HOUSE OF COMMONS

Environment, Food and Rural Affairs Committee

Oral evidence: Defra's responsibility for fracking, HC 589

Tuesday 10 March 2015

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Watch the meeting

Members present: Miss Anne McIntosh (Chair); Richard Drax; Jim Fitzpatrick; Mrs Emma Lewell-Buck; Neil Parish; Ms Margaret Ritchie;

Questions 74-208

Witness: **Francis Egan**, Chief Executive, Cuadrilla, gave evidence.

Q74 Chair: Good afternoon and welcome. Mr Egan, can I thank you very much for being with us to participate in our oral evidence session on the work of Cuadrilla and Defra's responsibility for fracking? Just for the record, could you give us your name and title?

Francis Egan: Francis Egan, CEO, Cuadrilla.

Q75 Chair: Could I just ask if you could tell us a little bit about Cuadrilla UK and what its relationship is to Cuadrilla in the US?

Francis Egan: There is no Cuadrilla in the US. Cuadrilla is a UK company. It is a registered company in the UK. Most of our employees are UK residents and UK citizens. We are owned by two shareholder groups. One is Riverstone, which is a US private equity group, and the other is A.J. Lucas, which is based out of Australia. Cuadrilla itself has got no US interests.

Q76 Chair: Where is your registered office located?

Francis Egan: Lichfield, near Birmingham.

Q77 Chair: Thank you. Could I ask if Cuadrilla has done a cost-benefit analysis on the hydraulic fracking for shale gas?

Francis Egan: We have done a considerable degree of exploration. At the moment, we are still in the exploration phase. We have done an assessment of what the resources, or, in layman's terms, what the gas in the ground, might be for our licence in Lancashire. What we have not yet done is made an assessment of how much of the gas in the ground we might get out of the ground. In order to do that, we need to fracture and flow test some wells, which is what we are applying for permission to do now.

Q78 Chair: I actually asked about a cost-benefit analysis, and whether, given the price of shale gas and the price of oil at the moment, it is going to be economically viable to extract.

Francis Egan: Sorry, I did not understand that. The resource is of such a size that, if it is to be developed, it will probably be developed over decades, not years. The day-to-day and week-to-week gas and oil price is not that important in that decision. In any event, a much more important parameter is how much of the gas in the ground you can get out of the ground. Until we do some further testing, we will not have a reasonable answer to that question. That is the whole point of what we are trying to do now, to answer the question that you have just asked me.

Q79 Chair: You have not actually done, as a company, a basic cost-benefit analysis at this stage.

Francis Egan: No, I did not say that. We have done plenty of assessments, but we need more data. You cannot get data without doing work.

Q80 Chair: When do you expect to start any exploratory work?

Francis Egan: Well, that depends when we get approval from Lancashire County Council. We have the environmental permits we need to go on both sites in Lancashire. The Council deferred its decision in January, and has said it will reconvene before the end of April, but we do not yet have the data. Hopefully, we will have that within the next few months.

Q81 Chair: Thank you. Do you accept that unconventional gas, this type of exploration, is new in the UK, and that therefore the regulations have not yet been tried and tested?

Francis Egan: No, I would not say that at all. The natural gas from shale is no different than the natural gas from sandstone or the natural gas that is being produced in the North Sea. There is nothing different about the natural gas. In fact, in many ways, the natural gas is of a purer quality. The gas we have found in Lancashire is 96% methane. The techniques used to extract it, drilling and hydraulic fracturing, are not new to the UK. What is new is the extent to which they have been used in the US to extract it from shale, which has not been done in the UK. But the actual techniques themselves, drilling and fracturing, are no different, frankly, for shale than they are for sandstone.

Q82 Chair: Let me ask the question a slightly different way. Would you accept that hydraulically fracturing at depth for shale gas is new to this country, and that therefore the regulatory regime onshore has not been tried and tested?

Francis Egan: No, I would not accept that either. I think the regulatory regime responds to the perceived risks of the activity. The risks associated with drilling at depth, for example, are well understood. We have drilled many wells at depth in the UK, and much

deeper wells, in fact, than shale wells. There have been much higher pressure wells and much higher temperature wells. I think the regulatory regime, as far as the drilling of wells goes, is very well understood. If you look at the particular aspects of shale, what goes into the ground and what goes out of the ground are regulated by quite a number of European Union directives and environmental regulations. I think there is a very robust regulatory system in place, and that in fact has been the findings of quite a few inquiries into this.

Q83 Chair: When Cuadrilla hydraulically fracked at Fylde and the activity caused a tremor registering 0.5 on the Richter scale, who decided that you should stop operations?

Francis Egan: It was before my time, but Cuadrilla itself stopped operations and then subsequently had the conversation with the Government.

Q84 Chair: This traffic light system, which the Government now envisage, who will actually police that? Who will ensure that you do stop operations at 0.5?

Francis Egan: DECC.

Q85 Chair: Will they actually be onsite to monitor that?

Francis Egan: Correct. Yes.

Q86 Chair: Is it not the British Geological Society that is monitoring it?

Francis Egan: No. I think the British Geological Society may do its own monitoring, but that is separate to DECC. It is clear that DECC has regulatory power over seismic monitoring and the traffic light system.

Q87 Chair: There will be a DECC official there.

Francis Egan: I understand there will, yes. I expect there to be.

Q88 Jim Fitzpatrick: Mr Egan, good afternoon. I want to ask you about the regulatory framework, but I just want to follow on from a question from the Chair about the timeframe from starting to development. Having seen what has happened in the States, where there were obviously some problems but clearly benefits from shale exploration, from a starting point to shale actually being extracted, from today how long would that take before we actually see some shale gas being available for the UK to use?

Francis Egan: In our sites in Lancashire we are proposing in the testing phase to put the gas into the grid. It will be available immediately to use. That is one of the benefits that the UK has, in fact, over the US. Our gas infrastructure is very extensive. Virtually every house in the country is hooked up already for gas. At one of our two sites in Lancashire, we are a little over 20 metres away from a national pipeline, so we can in theory go into every house in the country. At the other site, we are about 50 metres away from a local pipeline,

which can take it directly into local houses. Gas could start flowing within a matter of months.

I suspect your question is more at scale, in order to make an appreciable difference, which will be several years. It could be five or six years from the initial exploration, depending on what is found, of course. I have to emphasise, and I always do emphasise, we are still at the exploration phase. There has been a lot of talk about "dash for gas", rushing into shale and all the rest of it. There has not been a single shale well tested in the UK since 2011 and we really need to actually test what is there before we get too far down the track of, whether this either the saviour of the energy industry as we know it or the worst thing that ever happened to the UK. We actually need to test a few wells.

Q89 Jim Fitzpatrick: Are the articles that are being reported in the media about the vast reserves that could potentially be there total speculation or optimism, or an assessment that has not yet been proved? How would you categorise that?

Francis Egan: I think, again, this is a bit of industry jargon, but we distinguish between resources and reserves. "Resources" is gas in the ground. "Reserves" is how much of that gas in the ground you might economically get out of the ground. Technically, you might be able to get some of it out or not, but then economics always comes into it. I think we are pretty confident that the resource is huge. That has been backed up by the British Geological Survey, who said that, across the north of England, their mid-case estimate was 1,300 trillion cubic feet of gas in the ground as a resource. They have got a lower and higher band estimate on this.

To put that in context, total UK annual gas demand is 3 trillion cubic feet. That is a lot of gas in the ground. That is when you then go to what I would call "informed guesswork"— I would not call it "speculation"—which is how much of that can come out of the ground. I have said this before at a Select Committee. Everybody, every man and his dog, wants the answer to that question, but nobody wants to drill a well. You cannot answer that question without drilling some wells.

Q90 Jim Fitzpatrick: In respect of the regulatory framework, you mentioned European Union directives. Within the UK, you are dealing with Defra, DECC, the Department of Communities and Local Government, landowners, the Health and Safety Executive and the Environment Agency. How do you relate to all of those different bodies, given that you actually have a responsibility to demonstrate to a number that you are doing it properly and safely?

Francis Egan: We have to deal with each of them. You are quite right. Each has their own separate purpose. We deal with the Environment Agency for environmental permitting. We deal with the Health and Safety Executive for well integrity and approval to drill a well. We deal with the Department of Energy and Climate Change to get the licence in the first place, and, as I mentioned to the Chair, for seismic monitoring. We deal with the Local Planning Authority for local planning. Of course, each of them, to some extent, consults on each other's work, so they are interrelated. It is pretty clearly set out what the responsibilities for each component piece of that regulatory jigsaw are.

Q91 Jim Fitzpatrick: So it does not cause you a problem, having to relate to a variety of different public statutory organisations in terms of getting the green light to go ahead. It works.

Francis Egan: Yes. If you ask me, and I suspect you might be asking this, "Could it be made better?". Possibly, but it works, yes. It is fit for purpose.

Q92 Jim Fitzpatrick: Have you suggested to them a different way of working to make it more efficient for Government, for public confidence as well as for yourselves?

Francis Egan: Public confidence is an interesting piece, but in short no. We are preoccupied, and are fairly busy, with working through the existing system. It works. I think, having been through it, hopefully having demonstrated to everybody that this has been done safely and responsibly and is, in fact, promising from a technical and economic point of view, then it might be appropriate to look backwards, and say, "If we are going to move this forward into a development phase, is there a more efficient way of doing this?".

Q93 Jim Fitzpatrick: Given the fact that there is public concern about fracking and horror stories from the States, especially in the early days, does the regulatory framework in the UK, in the company's view, give you confidence that you will be able to extract and operate safely, and be able to satisfy public concern and the regulatory bodies? Is there more that could be done to instil public confidence?

Francis Egan: I will answer that in sections, if I may. Yes, I have absolute confidence. Personally, I would not do this if I did not think it could be done safely and environmentally responsibly. I do not have to do this. I have worked all over the world in oil and gas and I do not do this unless I think it can be done safely and responsibly. If it is not, we will stop doing it. That is my personal commitment. I am confident that from a regulatory point of view, I have been through it all. I could list the various EU regulations, UK regulations, and directives that we are complying with. I am confident that from a regulatory point of view it is well managed.

However, you then come to possibly the most critical part, which is public confidence. Public confidence is influenced by lots of things, including the horror stories that you have just mentioned. No, we are not there yet, entirely, with public confidence. All the surveys generally show that there is a small percentage of people that are very much in favour and a small percentage of people that are very much against, and the majority of people are waiting to make up their minds. There clearly is a job, but in order to address the public confidence, clearly, you have to communicate. But ultimately, you have to do something. You have to drill some wells and demonstrate that it can be done safely. As I say, since 2011 we have not done any. Typically, in the US, they are drilling 20,000 wells a year. I am not suggesting that we should be going from zero to 20,000, but one might be a good start.

Jim Fitzpatrick: Thank you very much.

Q94 Neil Parish: Good afternoon, Mr Egan. You started to talk about the public. How do you share information about your proposed shale gas exploration sites with the public and propose licensing applications with the public? Really, it is all about making sure the public are informed, so that perhaps they do not necessarily believe all the scare stories.

Francis Egan: Yes, I have to write down some stats to remind myself what we did. In 2014, in January, we announced two sites in Lancashire, two separate planning applications, with pretty much the same scope of work. On the day we announced those sites, a small team of ours went door-to-door in the local communities, knocking on every door, to talk to people and to invite them, that evening, to an informal initial consultation event where they could meet our people and have a conversation, and express any concerns or opinions that they had. It was not a formal consultation event.

Subsequent to that, there is a formal consultation process that is part of the planning regulations. We held four separate consultation events, two for each site. This is in addition to the one we held on the evening. We had 1,500 attend over the four sites. We have regularly distributed letters and brochures to the communities not just immediately adjacent but more broadly around the sites. We have delivered 88,000 letters and brochures to individual households in the Fylde area. We have responded to 130 separate direct enquiries in writing. We typically take 100 calls a month to our inquiries hotline and we respond to all of those. Sometimes, that requires a follow-on. We have set up community liaison groups, local to each of the two sites, which are populated by local community residents, a variety of Parish Council members and residents. They have met nine times now, between the two, since the sites were announced. They still continue to meet. To be frank, a lot of the people who are on those are not actually in favour, but we carry on a conversation. Some people are open-minded. Some are supportive.

Q95 Neil Parish: Are you finding it is just the local people coming to the meetings, or are people coming from far and wide?

Francis Egan: You get both. There is a good breakdown in the planning officers' report of where the objections to the proposals came from. 60% of them came from outside Lancashire and quite a good percentage came from outside the UK. Of the objections to the applications, I think 2% of the adult population of the Fylde responded. 98% did not. I know, because we are in the business, we think everybody is talking about shale all the time. Believe me, they have other things in their lives that are far more important to them and they are not talking about shale all the time.

Q96 Neil Parish: You have partly answered my next question, really. What opportunities are there for members of the public to raise any concerns about the environmental impacts of fracking and how are you responding to these? I want to know more than just perhaps what you are giving and how it is going to work. Is there an opportunity for the public to question what you are doing?

Francis Egan: Yes. I have sat in these community halls, in the Parish Hall at Roseacre, and had lots of questions. We have, as I say, a hotline. We have community liaison groups that meet at least monthly. There is plenty of opportunity for people to question us. I think if the work goes ahead, the British Geological Survey has announced that it will conduct its own monitoring, separate to the regulatory monitoring. It will measure air

quality, water quality and seismicity, and it will report all that data publicly. There is going to be a lot of information available publicly, assuming that these initial exploration sites go ahead.

Q97 Neil Parish: This is probably a slightly more difficult question to answer, because perhaps we have got to ask the public themselves. Do you think your public engagement has been effective in addressing their concerns?

Francis Egan: I think it is going in the right direction. You are in the politics business, so you know this better than I do. You can never fully address the public's concerns.

Neil Parish: We only wish, yes.

Francis Egan: But you keep talking. I go back to what I said earlier. Ultimately, you do have to do something or not do something. I think the country actually needs to decide, "Do we want to do this or do we not want to do it?". At the end of the day, we could talk about it from now until we run out of gas.

Q98 Neil Parish: Finally, how can public concern be more effectively addressed? Is there a role for the Government or operators such as yourselves, or possibly a combination of both? Are the Government doing enough?

Francis Egan: Sometimes the Government can do too much. I am not trying to take away from what the Government do. Our research shows that the public does not particularly trust operators, because we would say that, wouldn't we? It does not particularly trust the NGOs, who are against it, because ditto. I hate to tell you this, but politicians are not particularly high up their trust list either.

Jim Fitzpatrick: No, surely not.

Neil Parish: That doesn't come exactly as news to us.

Francis Egan: Actually, our research shows that the people they trust are independent academics, to the extent that you can find an independent academic. I do not mean that in a derogatory way, but generally universities research for lots of different things. I think it is very important. For example, I think the BGS announcement is very welcome, because we are not involved in it. We are merely providing access to the sites and the monitors. We have no involvement in them taking the data, no involvement in them interpreting it, and no involvement in them publishing it. We are very happy for them to do that and very happy for it to be up there in the public domain to say to people, "This is the air quality before, during and after. This is the groundwater quality before, during and after". That has got power.

Q99 Neil Parish: What you are really saying is that independent scientific advice coming from universities, provided it is seen to be absolutely independent, is probably a good way of reassuring people.

Francis Egan: It is probably the best way. I think all the rest of it is necessary. They do need to hear from the Government. They need to hear from Public Health England and from the politicians. They need to hear from the NGOs, to see what their concerns are. Then, they will form a view.

Neil Parish: Thank you.

Q100 Chair: Mr Egan, there are two ways you could bring water in, and take the wastewater out. Which way are you looking to use in Lancashire?

Francis Egan: The water coming in is by pipe. In the UK, a bit like gas, water infrastructure is generally not that difficult at sites. We will not truck water in. However, for initial sites, we will truck the waste out. If we move further into a development phase, we are already looking at the possibility of recycling water onsite, but for initial sites, we want to use tried, tested and proved treatment technology, so we will use existing sites and truck it to existing treatment sites.

Q101 Chair: Have you identified as part of your planning application a wastewater partner?

Francis Egan: I think it is very public knowledge that we are partnering with United Utilities, who are the water supplier, for the supply of water. For wastewater treatment, we have identified three or four different companies. We have not yet signed commercial agreements, so we are not at liberty to say who. I do not think it is actually that difficult to work out where they are in the UK. We have demonstrated in our planning that there is sufficient capacity to treat the water.

Q102 Chair: Have you amended your traffic movement plan in light of the planning application hurdles that you have had to overcome?

Francis Egan: Yes, at one site we had issues with the planning officer, and the County Council, in fact. They were not in favour of the proposed transport plan, so we have proposed an alternative solution. We still believe, actually, that the initial one is a feasible plan, but we have proposed an alternative, not instead of the other but as well as it, so that the Council can consider both. At the other site we have not had to modify.

Q103 Chair: Are you able to give the Committee an idea of how many lorry movements a day we are talking about?

Francis Egan: Yes. I might just describe the operation first. We are proposing to drill four wells at each of these two sites, so there will be eight wells in total. They are horizontal wells, and each well would be fractured and tested, and put on long-term test, and that is when it ties into the grid. The operational period when the most activity, the drilling and fracturing, takes place is a little over two years at the site, but we have applied for six years' planning consent because we would then want to tie them in and test over a longer period the flow rate.

The traffic movement is at its most intense in the first two years. The average truck movements in that two-year period are five trucks per day. The peak truck movements are 25 trucks per day. The peak periods are roughly six to seven weeks out of that two-year period, and the peaks are associated with primarily movement of equipment. Actually, the biggest peak is associated with construction of the site and moving the gravel onto the site, because you construct a foundation for the site. That is about three weeks or so. The other peaks are associated with moving the drilling rig on and moving the drilling rig off, which are about a week each.

The average is five trucks per day. The peak is 25 trucks per day in the first two years. Once you get beyond the two years and you are into an extended flow period, there is very little activity. The estimate is one to two trucks per week.

Q104 Chair: Have concerns been expressed locally about the level of traffic movement?

Francis Egan: Yes. You cannot have a truck on the road that there are not concerns expressed about.

Chair: In rural areas, there might well be a reason for that.

Francis Egan: Actually, the roads have plenty of capacity but I understand nobody wants additional traffic. However, if you look at the traffic density, for example, for a wind farm or a solar farm, it is an order of magnitude higher. If we are going to solve our energy problems, we will not do it without traffic on the roads.

Q105 Ms Ritchie: Mr Egan, moving on to water quality, there have been public concerns about water pollution, and direct concerns over the impact of fracking on water quality, contamination by the methane and contamination by the fracking fluid, and by the amount of water that has been used. Are you aware of any occurrences of water contamination caused by fracking?

Francis Egan: In terms of fracking fluid, no. I am not aware of any confirmed case where fracking fluid has been found in a water supply. I think there have been several million hydraulic fracturing jobs carried out. You are probably going to tell me that you are aware of some, and I will be very interested to hear where they are and what the proof of it is. I am certainly aware that there is—and again I do not know whether it is confirmed or not, frankly—methane in groundwater.

I would take issue, although not a big issue, with the word "contamination". Methane is not a contaminant. Methane is naturally occurring in groundwater, not that we want to get it in there, but methane is actually not a health hazard. There are certainly reports, let me put it that way, of methane in groundwater in the US. Whether that is to do with fracking or conventional wells, or water wells, I think there is a lot of debate on that issue.

Q106 Ms Ritchie: In terms of fracking fluid, we are told that 90% is water, 9.5% is sand, and then 0.5% is made up of additives, chemicals. Can you tell us what the

combination of chemicals is and what environmental and safety testing has been done on its impact, and whether the water can be purified again after use?

Francis Egan: Yes. Actually, the stats are not quite right. For us, at any rate, it is 99.95% water and sand, and 0.05% chemical additive.

Q107 Ms Ritchie: I think what I said was probably round about the same.

Francis Egan: Was it? I thought you said 5% chemical additives, so it is quite a bit less than that. This is one of the differences between, certainly, the UK and the US in the early days. I think the US may be different now. All chemicals and any chemical, in fact, that is put into fracturing fluid in the UK, has to be approved by the Environment Agency, and declared, and is on the Environment Agency website. The Environment Agency has been very clear and public in its statement that it will not approve any additives that are or will be hazardous to groundwater.

In our fracturing fluid proposal for the two sites in Lancashire, we are proposing sand, water, which comes from the mains, and one chemical additive, which is a friction reducer called polyacrylamide, which is non-toxic and non-hazardous. That fracturing fluid has been assessed and approved by the Environment Agency as non-hazardous to groundwater.

Q108 Ms Ritchie: You have carried out environmental and safety testing on its impact.

Francis Egan: Of course. Polyacrylamide has been tested. It is on an approved list. The EA makes that assessment.

Q109 Ms Ritchie: What are the future purification prospects for the water?

Francis Egan: That is different. What we are talking about now is the water that goes in.

Ms Ritchie: Yes. What comes out?

Francis Egan: I know it sounds crazy, but what comes out is different from what goes in. What comes out is what goes in plus the water that is already there. The water that is already there is the water that sat at the bottom of seas at the surface several hundred million years ago, and is now sitting 6,000 feet below the ground in Lancashire. It is quite salty. It is about four or five times saltier than seawater, and it contains minerals from the rock—as does water at the surface flowing through granite, for example—and it contains other compounds. It needs to be treated, but it is, again, assessed by the EA as non-hazardous.

If you go onto the EA website and you log on to the Preese Hall well in Lancashire, you can see a detailed breakdown of that flowback water. Again, the Environment Agency has to sample and monitor that, and will make the constituents of that publicly available. There is nothing secret about what is going in or what is coming out.

Q110 Ms Ritchie: Just to clarify, will you, Cuadrilla, publish information on the chemicals used and the total volume of fracking fluid used on your site, or would you rely on the Environment Agency to do this?

Francis Egan: Both. We are happy to publish it, but we are required to give to the Environment Agency as part of the permit. That is a condition of the environmental permit.

Q111 Ms Ritchie: What sort of environmental permit conditions are you required to meet to ensure that hydraulic fracturing does not threaten the quality of water for local communities?

Francis Egan: There are multiple conditions. The first one is what is going in the fracturing fluid. As I said to you, the Environment Agency has to review your proposal, and I have already said that they will not approve fracturing fluid that is hazardous to groundwater. Secondly, we have to have the flowback water monitored both in quantity and quality. That is tested by the Environment Agency, and again will be published by the Environment Agency. We have to take that fluid in an approved carrier to an approved Environment Agency treatment facility. We also have to have a permit from the Environment Agency for storing it on site, and they have to approve the storage arrangements. That is just for the water.

The likelihood of people's water being polluted by fracturing fluid, in my mind, in the UK, is zero. Let me put it this way. The alleged cases you see in the US of methane coming out of people's taps are almost exclusively, if not exclusively, where people have drilled water wells in their own property to access water supply. In the UK, 99.5% of our water comes from public utilities. They do not take it out of the ground and put it into our taps. They treat it.

Q112 Ms Ritchie: How is your compliance with the relevant permits ensured?

Francis Egan: The Environment Agency assesses it.

Q113 Ms Ritchie: Are those reports published?

Francis Egan: Yes. The Environment Agency is a public body and they are all publicly available.

Q114 Ms Ritchie: What is the penalty for breach of your permit conditions?

Francis Egan: That is a good question. It depends. The Environment Agency has pretty wide-ranging powers, up to and including unlimited fines, prosecution, and I believe even imprisonment, and down to asking you to stop and address the issue, which they would do anyway. Again, the Environment Agency sets all that out on their website. We are no different to any other industry in that respect.

Ms Ritchie: Thank you.

Q115 Mrs Lewell-Buck: Good afternoon. Just in response to my colleague's question about water contamination, surveys have been done in Canada and Norway that have shown nearly 5% and 20% respectively of their wells had integrity issues that actually led to contamination of water supply. Is that information that you have not been aware of before?

Francis Egan: Did you say that 5% and 20% of wells had integrity issues that led to proven contamination of the water supply?

Mrs Lewell-Buck: That is the information we have got.

Francis Egan: No, I would be delighted to see it.

Mrs Lewell-Buck: We can make that available, can we not, Chair?

Francis Egan: I have heard all kinds of statistics of well integrity failure rates, and, again, just at least from my perspective, one needs to be careful to distinguish between well integrity and well barrier. To describe what I mean by that, typically, a well is constructed with multiple barriers to stop whatever is flowing through the well getting into the surrounding environment. No well would be approved by the Health and Safety Executive if it had just one barrier. Typically, there are at least three barriers. A barrier failure is a not a well integrity failure, because nothing leaves the well into the surrounding environment. Most of the statistics that I have seen alleging well integrity failures do not make that distinction.

Q116 Mrs Lewell-Buck: In light of that information and the comments you have made there, are you concerned at all about leaks contaminating the water supply? How would you monitor that on an ongoing basis?

Francis Egan: There are two things. The first is the leak, and the second is the contamination of the water supply. The leak is prevented by designing, constructing and testing the wells. Contamination of the water supply is not an automatic consequence of a leak. You have to get from the leak into the water supply, which is why I said about 99.5% of people in the UK get their water supply from a utility. In the extremely unlikely event that we had a methane leak into the groundwater at, let's say, Lancashire that methane would then have to travel approximately seven kilometres to the nearest extraction point, through several billion gallons of groundwater, which would dilute it somewhat, into a treatment plant. Extracting methane from groundwater is not particularly complicated. It is a straightforward separation system. You put it in a tank; gas comes out the top, water comes out the bottom. That is why I say I think the chances of getting methane into the public water supply are zero.

Could you get methane coming out of a well? It is technically possible, and as part of our permit we have to put groundwater monitoring at the site. We will have three separate boreholes and they will sample the groundwater quality before, during and after our operations. Interestingly, a lot of the groundwater in the UK already has naturally occurring methane in it.

Q117 Mrs Lewell-Buck: You are convinced, even though you are saying it is nigh-on impossible that it would happen, you have procedures in place such that, if it did happen, you would be able to mitigate that.

Francis Egan: Of course. We would not be allowed to operate otherwise.

Q118 Mrs Lewell-Buck: Thank you. Would be monitoring any abandoned wells as well, in the same way?

Francis Egan: The Environment Agency, as part of the permit, requires an assessment of the risk to groundwater and air quality before you can surrender that permit after you have abandoned the well. They do not prescribe a set period of time. I think that potentially gives some people a cause for concern because they would like to say, "You have to monitor it for 10 years, or 20 years, or 50 years, or whatever it is". The EA actually has complete discretion. They make an assessment and you cannot surrender your permit until the EA is satisfied that the residual risk, if there is one, posed to the environment is negligible.

Q119 Mrs Lewell-Buck: Thank you. Moving on the flowback fluid, how do you plan to dispose of that?

Francis Egan: It will be trucked to a treatment plant. The flowback fluid from shale is not that dissimilar, if dissimilar at all, from flowback fluid from conventional oil and gas wells. Typically, the same components are there. It will be taken to an existing treatment plant and treated there. Typically, it is separated into a solid component, which can be recycled and effectively can be used and spread on land, and a liquid component, which can be treated in a normal sewage treatment works.

Mrs Lewell-Buck: Thank you.

Q120 Chair: It would not be your intention to use flowback fluid again in a mine.

Francis Egan: Yes. We are allowed to by the Environment Agency.

Chair: I thought it was currently prohibited.

Francis Egan: At least for our purposes, the Environment Agency has agreed that we are can if we are putting it right back where we took it out of. We can reuse some of it with the fracturing fluid on the next fracturing job. We would reuse a percentage of it as part of the fracturing fluid, because it is going back exactly into the formation that it came out of.

Q121 Chair: I thought it was generally understood that that was frowned upon, and not permitted.

Francis Egan: No, it is not disposal. We are effectively recycling it. It will come back out again in the next job, and it means we have to use less fresh water, so it environmentally makes more sense.

Q122 Chair: How do you know what to add to it for the next fracture?

Francis Egan: It is exactly the same. We use the same components. We will use water, sand and polyacrylamide, but then we will use a percentage of flowback water, as long as we can keep the fracturing fluid composition okay. The Environment Agency has assessed that and is happy for us to do so. Basically, it goes straight back into the same formation, creates some new fractures and then it comes back out with the flowback fluid.

Q123 Chair: Who actually checks that the concentrate is what you say it is?

Francis Egan: Again, we have to, on an ongoing basis, check and report on the quality of our fracturing fluid.

Q124 Chair: It is self-regulating.

Francis Egan: No, the Environment Agency will—

Chair: So they will have a DECC official, and an official from the Environment Agency.

Francis Egan: They are not there full-time. They can come on an unannounced basis and check the quality.

Q125 Chair: Effectively, you saying there is a rather large degree of self-regulation in this whole process.

Francis Egan: I would completely disagree with that, unless you believe that there should be someone standing there all the time.

Q126 Chair: If we could just row back for a moment to the fact that you went up to 2 or 2.5 on the Richter scale. How did you manage to do that when you were not permitted to do so? Who was there to stop you from doing that?

Francis Egan: At that time, the traffic light system was not in place. There was no rule that says, "You are actually not permitted to do that".

Q127 Chair: So you would have gone on to 5, 5.7 or 6.

Francis Egan: Clearly not.

Q128 Chair: Why?

Francis Egan: Because we did not. That is an anomaly. You would not expect, in the normal course of events, to have a tremor, so operations were stopped immediately.

Q129 Chair: Is it not the case that if you fracture, and if you re-inject fracking fluid in the way that you propose to do, it does actually cause a greater likelihood of earthquakes?

Francis Egan: No.

Q130 Chair: Even though there is evidence that proves that that is the case.

Francis Egan: There is not evidence to prove that is the case.

Q131 Chair: If we produce evidence to you, you would refute it.

Francis Egan: If you produce evidence that shows re-injecting fracturing fluid into the same formation that you just took it out of has a greater likelihood of causing earthquakes, I will be very interested to see it.

Q132 Chair: Excellent. I think you will find it is from a very sound academic.

Francis Egan: I think you may be looking at disposal of fluid, rather than recycling fracturing fluid.

Q133 Chair: Would you agree to dispose of fluid in that way?

Francis Egan: We are not disposing of fluid in that way. There is a distinction here to be made between disposing of fluids, so re-injecting fluid for disposal that you do not intend to produce again, and reusing fracturing fluid that is going into the formation in one stage and coming back out in the next stage, which is basically a means of reducing your use of fresh water. From an environmental perspective that made sense to us, makes sense to the Environment Agency, and has been assessed and approved. I think what you may be thinking of is disposing of wastewater by injecting it and leaving it in some formation. That is not what I am talking about.

Q134 Chair: Just reverting to what Mr Fitzpatrick said earlier, I think you would want to carry the public with you. Would it not be better that there was less self-regulation than currently is the case?

Francis Egan: I do not accept that there is self-regulation. Again, perhaps we have a different view as to what regulation is. The Environment Agency, the Health and Safety Executive, DECC, and Lancashire County Council are all regulators. Does that mean there is somebody stood over someone's shoulder all the time? No. Does it mean they can have unannounced and announced visits? Yes.

Q135 Chair: I think we and the public are taking it on trust, Mr Egan, that Cuadrilla is going to operate the traffic light system as far as seismic activity is concerned. The public are taking it on trust that Cuadrilla is going to take the absolute concentration and content of the fracking fluid on trust. Yes, there will be tests, and yes, it will be regulated, but you will have a large degree of self-regulation, which leaves a hostage to fortune.

Francis Egan: I could not disagree more. DECC will be on site all the time, for the purposes of monitoring the traffic light system. The Environment Agency will do spot checks of the fracturing fluid and the flowback fluid. If you were to take any industry in the world and say, "The only way this industry can work is that everything you do there is somebody stood over your shoulder, checking that you are doing it correctly", we would never fly a plane, drive a car, drive a train or produce anything. If the public and the political expectation is that regulation means every second thing you do has to be checked by a regulator, nothing will get done.

Chair: So be it.

Q136 Richard Drax: Good afternoon, Mr Egan. With regards to the impact on water resources, can you give us some image in our mind how much water you are going to use, that the well would use?

Francis Egan: I will give it to you in absolute terms, which will sound a lot, and then I will give it to you in relative terms, which hopefully will not sound a lot. In absolute terms, fracturing is done in stages for a horizontal well. Basically, that means you do it in sections. Typically, if you drill that is a kilometre or a kilometre and a half long, you will start off at the end of the well, the bit furthest away from the vertical, and you will fracture maybe 100, 200 feet of that, and then you move back along in sections. You could have, and we are proposing, up to 30 separate stages for a well. Each stage in our proposal in Lancashire is 750 cubic metres. Are you metric? A cubic metre is 1,000 litres, so that is a lot of water. There are 750,000 litres per stage and 30 stages. That is the absolute quantity, so that is a lot of water.

To put that into context of United Utilities' daily supply, one stage is 0.03% of United Utilities' daily supply. In terms of putting stress on the water supply, it is not such an issue. In fact, if you look at the water loss rates for United Utilities, they would lose 650 fracture stages a day just through leakage in their system. Imperial College London have made an assessment that to supply 10% of UK gas demand from shale would use, they reckon, 0.01% of water supply in England and Wales. On a macro scale, it is not such a big issue. What you have to be careful about is on a local scale because, clearly, water supply is not uniformly distributed across the country. In addition to the overall usage, you need to look at it on local usage, which we do with United Utilities in our case.

Q137 Richard Drax: On that point, will you source the water for your hydraulic fracturing operations from local water companies or will you get an abstraction licence yourself?

Francis Egan: No, we are not getting abstraction licences. We are sourcing it from United Utilities. In the fullness of time, I would hope we can treat the flowback water and reuse it for future operations, but in the initial exploration phase, we are taking it from United Utilities' pipe supply.

Q138 Richard Drax: Have you ever had discussions with any utilities about there not being sufficient water for your activities?

Francis Egan: Yes, that is one of the first conversations you have. We are no different to any other industrial user.

Q139 Richard Drax: If there is not, what happens then?

Francis Egan: Then you get cut off. Domestic supply always has precedent. That is pretty much like electricity.

Q140 Richard Drax: If you are cut off, what effect does that have on your operation?

Francis Egan: You stop.

Q141 Richard Drax: How long could be stopped for?

Francis Egan: I have just given you the stats. We take a look at those stats, and we say, "What is the risk of us getting cut off?". It is a commercial arrangement you enter into. It is a business like any other business. Like a golf course or power station or anybody else who is using water, you have a contract with, in our case, United Utilities to supply you with water.

Q142 Richard Drax: So under severe drought conditions, you could be cut off.

Francis Egan: Correct, but I do not know the last time you were in Lancashire. Drought does not come that often.

Q143 Richard Drax: I know it rains a lot. Can we move onto the Infrastructure Act 2015, which, as you know, has now got a series of amendments to it, which are, in a sense, more restrictive, not least Clause 50? What other practical implications could the fracking safeguards, which will be introduced by the Infrastructure Act 2015, have on your shale gas operations in England?

Francis Egan: I do not carry Clause 50 in my head, so you are going to have to read through them for me.

Richard Drax: I could be here for an awful long time.

Francis Egan: Whichever ones you want to know about.

Richard Drax: One such safeguard is that no hydraulic fracturing to take place at less than 1,000 metres and without consent from the Secretary of State. That consent of the Secretary is conditional upon the following conditions, environmental impact assessments—there is a whole mass of guidelines that you have got to follow. Is that going to affect your operations in England?

Francis Egan: In the immediate term, no, it has no impact on our operations or our proposals in Lancashire. But I think there are still pieces of that that have to be defined, I think you know that, in terms of what the excluded areas. Clearly, until we know what they are, I cannot say whether it is going to have any impact or not.

Q144 Richard Drax: Will you change any of your plans because of the possible implications of this?

Francis Egan: In the short term, no. I think I said in response to the Chair's question that we are hoping to get a decision from Lancashire County Council within months. So no, not in respect of our short-term plans. In the longer term, you have to have a look and see what, if any, impact it has on where you can explore for shale gas. The Government decide that, not the operators. The Government say, "These are the areas you can work in", and then we form a commercial view as to whether it is good business sense to work there or not.

Q145 Richard Drax: So this lack of certainty will not stop you from doing anything you are doing at the moment.

Francis Egan: Correct.

Richard Drax: It is going to continue, until these become black and white, as it were.

Francis Egan: Correct, yes.

Richard Drax: Thank you.

Q146 Neil Parish: Some argue that the development of the shale gas industry will increase climate change emissions and delay the development of renewable energies. How do you respond to these particular concerns?

Francis Egan: I understand the concerns. I understand that there is a desire, and I understand the reason, to move away from fossil fuels towards renewables. I think that is completely understandable, and I have, actually, no issue with it. It is managing that in the context of where we supply our energy from. Currently we supply roughly 86% or 87% of energy from fossil fuels, so there is clearly going to be a transition, and probably a considerable transition, to being in a position where you are fossil fuel free.

For me, really, it is a question of: is it better to produce our own shale gas resources or to import it? I think to pretend that we are not going to be using gas would be exactly that, a pretence. That, for me, is the fundamental decision. I am confident that we can do it in a way that is more environmentally responsible and much better for the British economy than to import it, assuming, of course, we can demonstrate it is there in commercial quantities.

Q147 Neil Parish: Could you see us at any stage being self-sufficient in gas?

Francis Egan: In gas, if we can get the demand down, possibly. It is a stretch. At the moment, you are probably aware, we are importing about half our gas, and the North Sea

is pretty much in free-fall. I think the forecasts are that by 2030 we will be importing roughly 80% of our gas. That is quite a big gap to make up. We have not drilled enough wells, frankly, for me to be able to say whether that gap could be bridged, but is quite a big gap.

Neil Parish: Thank you.

Q148 Chair: Knowing how fond you are of academic references, does Cuadrilla plan to burn, or flare, methane on site, rather than emit it directly? Is that part of your plan?

Francis Egan: Yes, for short-term testing. For the longer term testing we will put it into the pipeline.

Q149 Chair: Are you familiar with the Cornell study of 11 April 2011 that said that natural gas, or shale gas from fracking, could be dirtier from coal? They say that as much as 8% of the methane in shale gas leaks into the air during the lifetime of a hydraulic shale gas well. Do you agree with that?

Francis Egan: No, absolutely not. Like all these things, the devil is in the detail. There are numerous other studies that would give you much lower percentages. You can go from probably less than 1% to, I am sure there is a study that says greater than 8% somewhere out there.

If you look at the US experience, the greatest source of methane emissions, at, I would warrant, about 80% of what is called fugitive emissions, comes from the practice, in the early days in the US, that may be still ongoing in some places, of storing the flowback fluid in open pits on the site. Flowback fluid, when it comes back, in the initial production from the well, is almost all water, but does contain some methane. Over time, the water lessens out, and you get almost all methane, and no water. If you store that water in an open tank on the site, the methane leaks off from the water and goes into the atmosphere. That practice is not allowed in the UK or, indeed, anywhere in Europe, so I would not be expecting methane emissions to be anywhere near that percentage.

In any event, we will be monitoring methane emissions and we are already measuring baseline methane emissions at both our sites. You will not have to take Cuadrilla's word for it. We and the BGS will have the data to say what the methane emissions are. There is already methane in the atmosphere there, to a certain amount, not least from agricultural reasons, before, during and after.

Q150 Chair: Just one final tease, if I may. Do you agree with the Secretary of State for Energy and Climate Change, Ed Davey, who said there was no evidence for the ridiculous notion that fracking for shale gas could transform the UK economy?

Francis Egan: I have a more modest ambition in the short term, but that is just, as I say, to drill a few exploration wells. I will defer to the Secretary of State until we have some data to say otherwise.

Chair: You have been immensely kind, Mr Egan. Thank you very much for talking with us this afternoon.

Francis Egan: You are welcome, thank you.

Examination of Witness

Witness: **John Dewar**, Director of Operations, Third Energy, gave evidence.

Q151 Chair: Mr Dewar, can I say a warm welcome to you? Thank you very much for being with us here in London. It is better to see you down here than up there, or vice versa.

John Dewar: Thank you, Madam Chair.

Chair: You are very welcome indeed. Thank you very much for participating. Could you give us your name and title for the record?

John Dewar: I am John Dewar. I am the Operations Director for Third Energy.

Q152 Chair: Can I just ask if you've done a cost-benefit analysis at Third Energy as regards the exploitation of shale gas?

John Dewar: To do a cost-benefit analysis, you need to know how much money you are going to make and how much money you are going to spend. We have done an awful lot of studies, in terms of how much this particular job is going to cost. We have done some analysis on how much we expect to get back, but we have not done a detailed cost-benefit analysis, because we do not have the data. The whole point of testing this well is to get an idea of whether the well can produce in commercial quantities for us to conduct that cost-benefit analysis. The answer is not yet.

Q153 Chair: Can you give us a rough idea of how many wellheads you would require to make the operation in Ryedale commercially viable?

John Dewar: Our present focus is on testing the well that we drilled last year. If that well is successful, then the immediate short-term plan would be to drill some more wells, similar to Cuadrilla, to get a better idea of the resource and the extent of the resource over our acreage. To then project further and say what the total number of wells you would need in the area would be, is very hard and very speculative. We have been asked that question many times. To allay people's fears, we have said, bearing in mind we have nine existing sites in and around the area, some in Ebberston Moor, and seven in the Vale of Pickering, that we do not foresee the need for more than 10 more sites. We have provided numbers for how many wells we would put on those sites. Depending on the size of the site, it could be 10 to 20. If it was a bigger site, it could be 20 to 50.

Q154 Chair: You are talking about an area of tourism and farming housing approximately 50 wellheads.

John Dewar: We would have to think very carefully where we would place the site, so it would not be causing disruption to local residents. Placing the site is quite crucial. We have already, as I said, many sites. One thing I should point out at the very beginning is we have been there for 20 years. We have got lots of sites; we have drilled lots of wells. We have done fracking jobs. We have even done a fracking job on this same site that we are planning to do another one.

We have operated quietly and safely, causing minimum disruption to the local population. We have won and built their trust and have good relations with the local regulators. It is not as if we have blown in with the wind and we are now talking about fracking. This is an extension to our natural business. It is another tool in our toolbox.

Q155 Chair: As you explained at the public meeting locally, all your existing well heads have been for shallow fracking. We are talking about a different type of operation completely, just for the record. I think it would be prudent to establish that at the outset.

John Dewar: I would like to state it is not a different type of operation. Yes, it is deeper. When I got into this business of shale gas fracking, I was not 100% sure what it involved. I have done fracking all around the world. I have got almost 40 years of experience with Shell. Shale gas fracking I needed to look into. What I learned was that it is not a big outstep from what we do all the time. Conventional fracking, which could be of a tight sandstone or a tight limestone at a higher depth, involves the same equipment, the same people, the same pressures and the same procedures as just fracking, 1,000 or 2,000 feet deeper. The only difference I can see is the volume of fluid that we are talking about. That is the only difference. Everything else is very similar.

Q156 Chair: It involves hydraulic fracking, which is potentially causing seismic activity.

John Dewar: It was potentially causing seismic activity before the legislation was changed. I would agree with Cuadrilla that with the 10 safety steps that have been put in place by the Government, the chances of us incurring another seismic event of a similar magnitude are negligible.

Q157 Chair: You are working for Third Energy, which is owned by Barclays. Where is Barclays' head office?

John Dewar: In London.

Q158 Chair: Where is its registered office?

John Dewar: You would need to ask Barclays that.

Q159 Chair: You do not think it is registered in the Cayman Islands.
John Dewar: Where Barclays are registered, I have no idea.

Q160 Chair: If that was the position, would it be a problem, either if you were to frack in Ryedale or any other part of the country, in placing a bond for the security at the end of your activities, for fugitive emissions or any future liabilities?
John Dewar: The regulators have, I believe, the right to request a bond, and they have done so, actually, in some of our previous operations, when we were preparing a site at Ebberston Moor Two, the mineral planning authority requested us setting aside some money if we did not have, for instance, the money to finish the site. That is not a new step, and we would have to listen to what they wanted and take it from there.

Jim Fitzpatrick: It is not a declarable interest, but Barclays' headquarters are in Churchill Place in my constituency.

Chair: It is Barclays Natural Resources. I do not think that they have their headquarters in Poplar.

Q161 Jim Fitzpatrick: Mr Dewar, good afternoon. You will have heard me asking Mr Egan about the regulatory framework and the various bodies that Cuadrilla and you have to deal with. My question is the same. Is that problematic, because you have so many different organisations to which you have to relate, are accountable for, and are monitored by? Does it cause you problems, or is it a workable arrangement?
John Dewar: It can seem confusing at first, from the outside. When you are on the inside, working it, I think it is very good. At the top, you have DECC, which is the ultimate authority, and all bodies report into it. Underneath them, depending on the skills of the regulatory body, we have to go to them for particular things. For example, all things environment-related go to the Environment Agency, where it has experts in that field. We have been working with it on several applications, and we have to apply for several permits, groundwater permits, radiation permits, a whole host of permits.

Moving away from the permitting side, which is Environment Agency, and on to the planning side, which is the mineral planning authority, within North Yorkshire we have three departments looking after it. We have got North Yorkshire County Council, we have got Ryedale District Council, and we have got the North York Moors National Park Authority, for anything in their area. They all work close together. They rely on each other: "Can we borrow your environmental specialist?". "Can we use your safety specialist?". They all talk regularly, and they perform, I think, a very good job.

Then, with respect to the drilling programme or the fracking programme, we have to go through the Health and Safety Executive in Aberdeen. They are hardened, experienced drilling professionals, and we go to them for approval of the programmes. In addition to that, there is an independent adviser that we have to go to, and we need the approval of all these bodies, plus all the statutory bodies, before we can get overall approval to proceed. I think it is very robust, very sound and methodical. It is one of the best in the world, I would say. If

you are going to ask me whether we can improve it, I would say, "Let us look back and set up a committee". We are learning lessons as we go, both positive and negative, but it is too early to say yet.

Q162 Jim Fitzpatrick: Is it too early to say whether there could be improvements to the regime in terms of lead body and cascading down responsibility? I imagine the different regulatory bodies have got different approaches, different emphasis, and are looking at different things. How long do you think it might be before you can qualify whether it could be improved?

John Dewar: I was not thinking of the bodies and structure. I am quite happy with that. I was thinking more of the processes that we are going through, and whether we can improve them. I think we would need to look back at that. I am certainly not suggesting a change to the overall structure.

Q163 Jim Fitzpatrick: As the previous questions have indicated, there is some public concern out there. Going back to Mr Egan's comment, there is a small minority very concerned and a small minority happy. The vast majority of the public have yet to make a decision. You clearly have confidence in the robust, as you describe it, regulatory framework we have. How do you communicate that to the public, or is that not your job? Is that Government's job?

John Dewar: No, no. It is absolutely our job. It is, first and foremost, our job. We are operating in the local community. It is up to us to inform the locals. I think, for the last 20 years, people have got comfortable with us. We have got about our business in a very quiet way. We have always delivered on our promises. We have got an excellent safety and environmental record. People have just got used to us. I think we have got a good name. Again, not in an overstated way, but we do our best to support local charities, football teams, flower festivals and whatever else, the little way we can. I think trust is something that takes you a long time to build up, and you can very quickly lose it. We are conscious of that and we work extremely hard to maintain that trust with the community.

In terms of informing them what we do, for this job alone, we had a consultation in the nearby village of Kirby Misperton, as part of the DECC ERA. Then we held four further public consultation events in each of the surrounding villages of the site. I would say that 80% of the people came out of interest. Of those 80%, more or less all of them left with, "Yeah, looks okay. I think you can do it". Of course, there is always going to be that percentage either side, but I think that we went a long way to winning over the silent majority.

Jim Fitzpatrick: Thank you.

Q164 Chair: I think your impression and my impression, Mr Dewar, might be slightly different.

John Dewar: You are talking, if I may, Madam Chair, about the consultation event we had in Kirby Misperton before the four public consultation events. What you have to

remember is that there was a time period between them. The consultation was not so much a consultation event as a public meeting. We did our best to meet the timing on that, recognising that we had not done all the work. We had things like the traffic management plan outstanding and we had the waste management plan outstanding. Of course, when we got questions related to those subjects it was not in the best light, but when we held the four public consultations, we had done an awful lot more work and we were a lot more ready. All those people at that meeting were, of course, invited to the four public consultation events, one of them even in the same hall three weeks later.

Q165 Neil Parish: Good afternoon, Mr Dewar. I think you have answered quite a lot of this question, but perhaps there is something else you would like to add. How do you share information about your proposed shale gas exploration sites and proposed licensing applications with the public? You have obviously had the consultation meetings. How else can the public get hold of you, and how do you keep the public informed?

John Dewar: We have quite openly said to all the people that come to our consultation events, and at another public meeting in Malton and the one that Madam Chair is talking about, that we are willing to talk to anyone at any time about their concerns about our plans. We have had, almost on a weekly basis, groups of people visiting us, where we take the time to show them the plant, show them the facility and explain to them what we are planning to do. That is another thing. Could we do more? Absolutely. Do we plan to do more? Most definitely, yes. We have got many months before we actually execute the job. Our challenge is to win over the hearts and minds of as many of the local residents as possible within that time. Right now, we are focusing on getting the permits and the planning applications right first time.

Q166 Neil Parish: When the public are coming to see you and contacting you, is it mainly about the environmental impacts of fracking? How, in particular, are you responding to that?

John Dewar: I think, when they come and see us, groundwater pollution tends to be their main concern. We can very quickly demonstrate that that is absolutely not a concern. We roll out a map showing where the fracking is taking place and where the water table is. We show how many barriers we have got in between. We then show them that, even if all this did happen, the water that we are using has actually got no chemicals that are hazardous to the groundwater. That is a prerequisite definition. It has to be approved. Then, on top of all that, the water that is in that area is not actually used for public consumption. There are several layers, layer upon layer, and layer inside layer. It does not take very long to explain to people that water pollution in our area, for this well, is not an issue at all.

Q167 Neil Parish: You said earlier in an answer that keeping the public trust is precious and it can be so easily lost. Are you convinced that you can keep the public's trust and you can gain the public's trust?

John Dewar: I think we have already gained it. It has taken 20 years to gain it. Could we lose it? Yes, it is possible. We are going to do everything possible to make sure we do not lose it. Forget the scaremongering, forget the misinformation, and just look at

what it is we are doing. It is not a big outstep from what we have been doing all the time. On this particular site, we drilled a well last year. No one complained about traffic. One lady complained about noise. I went to visit her; I promised her that would never happen again. The year before, we drilled a side track from a well on that side. No one complained about noise, light, wind, wave, or whatever.

We are doing 13 base line assessments right now, 13 base line surveys. You would be hard pushed to come up with 13 things you can measure. We are measuring everything from flood risk, hydrogeological risk, seismicity, traffic, waste, air quality, cultural heritage, and community socio-economics. We are doing all this to show people that we care and to show people that we want to continue winning their trust, and we will monitor all those parameters before, during and after.

Q168 Neil Parish: The final part of my question is: are the Government doing enough to help with public concern? What more would you like to do yourselves and what more would you like to see the Government do? Similarly to my question to the last witness, how many of the people that are contacting you are local and how many would be from a greater distance?

John Dewar: Let me answer the second part of that question first. When Ryedale District Council held a public debate at Malton, we heard after the event that some of the people at that site had been bus-loaded in from Lancashire.[1] There were 250 people in there. I think the majority of them were antis. They were vociferous and gave me a hard time, it has to be said, but they are not the people that we have to win over the hearts and minds of. There are 50,000 people in Ryedale district area. They are the ones that we have to win.

For the people who have already made their mind up and are bordering on protest activities, it is going to be very hard to win them over. What would be nice would be if, once we do this job, and we show people that it was relatively simple, and it was done quietly, efficiently, and without disruption, then I think we will start even to win over not only the locals, who I believe are on our side, but also the protesters, who will then look for something else to protest about.

Q169 Neil Parish: Are the Government doing enough to reassure the public?

John Dewar: You would have to really ask the Government that. It is not for me. After we have submitted the planning and the permitting, which we hope to do in the coming weeks or so, given that we are quite close, I would like us to have a meeting with them to review how it went, and to say what could be improved. One of the principles that we live by in our industry is that everything can be improved. You can never pat yourself on the back; you must always be trying to do better. By sitting down with the right people, we will try to do even better next time.

Neil Parish: Thank you.

[1] Clarification received from witness on 26 March 2015: Third Energy wish to clarify that these protesters had arrived to participate at a Third Energy public consultation meeting and not specifically for the public information event at Malton held by Ryedale District Council, as suggested by John Dewar's original answer.

Q170 Chair: Can you give us an idea of the lorry movements at the height of the construction phase?

John Dewar: I would not call them minimalistic, but our lorry movements are very small in comparison. What you have to remember is that we drilled the well already. The drilling of the well uses an awful lot more lorry movements than the fracking of the well. We have broken up the hydraulic fracturing of the well into two phases. One phase is the work-over, and that will use about 50 trucks, and that is over two weeks. The other side of the operation is the hydraulic fracturing, and that will use an approximate total of 100 trucks in and out.

The traffic management plan, where all these numbers are more carefully worked out than what I am giving you here, is ready in draft, but we made a promise to the residents of Kirby Misperton that they would be involved in its finalisation. We are planning to involve them as to when they would like the trucks to move through the village to cause them the least amount of disruption.

Q171 Chair: You are proposing to pipe the clean water in, and I think you indicated you are proposing to pipe the wastewater out. Is that still your plan?

John Dewar: It is not. We are still planning to pipe the water in, because that reduces an awful lot of truck movements. We are still planning, as Cuadrilla are, to reuse the water for the next job. That will then limit the amount that we will have to treat offsite. Did I mention that we are planning to do five fracks, starting at the bottom and working our way up? For each frack, whatever we get back will be used for the next one. That causes a problem with the last one, because we have no more jobs that we can use it on. However, that is the smallest job, and for that water we had initially planned to pipe it back. But after discussions with the Environment Agency, with the people at the plant, with the Highways Department at North Yorkshire County Council, we came to the conclusion that overall it would be better to put the water in tanks and truck it off site, as opposed to sending it down the pipeline. There is a change to that.

Q172 Chair: Excellent. We did discuss how shallow the pipes were going to be, and my colleagues did not actually believe me. Have you now identified a waste partner?

John Dewar: We have not awarded a contract, but we did look at several. I went to pick out the one that was relatively local, audited them, and was very impressed. This particular company has the accreditation, certification, experience and approval from the Environment Agency. That would be my preferred company to move forward with, but I do point out we have not awarded them the contract.

Q173 Chair: We heard from Mr Egan how it is not a good idea to put the water in a tank, because the methane would escape from the wastewater. Can you confirm that you are not planning to do that either?

John Dewar: The waste pits that Mr Egan referred to is not a policy allowed in the UK.

Q174 Ms Ritchie: Turning to water quality, in terms of the chemicals that are used the fracking fluid, what combination of chemicals is used? What environmental and safety testing has been done on its impact? Can the water be purified again after use?

John Dewar: What are the chemicals that we are planning to use? At the meeting that I had with Madam Chair at Kirby Misperton, we actually handed out on that day the list of chemicals what we were planning to use.

Ms Ritchie: It would be useful if you could tell the Committee.

John Dewar: There was the proviso that, at that moment in time, the Environment Agency had not actually approved them. What has happened since is that the Environment Agency has approved the chemicals we have submitted. How does that process happen? There is a document that actually defines the process and procedure for defining whether a particular chemical is hazardous or non-hazardous. You would need to look at the documentation, but it is under JAGDAG, the Joint Agency Groundwater Directive Advisory Group. You would need to look at the details of that and that defines in there how the water is used.

Can we use the water again after it has been fully recycled and processed? That water does not go straight into public consumption, but after we have sent the wastewater to this particular company that is permitted and experienced in handling it, they then dispose of it back into the system at a permitted level. How does that work? That works by them proving to the Environment Agency that it is good enough not for drinking water, but for disposing into as big a resource as the sea, for example.

Q175 Ms Ritchie: Are you aware of any occurrences of water contamination caused by fracking?

John Dewar: I would give the same answer that Mr Egan gave. There is no evidence to my knowledge of water contamination caused by the direct result of hydraulic fracturing. However, there has been a lot of water contamination. I think one gets associated with the other. I was provided with over 20 peer-reviewed scientific papers where it was proven that there was contamination caused by fracking. When you analyse them in detail, you actually find that it was not the case. Like Mr Egan, I would like to see papers—because I have gone through quite a number already—where these claims are made.

Q176 Ms Ritchie: Will you publish information on the chemicals used and the total volume of fracking fluid used on your site, or would you rely on the Environment Agency to do this? You have already referred to the chemicals, but you have not told us what those chemicals are.

John Dewar: First, with regards to the volumes and the chemicals, both the composition and the constituents are in the public domain already. We had to do that as part of the DECC Environmental Risk Assessment. That is already in the public domain. After

we have submitted the planning applications, we will put them on our website for everyone to see.

Q177 Ms Ritchie: What sort of environmental permit conditions are you required to meet to ensure that hydraulic fracking does not threaten the quality of water supplies for local communities?

John Dewar: We have to apply for a number of permits and one is a groundwater permit. We also have to apply for an RSR radiation permit. We have got other permits to apply for and each one of those is reviewed by experts and will collectively, when approved, provide that level of assurance that you are seeking.

Q178 Ms Ritchie: How is your compliance with the relevant permits ensured?

John Dewar: How is our compliance with the relevant permits ensured? The communication we have with the Environment Agency is not just a one-off incident. It will monitor us continuously. There is a person called a compliance officer, within the North Yorkshire County Council, and they have come and visited our sites to check on things. We also get visits from the Health and Safety Executive to come and visit us. Within each of these regulatory bodies, I would say the communication is good and it is not uncommon for them to come and visit us.

Q179 Ms Ritchie: What is the penalty for breach of your permit conditions?

John Dewar: The penalty would be, I suppose, related in some way to the level of infringement. Certainly in the last 20 years I am unaware of us having infringed any, and it is definitely incumbent upon every person in our company to make sure that we do not.

Ms Ritchie: Thank you.

Q180 Mrs Lewell-Buck: Good afternoon. I think, in response to my colleague, you indicated you also were not aware of the research that I quoted to Mr Egan earlier from Canada and Norway that evidenced contaminated water supply. Is that correct?

John Dewar: I would agree with Mr Egan's reply. Many people who are not professionals within the industry do not make the distinction between losing a barrier and water contamination. For instance, the gas comes up the tubing. If that tubing leaks, we will notice it in what is called the A annulus, where we have pressure gauges and we monitor it. That would be the first line of us knowing that something has happened. If that next casing leaks, we would notice it in what is called the B annulus. For contamination to occur from the fracturing process, all the way through thousands of feet of tubing cement formation, and to get into the aquifer, you would need many, many barriers to break down. Everything in my experience tells me that those numbers are misleading. I am not saying they are wrong, but they are misleading and I worked in Norway.

Q181 Mrs Lewell-Buck: You would also like to see the paper.

John Dewar: Yes, I would like to see the paper, and challenge it.

Q182 Mrs Lewell-Buck: Can you tell me how well integrity is monitored on a regular basis?

John Dewar: We visit our sites almost on a daily basis. Let me go back and say that over 20 years, we have drilled 19 or 20 wells. It depends how big the area I take is. We have not had one incident of well integrity. We monitor the integrity of our wells by visiting them. I am not saying that it has been done all the time, but a more recent practice is that we run cement bond logs after all the critical casing jobs we do to make sure that the cement has been properly set and hardened. We also have online monitoring through a fibre optic system of the A and B pressures in the annulus. I suppose that we have been known to have visits from the Health and Safety Executive in Aberdeen, and we have had visits from the compliance officer in North Yorkshire County Council.

Q183 Mrs Lewell-Buck: How often are those visits, the last two that you mentioned?

John Dewar: For the last two wells we drilled, we were visited on both sites.

Q184 Mrs Lewell-Buck: Were you visited by both agencies?

John Dewar: One agency visited all our well sites. The Health and Safety Executive just visited the sites that we were drilling on.

Q185 Mrs Lewell-Buck: Do you mind telling the Committee what kind of conditions are imposed by the Environment Agency to ensure that the disposal of the flowback fluid does not threaten the quality of water supply?

John Dewar: This would all be detailed in our groundwater permit application.

Q186 Mrs Lewell-Buck: Would you be able to share with the Committee what that is?

John Dewar: It is not dissimilar to what I explained about the levels and barriers that are in place between the fracking that we are doing thousands of feet below and the groundwater, or local aquifer, which are at 1,000 feet. We have got 6,000 feet of separation between where the aquifer is and where the top of the frack is. In terms of cement, you only need a few feet of good cement, well bonded to both the casing and the formation, to actually provide a seal. We have got thousands of feet. I would just repeat that the chances of us getting contamination from the fracking fluid into the aquifer are minimalistic. Even if they are, then it is not harmful. Even if they are and they are harmful, it is not going to cause any problems because that particular area is not connected to anything. It is faulted on both sides.

Mrs Lewell-Buck: Thank you for that.

Q187 Richard Drax: Mr Dewar, I have the same questions for you as for Mr Egan, if I may. First of all, it says here that your maximum water use is about 4,000 cubic metres, which you hope to halve with a new technology, which allows you to reuse the flowback water. You have touched on it with the Chair, but just because I am a very simple man, could you just please explain how that flowback works, thereby reducing your water usage by half?

John Dewar: What we do, if I can concentrate on just one job, we pressure up the formation until it reaches a point that it then cracks and we pump the fluid in. While we are pumping the fluid in, we will then be monitoring everything on surface, hoping that the execution and the plan are working. Then, at the end of that job, when we let the pressure go, the formation wants to close itself again, but it cannot close because we have put in proppant, which is essentially sand. However, as it is closing, it does send some of that proppant back into the well. We then get that back, but some of the proppant, the sand, remains down there with the water. How much we actually get back we will have to wait and see. We are estimating, based on previous jobs, that we will get back between 20% and 40% of fluid we pump in. When you work that through in terms of total number of jobs and the total amount we get back, it is a lot less than the 4,000 cubic metres, which is equivalent to two Olympic pools.

Chair: Order, order. We will adjourn and try to get back in eight minutes so you can complete your answer then, if you would.

Sitting suspended for a Division in the House

On resuming—

Q188 Richard Drax: You very kindly, I think, explained about the water and how it flows back. You would cut the amount of water you use by half, which is how you explained that. Thank you for that. My next question is: where will you source your water from? Will that be from a local water company or will you apply for an abstraction licence, or have you got one already?

John Dewar: I have not answered that one. Where we get the water from is from a local water company. It comes from Yorkshire Water. We have a site at Knapton. It is the Knapton generating station. We take water to that station, where we fill up big tanks. The water that we will use will come from one of the big fire water tanks there, sent to the site by underground pipeline, which is infrastructure that is already there, and will then be used to fill up the water tanks that we will have on site. It will be Yorkshire Water supplying us with water. We will send it underground to the site, where it will remain until we are ready to use it.

Q189 Richard Drax: At what depth are the pipes underground that go from Yorkshire Water to your tanks?

John Dewar: The pipes are the same depth as all the surface infrastructure pipes that are threading their way up and down the country all over the place, and they are traditionally one and a half to two and a half metres deep.

Q190 Richard Drax: Have you ever had problems with sufficiency of water or has that not been a problem? Have you discussed this with Yorkshire Water at all?

John Dewar: Yes, absolutely. We have had several meetings with Yorkshire Water and we have discussed quantity. Yorkshire is a place that is characterised by a lot of rain, I would say. The volume we are using is very small. We use significantly less volume than Cuadrilla uses, because our formations are different and the way we are planning to do the job is slightly different. We are not using a lot of water.

Lastly, if there was a drought of a sufficiently long period of time, unlike Cuadrilla we would not stop. We would continue, because we know how to use seawater. We are an island nation, and there is no shortage of seawater. We would be able to use the seawater to do the fracks. However, that would increase the amount of traffic we would have to use, because we have no pipelines going from the sea.

Q191 Richard Drax: Seawater would be brought in in trucks.

John Dewar: in trucks, yes.

Q192 Richard Drax: How many trucks would that need a day, roughly?

John Dewar: It would require 4,000 cubic metres and each truck takes about 30, so it would be quite a lot of trucks, which is why we would prefer to use the water that we have on site, and send it underground to reduce the traffic. But in a drought situation, where water is cut off from us, all I am saying is that we would have a plan B that would allow us to continue.

Q193 Richard Drax: Seawater can be used for this, can it?

John Dewar: Seawater can be used, but it would require some chemicals to be used in addition to the ones that we are planning. It is not ideal, but it can be used.

Q194 Richard Drax: It may be better than using drinking water, perhaps.

John Dewar: No, no. It would not be better from the frack efficiency point of view. It would not be as good, because seawater has got all kinds of impurities in it and we would have to nullify those impurities.

Q195 Richard Drax: Do the public know that if you run out of fresh water, you might have to resort to truckloads of seawater?

John Dewar: We have not had to mention that, because so far we have not actually brought up droughts in Yorkshire, considering the last three years.

Q196 Richard Drax: I lived there for five years and it rained a lot. I remember.

John Dewar: Yes. In fact, we have had to visit one of our sites by boat.

Q197 Richard Drax: "Hope for the best and plan for the worst" is the old adage my grandfather taught me. I am assuming the public will know that in the worst case you might have to resort to truckloads of seawater.

John Dewar: So far, we have not mentioned it, but as you have brought it up I will make sure that that is put on our website for people to know.

Q198 Richard Drax: Are you aware of Clause 50 of the Infrastructure Act 2015, Mr Dewar? I know it is slightly unfair. It caught Mr Egan out, I know. I am not going to read through it, but it is not actually law yet, as I understand it, but it is going to put quite a lot of—

John Dewar: My understanding is that some parts of it are law and some parts of it will be defined in more detail under the secondary legislation. Your question to Mr Egan was, "What impact will it have on us?". For this next well, it may have an impact in terms of the water monitoring requirement for 12 months beforehand. That is the only area, I would say, that could impact us, so after we submit the planning application. We started monitoring the water a few weeks ago. If that came into play, then it could be one year later before we would be allowed to frack.

Q199 Richard Drax: When you say "monitoring the water", are you talking about monitoring how much water is being used?

John Dewar: No, monitoring the methane in the water.

Q200 Richard Drax: I see. This possibly might need you to change your plans.

John Dewar: It might need us to change our plans—not change our plans, but wait longer for the planning and permits to be approved. In addition, we are drilling. I think someone asked the question earlier about monitoring the water and how we are ensuring its quality remains good. In addition to what I have said so far, I could have added that we have been asked to drill four more wells on our site. There will be three shallow ones, to roughly 100 feet, and one relatively deep one, to 1,000 feet.

Q201 Richard Drax: Sorry, I did not understand. You have been asked by whom?

John Dewar: We have been asked by the Environment Agency, as part of the water monitoring baseline study that we are doing. We have got to drill three shallow wells and one slightly deeper well to provide us with a baseline of the water in and around the site. At

any point in time, both now and in future, we will be able to take samples from that and make sure that none of our activities are influencing the local water, even though it is not actually used as the water supply.

Q202 Richard Drax: This lack of certainty on the Infrastructure Act is not going to stop you. You are going to carry on, like Mr Egan, until such time as the rules become law?

John Dewar: Absolutely, we will carry on. I actually welcome many of the changes in the Infrastructure Act. I think I already mentioned to Madam Chair during our meeting in Kirby Misperton that I supported many of the recommendations that she herself was supporting. However, we need to examine it in more detail and we need to wait for the second legislation in July before we can be 100% certain of the long-term impacts of the future wells that we are going to do.

Richard Drax: Thank you.

Q203 Chair: Thank you very much indeed. If we have established that the Infrastructure Act and the regulations do not apply until they are brought before the new Parliament in July, any application you make would be under the existing legislation. Can you give us a commitment today that you do not plan to drill in or under the North York Moors National Park?

John Dewar: Yes, I can give you that commitment. It is impossible to say, "Never, ever", but I can give you that commitment, as I gave you in February last year when we met, and I said that we had no plans then to do so. The same applies, Madam Chair.

Chair: That is very helpful, thank you.

Q204 Mrs Lewell-Buck: Again, this is a similar question as to Mr Egan about: some people would say that the development of shale gas will increase climate change emissions and delay the development of renewable energies. I am just wondering how you would respond to that criticism?

John Dewar: I am a real supporter of all forms of energy. Gas is much cleaner than oil. Oil is much cleaner than coal. Renewables are cleaner than all of them. I think the UK faces a significant challenge in the future. How do we make the transition from what we have got to what we want? I think that is going to take an awful lot of debate, but I am certainly a supporter of renewables. I think we need a mix. There is a tremendous saying in North Yorkshire that "You get owt for nowt". Even while renewables sound very good on the surface, again, when you investigate deeper, they have got their own particular drawbacks. I do believe we need to look at them all, but we do need to take certain measures to meet our obligations to reduce our carbon footprint.

Mrs Lewell-Buck: Thank you.

Q205 Chair: Can I just ask a couple of questions to wrap up at the end? What are the chances of fugitive emissions? Do you plan to burn them off and flare methane gas escaping at the site?

John Dewar: We are quite lucky that the infrastructure is already in place. Our pipelines are already in place. We have export routes for it. We are not planning to do any venting or flaring of gas at the site. Gas, to me, is very precious. It is what we sell. I do not want one thimbleful of gas to escape. We have gas detectors all around our sites and all around our wellheads at the Knapton site. Gas is enormously precious to us. It is not the same as in the States, where gas can be a by-product, and it is oil that they are after. To us, it is our main product. I do not want to see any leaks or any emissions.

Q206 Ms Ritchie: When I was talking to you about water quality, I mentioned to you about chemicals and I asked you to name the chemical or chemicals that are used. We did not get that information. Is it possible now to get that information?

John Dewar: I have the list here.

Ms Ritchie: That is very good.

John Dewar: This is the list that is in our DECC ERA. It is the list that I handed out to the local residents at Kirby Misperton. It is the list that the Environment Agency has reviewed and approved. I can not only give you the name, I can also give you the quantity and then I can give you want it occurs in, like such common things as vinegar, ice cream, or whatever else. If you want that for all eight, it can be very boring.

Chair: If we could have it in writing, because it is rather long.

Ms Ritchie: If you gave it to us in writing, as the Chair said, that would be very useful.

John Dewar: Otherwise, words like, "Hemicellulase enzyme. 0.001%. Food additive. Improves the texture of butter". I think it could be fairly boring if I continue on that theme.

Ms Ritchie: I think it might be useful, as the Chair said, if you were to furnish us with it. Thank you.

Q207 Chair: There is a chance, I understand, of fugitive emissions of gas escaping in the years after you have actually sealed the wellhead. Do you have a process of monitoring that and ensuring that you, Third Energy, or, I understand, a successor company, will actually do the exploitation?

John Dewar: As long as we are in existence, and the licence holder, it is our responsibility, for both the existing wells and wells that have been abandoned. That is our responsibility. If there was ever a leak, it is our responsibility to go back and fix it. We are not planning to—so please do not take it as a plan—but if we were to be sold to someone else and they became the licence holder, then that same responsibility would pass over to them. If we went out of business, heaven forbid, and there was no one else after us, and there was a

leak, then that is a grey area right now that is being negotiated between DECC and UKOOG. I think that is an area that needs more discussion.

Q208 Chair: That is very helpful. Is it an issue that an area such as Ryedale might be situated on an area of natural geological fault line, in terms of the seismic activity that you might cause?

John Dewar: We do have faults in and around the area. The UK has faults all over the country. One of the protections that the Government put in place is that we can only frack if we have a very good understanding of the subsurface. For that, we will have had to shoot 3D seismic. We will have had to analyse it. We will have had to look at all the nearby faults, and we would not be allowed to frack nearby any big faults. Bearing in mind that the length of our fractures is only a few hundred feet, and the big faults in the area tend to be kilometres away, again the chances of us energising a fault would be very slim. Again, it is part of the protection measures that the Government have put in place.

Chair: Mr Dewar, thank you very much for being with us today, and for answering for our questions so patiently and so comprehensively. We are very grateful to you.

John Dewar: Thank you, Madam Chair.

Chair: We stand adjourned.