks sounding somewhat patronising.

Steve Thompsett: I apologise for that. I didn't mean it to come across in that way. We need to give people a balanced view from both sides. We need to give people the evidence about the techniques that are undertaken, about what the operation really is, and let them form their own view about whether that is something that they are willing to accommodate in their community.

Q162 Caroline Lucas: If we are talking about evidence, does that mean that each of you would be willing—or maybe you already have done—to write to the Government to say that the report on the rural impacts of fracking should be made available now, completely unredacted? If you are talking about things that are going to make people not have confidence in the process, to have a document that has about two-thirds of it redacted is not guaranteed to have that effect. Is that something you could guarantee to do?

Steve Thompsett: No, I don't think I could guarantee to do that because I don't think that—

Caroline Lucas: But you want people to have the evidence.

Chair: You just said about transparency.

Steve Thompsett: Yes, but I don't know the context in which that document was developed, whether it was developed as a discussion piece that could perhaps concern people from a different perspective. I don't know what the details are of that document. I have not seen it, so it is very difficult for me to comment on whether that should be in the public domain.

Lord Smith: I would very happily say to the Government that openness is absolutely essential and I would say exactly the same to the industry. One of the surprising things that I discovered when we were talking with some of the communities in West Sussex was that in relation to applications for drilling sites, information about, for example, the number and frequency of lorry movements during the well construction stage, the exploration stage and the decommissioning stage was not being openly and clearly made available to local communities. Of course that is precisely the sort of thing that local communities are going to be extremely concerned and worried about and if they don't have that clarity and information then they are going to draw very obvious conclusions.

Q163 Chair: So you would be prepared to write along the lines just suggested by Caroline Lucas, Lord Smith?

Lord Smith: I would certainly be prepared to write to the Government and say, “You must be open about all the information that you have in relation to this subject”.

Q164 Dr Offord: In regard to the management of risk that people are concerned about—what if something goes wrong—are the current liability arrangements adequate?

Steve Thompsonett: I believe they are, yes.

Q165 Chair: On what basis do you say that?

Steve Thompsonett: I think the layering of mechanisms that regulators have in place is sufficient. The industry over time will be in a position where it can develop a captive that in fact makes the ability to manage that liability cheaper for the industry. You can buy bonds and insurance mechanisms, but they are currently expensive. If we could get into a position where all industry is able to buy into that and take that forward then that would be a very positive place.

Q166 Mark Lazarowicz: In the earlier evidence session most of the discussion has been about the regulatory regime that applies in England, and I think England and Wales, but the actual subject matter of the inquiry is environmental risks of fracking in the UK, so I want to ask a question about the situation in Scotland, in particular to Mr Thompsonett but maybe Lord Smith as well if he wishes to comment. What contact and discussions have you had about fracking with the Scottish regulators and with the Scottish Government and what has their response been to your activities?

Steve Thompsonett: As with Wales and England, we are engaged with Scotland. We have operators in Scotland who are looking to undertake various things. We have links to SEPA. In fact, only today I shared the industry’s baseline monitoring guidelines, which we developed, with them to initiate some discussion with the industry. We are engaged with them. There is a lot more activity in England so our focus has been fairly significantly in England with the Environment Agency and the other regulators, but we are certainly linked into Scotland as well.

Q167 Mark Lazarowicz: What about the Scottish Government? Have you had contact with the Government rather than the agencies?

Steve Thompsonett: Yes, we have indeed. We do have an ongoing dialogue with all of the regulators and really it is determined by the level of activity that is going on. Of course we do represent a number of operators that work in Scotland.

Q168 Mark Lazarowicz: What has the view been that the Scottish Government have taken about your operations or your plans for the industry?

Steve Thompsonett: They engage with us in a similar way as other regulators. They often listen to what we say, feed back on where they think perhaps we need to be doing things in

a different way. We have an ongoing dialogue, so there is no particular issue that we deal with on a daily basis.

Q169 Mark Lazarowicz: Have the Scottish Government suggested to you, for example, that you should not be doing fracking in Scotland?

Steve Thompson: Not directly to us as an industry. No, not at all.

Lord Smith: Our primary focus is on England but we will, of course, be wanting, in the course of our work, to look at what is happening in Wales and Scotland, particularly to see if there are cross-border lessons that can usefully be learned.

Q170 Mark Lazarowicz: Just to Mr Thompson again, have you had any discussions directly with Scottish Government Ministers?

Lord Smith: Not yet.

Mark Lazarowicz: Mr Thompson, any Ministers?

Steve Thompson: Have I personally?

Mark Lazarowicz: Well, you or your organisation.

Steve Thompson: Yes. Certainly UKOOG has had an ongoing dialogue with the Scottish Government.

Mark Lazarowicz: Actually with Scottish Government Ministers?

Steve Thompson: I can't tell you exactly who it has been discussed with but, yes, members of UKOOG and the industry have engaged with Scotland and the Ministers.

Q171 Caroline Lucas: I have one last question. It is where we started off on this one about building trust with the public. When you first introduced the task force you said that it is funded by industry. Notwithstanding as many firewalls as you might put between you and it, do you not accept that by having industry funding rather than public funding you are starting off on the back foot because it gives out a signal to people that this is something that the industry may well have an interest in? I am not suggesting it does but the signal that it gives.

Lord Smith: I entirely accept that, in an ideal world, funding for the sort of work that the task force is undertaking could most usefully come from the public purse. That is not on offer and, given that and given that I think the work is important and that it is for the benefit of the public that it is done, the way in which we have structured the task force, the guarantees of independence that we have and the eminence of the four people who make up the task force I think are the best guarantees that we have.

Q172 Caroline Lucas: Could you conceive that theoretically it could come to a position, for example looking at the climate change aspects, of saying, "Fracking is not compatible with our climate change objectives" and it would be able, free to make a recommendation as strong as that?

Lord Smith: If that is where the evidence leads us, yes. What I don't know at the moment is where the evidence is going to lead us.

Chair: We need to draw our proceedings to a close. Thank you for coming along this afternoon and thank you to the Committee as well.