FYLDE BOROUGH COUNCIL

Report and recommendations arising out of an in- depth scrutiny review of the impacts of Shale Gas exploration activities in Fylde

FINAL REPORT

April 2012

Contents

Foreword

This report presents the findings and recommendations of the Shale Gas Task and Finish Group. The Group have acted upon the instructions of the Community Focus Scrutiny Committee, who called for this group to be established following concerns raised by elected members and local residents about the on-shore exploratory shale gas operations within the borough (known as fracking)

I would like to thank members of the Task and Finish Group for giving so much time and energy to this scrutiny review and, in particular, Mike Hill (Technical Advisor) who has assisted the Group in digesting a great amount of information, much of which has been in depth and of a highly technical nature and has required all our concentrated effort.

I would also like to thank the Portfolio Holder for the Environment & Partnerships for his encouragement and the time he has given to this review.

I would like to especially thank those individuals who took the time to give evidence and attend the various meetings of the Group.

Lastly, I would like to thank our Scrutiny Officer, Lyndsey Lacey for her diligent hard work and determination.

The Group feel that the monitoring of the recommendations included within this report and the on-going operations is crucial and in the interests of the local population and the environment.

Councillor Kiran Mulholland
Chairman of the Community Focus Scrutiny Committee

1. Summary of Recommendations

The Task and Finish Group discussed the possibility of seeking a moratorium on shale gas production but felt this unnecessary provided that the following recommendations are implemented.

Recommendation	Decision making body/ responsible member
The Department for Energy and Climate Change (DECC) ensures that a comprehensive regulatory framework is in place specifically for the onshore shale gas sector. The regulatory framework should be prescriptive in character and, in particular, should cover (but not limited to) well integrity, cement quality, casing strings, annular pressures, surface methane detectors, formation integrity tests, cement bond logs, tests and thresholds for seismic activity, post-tremor actions, sourcing of water for fracking, storage, disposal and recycling of produced water and the testing of local bore holes/wells before and after operational activities.	Cabinet
The regulatory framework provides for the appointment of a “shale gas tsar” whose remit would include (but not limited to) overseeing the development, implementation and monitoring of the regulatory framework. Their remit would include ensuring that all relevant regulatory agencies properly carry out their functions relating to onshore shale gas, and that their inspection regimes are robust and appropriate.	Cabinet
The regulatory framework provides for a permit system under which each stage of well construction is inspected to ensure that the integrity of its construction complies with relevant regulations.	Cabinet

The costs of implementing and maintaining the regulatory framework, including the necessary inspection regime be met by imposing a levy on operators of onshore shale gas wells.	Cabinet
In tandem with the introduction of the comprehensive regulatory framework, DECC encourages operators to continue to adopt and work to voluntary codes and best practice standards, including standards of transparency and accountability to local communities.	Cabinet
DECC and the shale gas tsar should conduct or commission continuing credible research into (but not limited to) the following issues: ▪ The potential effects of the use of any of the chemicals used in onshore shale gas exploration and production. ▪ The on-going monitoring, collection, transportation and disposal of waste materials and fracked water (including radioactive waste) from the various sites in Fylde and the number of journeys required. ▪ The effect on water supplies of the use of high volumes of mains water in fracking operations, particularly in view of current shortages in various parts of the country, and whether seawater could be used as an alternative.	Cabinet
The planning authority considering any application for planning permission for shale gas drilling operations should ensure that any appropriate screening assessment is in place and should give appropriate weight to the need to avoid industrialisation of the countryside to the detriment of the traditional rural environment.	Cabinet

2. Membership of the Task and Finish Group

Members

Chairman of the Community Focus Scrutiny Committee - Councillor Kiran Mulholland

Vice-Chairman of the Community Focus Scrutiny Committee - Councillor Christine Akeroyd

Councillors Tim Armit, Susan Ashton, Susanne Cunningham, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officer Support

Lyndsey Lacey - Principal Democratic Services Officer
Andrew Dickson - Head of Technical Services

Technical Advisor

Mike Hill (Local Chartered Electrical Engineer)

3. Terms of Reference/Scope of the Task and Finish Group Review

The Terms of Reference and Scope of the review were agreed as follows to gain an understanding and appreciation of:

- The self regulatory aspects and controls in place in relation to the operations
- The economic, social and environmental impacts of the operations
- Existing planning permissions in place and any proposed applications pending
- The insurance/ public liability arrangements.

4. Role of the Group

Councillors are well placed to understand the needs and wishes of local people and the wards they represent and balance those against the demands of professional organisations/ groups. This exercise was an example of essential interaction with key organisations and the local people they represent and working within the remit of the Terms of Reference.

5. Methods

Members requested a range of evidence and comparative information throughout the course of the review and invited a variety of representatives to assist in the forming of evidenced based balanced recommendations.

In conducting its research, the Task and Finish Group acknowledge that there is a wide range of highly technical and sometimes conflicting reports on the shale gas industry. However, despite this, the Group endeavoured to conduct what it believes to be a professional, fair, transparent and comprehensive review taking into consideration all the wide ranging evidence it had been presented with and had available to it. It is acknowledged that the initial timescale for conducting the in-depth review was ambitious due to the number of organisations/ bodies involved in the process and wealth of technical information available that needed to be considered. The review has therefore taken longer than was originally anticipated.

In the review, the Task and Finish Group considered the following evidence:

(a) Committee reports supplemented by verbal evidence
(b) Notes of the various Task and Finish Groups
(c) National policy/ Government reports
(d) Select Committee Reports
(e) Presentations from representatives of Cuadrilla (the company concerned) including introductory video to illustrate the hydraulic fracturing process
(f) Site plan showing the areas/ sites of all the shale gas operations within the borough
(g) Review of the Geomechanical Study of Bowland Shale Seismicity – Synthesis Report – November 2011
(h) Review of planning permissions and conditions in place
(i) Meetings and site visits
(j) Written evidence from the Department of Energy & Climate Change
(k) Written evidence/attendance at meeting by the Environment Agency
(l) Written evidence/attendance at meeting - Lancashire County Planning
(m) Written evidence from the Health and Safety Executive -Off Shore Division
(n) Written evidence from United Utilities
(o) Written evidence from Cuadrilla
(p) Written evidence of the Technical Advisor (oil and gas industry experienced)
(q) Written evidence from local residents
(r) Gaslands Video
(s) Written response from DECC
(t) Technical advice to the Task and Finish Group from Mr Mike Hill
(u) Geophysical advice to the Task and Finish Group from Mr Martyn Rayson
(v) Intranet and newspaper articles
(w) Review of the DECC report on the Preese Hall Shale Gas Fracturing – Review and Recommendations for Induced Seismic Mitigation – Published April 17 2012.
(x) Awareness of public Information days hosted by Cuadrilla across the borough
(y) Best practice of Cuadrilla Resources
(z) Any written representations

6. Summary of meetings

The Task and Finish Group carried out its review as follows:

Date of meeting	Meeting information	Focus/ outcome
15 August 2011	Task and Finish group	First meeting of the group to agree scoping document and the focus of the review and direction
27 September 2011	Meeting with borough council, county council (planning) and Environment Agency representatives	To have an appreciation of the roles of the Borough Council, County Council (planning) and the Environment Agency in relation to the shale gas operations
19 October 2011	Meeting with Mike Hill (Technical Advisor)	To have a better appreciation of the technical aspects of the operations
19 October 2011	Event at Hilton Hotel – showing of Gaslands Film	To learn from the experiences encountered in the USA
5 December 2011	Meeting with the Task and Finish Group	To consider the submissions from Cuadrilla, DECC, HSE, EA, United Utilities, LCC and Technical Advisor. In addition, to consider the synthesis report of the Geomechanical Study.
8 December 2011	Site Visit to exploratory well at Hesketh Bank, Becconsall	To gain a better appreciation of the operational activities on site
14 December 2011	Meeting of the Task and Finish Group and Chief Executive/other reps of Cuaudrilla and the Technical Advisor	To summarise some of the issues previously raised by the Task and Finish group with Mr Miller and Mr Hill.
29 February 2012	Mr Martin Rayson (local Geophysicist)	To gain a better understanding of the work of geophysicists and geologists in the shale gas industry and obtain an expert view on the seismic event and other related shale gas matters
14 March 2012	Meeting of the group to draw conclusions	To work towards a conclusion
23 April 2012	Meeting to draw up the final recommendations	To consider the final recommendations on the exploration of shale gas.

The findings and recommendations contained in this report will be presented to a Special Community Focus Scrutiny Committee on 17 May and a subsequent meeting of Cabinet on 23 May for further consideration. It is anticipated that the work will be concluded and forwarded to the appropriate bodies by the end of May.

7. Introduction

Cuadrilla Resources Ltd is a company currently exploring the potential for commercial shale gas extraction on the Lancashire area. The company is carrying out exploratory shale gas drilling in the Fylde area via a series of test wells. Currently, the company is only exploring for gas and all of their sites are temporary, with the exception of Elswick which has been extracting natural gas since 1993. Over the last year, the company has been active on three sites in the Fylde area but anticipates being active in a total of five sites over the coming year.

8. An overview of the Operational Company – Cuadrilla Resources Ltd

Cuadrilla is a UK registered company based in Staffordshire. It was formed in 2007 as a privately owned exploration and production company. Its focus has been to bring together experts to release natural resources, such as those in Lancashire.

The Company has some 70 staff in the UK both directly employed and through contractors mostly based at the well sites. The main contracting partner in the UK is PR Marriott Drilling Ltd based in Chesterfield, which has over 60 years of mining experience in Britain. The Company is privately owned by its management team and two substantial investors, AJ Lucas and Riverstone LLC.

9. Background

9.1 Some time ago, Cuadrilla gained permission from the Government (via a licence) and the County Council (via Planning permission) to investigate how much gas is in the rocks beneath ground level. Cuadrilla Resources began testing for gas on the Fylde Coast last year, using a technique known as "fracking". Basically, fracking involves water, sand, and chemicals injected underground at high pressure to break up rock formations, allowing oil or gas to flow up the well.

9.2 Cuadrilla has stated publicly that all the exploration that they do is highly regulated by the relevant government department including the Department for Energy and Climate Change (DECC), The Environment Agency, the Health and Safety Executive and the relevant county council in the county where the site is based.

9.3 The areas that Cuadrilla has the benefit of planning permissions in place are:

Elswick

The site in Elswick is Cuadrilla's only permanent site and was hydraulically fractured in 1993. Generating 1MW of electricity, gas is extracted from the sandstone formation and is sent to national grid via an on site generator and underground cables.

5/09/0572 Preese Hall, Weeton

Temporary planning permission was granted in October 2009. Drilling began at the site in August 2010. During fracturing induced seismicity was experienced which is referred to later in the report.

NB Application 05/11/0431 is the current application to extend the time period for completing investigations provided for by planning permission 5/09/0572.

5/09/0813 Hale Hall Farm, Wharles

Cuadrilla acquired temporary planning permission for the Hale Hall Farm site in February 2010. There are currently no plans to undertake exploration at the site.

5/10/0091 Grange Road, Singleton

Temporary planning permission was granted in April 2010. Drilling began at the Grange Hill site in January 2011. It was at the Grange Hill site that Cuadrilla reached its deepest target zone (10,700ft) in July 2011.The well was plugged and the drilling rig left the site.

5/10/0634 Anna's Road, Westby

Cuadrilla acquired temporary planning permission for the site in Westby in November 2010. At present, the Anna's Road site has been prepared for

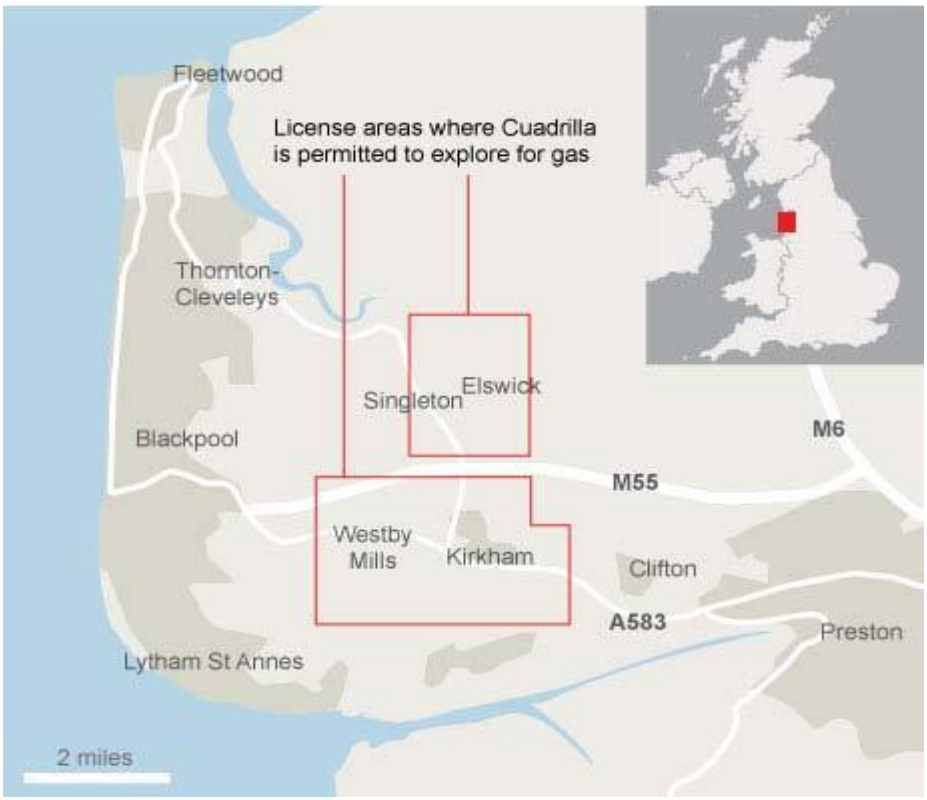
operations. However, Cuadrilla has not yet set a date for the arrival of the drilling rig. Before exploratory work begins, the company will contact nearby residents with the moving date and information on how residents can visit the Anna's Road site.

Kirkham

Planning permission has been granted for the following:

- 5/01/0685 Kirkham Prison – never implemented – extended by application below
- 5/07/0333 Kirkham Prison – never implemented – extended by application below
- 5/01/0184 Kirkham Prison – copy of decision notice attached

Cuadrilla acquired temporary planning permission for the Kirkham site on 15th June 2010. There are currently no plans to undertake exploration at the site.



9.4. Local residents, elected members and local parish councils have raised concerns about the environmental and health risks/impacts associated with the shale gas production.

9.5 Following a request made by an elected member to seek further information on the shale gas operations, a presentation was made by Cuadrilla Ltd to the Community Focus Scrutiny Committee on 23 June 2011. Some of the issues

highlighted were addressed by the company but in view of the fact that it was felt that the subject was very technically complex and wide-ranging and has generated interest locally, nationally and internationally, an in-depth review was considered by elected members to be beneficial. Consequently, a Task and Finish Group was appointed made up of various members of the Scrutiny Committee to undertake an in-depth scrutiny review on the exploration of shale gas in the area.

9.6 From the outset, the Group was made aware of some of the controversy associated with the shale gas operations and therefore wanted to ensure that it took an objective view on the matter. The Group was aware that the exploitation of proven shale gas resources elsewhere in the world had received mixed publicity. One of the key potential hazards (identified by opponents) was the risk of ground and surface-water contamination by gas and chemicals (based on information gathered from the USA). Additional concerns in the USA expressed concern at perceived weak regulation and the potential for long term health effects on local residents. Conversely, Cuadrilla has stated publically that all exploration is highly regulated by various government departments and those operations could bring economic vitality to the area. The Group considered it was important to look at these areas and appreciated that to do this it had to gain a better understanding of the hydraulic fracturing industry, take the time to look at all the evidence before it and enable it to take a balanced, objective and informed view.

9.7 It is appreciated that the topic itself is fairly complex and technical and involves a range of organisations covering different aspects of the operations. In addition, the evidence/information gathering and frequency of meetings was heavily reliant on the co-operation of relevant bodies located across the UK and as such, has been geographically challenging. Details of the various review meetings that have been held are referred to in this report together with evidence gathered from those witnesses considered relevant to these operations. This evidence gathering has also been supplemented by government reports, literature and presentations.

9.8 The Group considered the Select Committee Report, attended presentations by Cuadrilla, met with representatives of the borough council's planning and community services section and representatives of Environment Agency, Lancashire County Council (Planning) and a respected local geophysicist (Mr Martin Rayson) . Unfortunately, United Utilities were unable to be represented and the HSE stated that it was unable to attend any meetings of the Group due to geographical difficulties. In addition, Mark Menzies, MP for Fylde also declined the invitation to attend meetings of the group as he considered he had a conflict of interest being Private Parliamentary Secretary in the Department of Energy and considered it inappropriate to take part. The Group also worked with a local technical advisor (Mr Mike Hill) who has engineering background in the oil and gas industry. Notes of the various meetings are attached at **Appendix B**

9.9 All key organisations (listed above) were asked to complete an Issues and Response Paper in an attempt to address key shale gas issues and concerns. The response documents are included within the report at **Appendix C**

9.10 Cuadrilla has offered on numerous occasions to show individuals and key organisations round their operations to discuss any concerns. Some elected members took the opportunity to do so and site visits took place in during 2011 and 2012.

9.11 To supplement this work, representatives of the Task and Finish Group attended an economic benefits presentation by Cuadrilla in September 2011. This essentially looked at the economic impact of shale gas exploration and production in Lancashire and the UK. Regeneris Consulting (an independent economic development consultancy) were appointed by Cuadrilla to look at the economic impact of both the current exploration phase and the likely economic impact of a subsequent and far more extensive phase of commercial extraction. The company modelled the impact for both the county of Lancashire and the UK as a whole. A copy of their document entitled "Economic Impact of Shale Gas Exploration & Production in Lancashire and the UK is available via the following Link:

http://regeneris.co.uk/latest/news/entry/economic-study-on-shale-gas-extraction

9.12 A number of members of the Task and Finish group also attended the viewing of the Josh Fox 'Gaslands' film (the Halliburton-developed drilling technology of fracking or hydraulic fracturing in America) in October 2011 - See link below:

Members of the group acknowledged the clear distinctions between the UK and America. It was felt that the fact that the Frac Act which is now being introduced in America to ensure strict regulations of the industry, is an essential requirement.

http://www.gaslandthemovie.com/whats-fracking

9.13. As part of Cuadrilla's on-going programme of community engagement, it has hosted a series of public information days throughout the borough which have essentially centred on the geophysical survey work but also provided an opportunity to find out more about the company's wider operations. The company had a significant amount of display material at each of the events. In addition, the information days were staffed with a team of experts covering each of the key areas of interest. Letters and leaflets were also sent out to over 30,000 households in Fylde and a free phone community helpline was also made available.

http://www.cuadrillaresources.com/about-us/blog/a-week-of-public-information-days/

9.14 During the course of its work, there was a small seismic tremor reported of a magnitude of 2.3M_L located about 2km away from the drilling site at Preese Hall Weeton. The Group acknowledged that this was a major concern to the local population and was pleased that the company decided to postpone immediately its fracking programme pending further investigations. The interpretation of the data produced by the British Geographical Society to determine the cause of the

seismic event was a key and urgent requirement for all bodies concerned. A copy of the report entitled "Geomechnical Study of Bowland Shale Seismicity – Synthesis Report" was made available to the group. See Link below

http://www.cuadrillaresources.com/wp-content/uploads/2012/02/Geomechanical-Study-of-Bowland-Shale-Seismicity_02-11-11.pdf

As a result, the Group sought professional, technical advice on the matter and have studied subsequent reports that have been issued. The Group's work focused on the probability of other earthquakes occuring during future treatments, an understanding of the occurrence and sought confirmation that robust and appropriate mechanisms were put in place to ensure that such events are not repeated before any operations continued. The Group considered it of paramount importance and the main consideration was to ensure the safety of local residents.

9.15 The seismic event actually helped the Group to gain a better understanding and knowledge and identify the following key areas:

- Cuadrilla - The operating company
- Various sites involved
- The regulatory framework for onshore exploration
- Seismicity
- The planning process/ cross regulatory issues
- Inspection/ announced/ unannounced visits and monitoring arrangements
- Rock formations
- Processes and procedures
- Roles and responsibilities of the various organisations including DECC
- Various Government/ other reports
- An appreciation of the public liability arrangements
- Impacts on ground and surface water
- Quality and quantity of water flow back
- Use of any hazardous/ non hazardous chemicals in the operations
- Depth of drilling
- Bore Hole/ well integrity
- Responsibility for Cement Bond Logs (CBL's)
- Public perception
- Environmental related matters

More recently, the group were advised that Cuadrilla's had commenced a new geophysical survey (a study of subsurface geology) The survey will provide a better understanding of the geological conditions beneath the proposed drilling locations and yield a significant amount of knowledge of the geological structures (beds/ faults) that occur within the bowland shale area and the formations below to a depth of normally around 5,000 to 15, 000 feet.

9.16 To assist the Council within technical understanding of the shale gas operations, the Group appointed (on a no fee basis) Mr Mike Hill (local chartered engineer) to act as the Council's technical advisor at the various meetings of the Group. In addition, the Group also invited a local independent local geophysicist,

Mr Martyn Rayson to one of its meetings to help further its understanding of seismic events.

9.17 The various reports considered by the Community Focus Scrutiny Committee including the Interim Report presented to committee on 1 December 2011 are detailed in the links below:

http://www.fylde.gov.uk/meetings/details/940/

http://www.fylde.gov.uk/meetings/details/851/

http://www.fylde.gov.uk/meetings/details/852/

http://www.fylde.gov.uk/meetings/details/936/

http://www.fylde.gov.uk/meetings/details/937/

9.18 During the final stages of the work of the Group, the Department for Energy & Climate Change published a report on 17 April, by a panel of independent experts which examined the possible relationship between hydraulic fracture operations at Preese Hall well and a number of earthquakes that occurred in April and May 2011. The body had been asked by DECC to review previous reports, and the further studies and information provided by Cuadrilla; and make appropriate recommendations for the mitigation of seismic risks in the conduct of future hydraulic fracture operations for shale gas.

The report entitled "Preese Hall Shale Gas Fracturing Review and Recommendations for Induced Seismic Mitigation" is included as a Link below:

http://www.decc.gov.uk/publications/basket.aspx?filetype=4&filepath=11%2Fmeeting-energy-demand%2Foil-gas%2F5055-preese-hall-shale-gas-fracturing- review-and-recomm.pdf

9.19 The Task and Finish Group was aware that the Preese Hall report was concerned solely with earthquakes. It also acknowledged that the remit of the Group is wider to include all possible outcomes of the fracking operations. It is acknowledged that some of the recommendations of the Group contained in this report do not fall within the narrower remit of the Preese Hall report and this report's recommendations reflect both the Council's response to the Preese Hall report and the Preese Hall Shale Gas Fracturing: Review & Recommendations and the much wider remit of the Group.

9.20 DECC had asked for responses to the recommendations by 25 May 2012. The Group's final report which includes its findings and recommendations will be considered at the Community Focus Scrutiny Committee on 17 May and thereafter, Cabinet on 23 May. This will enable the Council's response to be made in time.

9.21 Whilst it is acknowledged the operations are not a council responsibility, to ensure engagement with the local community, an information page was set up on

the Council's web site to seek views from the local community about the ongoing exploratory operations. See links below:

https://getsatisfaction.com/fylde/topics/shale_gas_drilling_fracking_your_views

10. Terminology

At an early stage of the review the group found it important to be aware of the various technical, engineering terms associated with the shale gas industry and a Glossary of terminology document is attached at **Appendix A**

11. Overview of exploration and development of Shale Gas and Coal Bed Methane

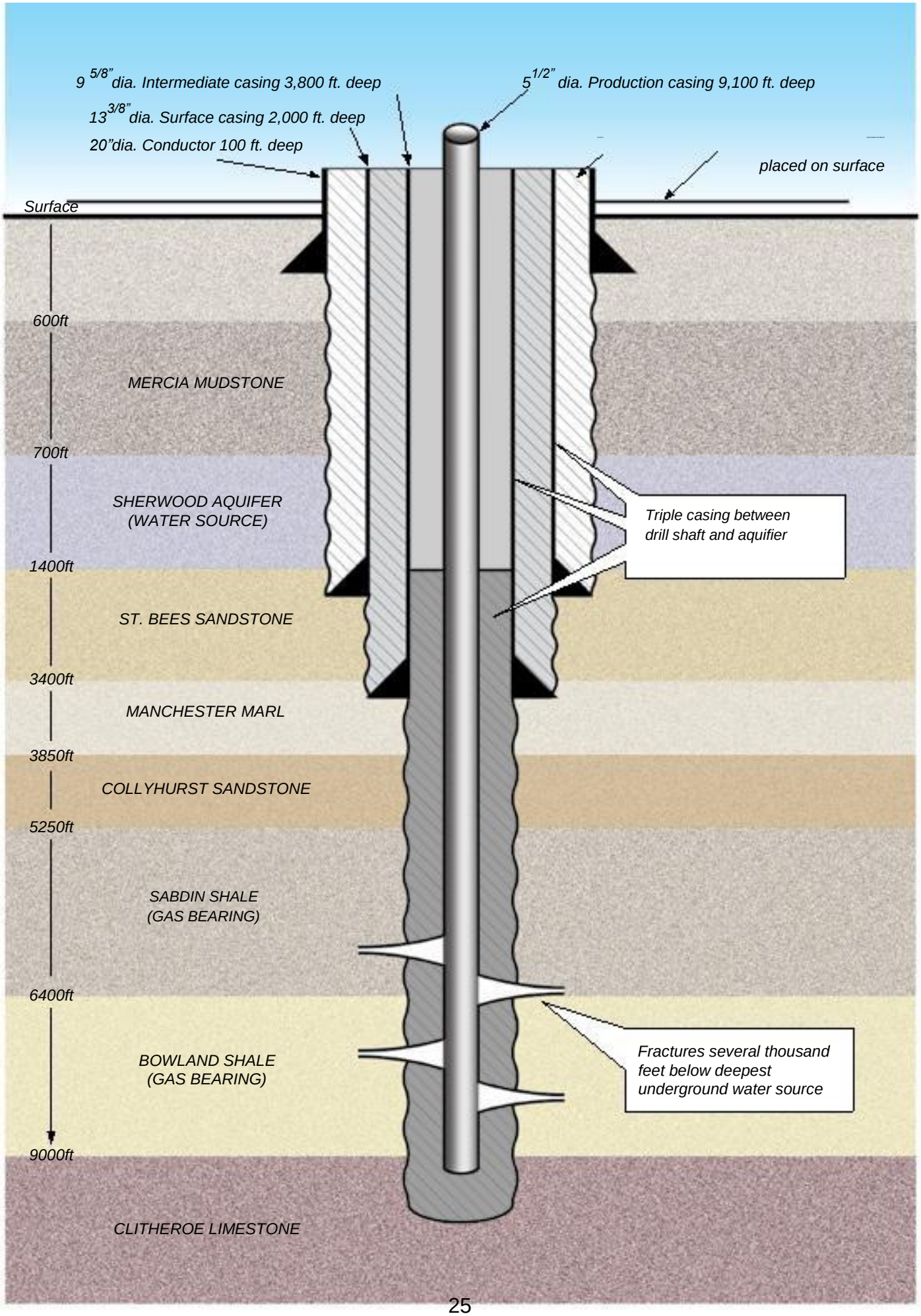
11.1 Natural gas prices have steadily increased over the past few years. This has spurred interest in the development of "unconventional" gas resources, such as gas shales.

11.2 Shale gas is natural gas extracted from shale rock formations. It is one of a number of so-called unconventional sources of natural gas, with other unconventional sources of natural gas including coal-bed methane. It is mainly methane gas like the one we use for cooking or heating. However, this gas is tightly trapped in rock formations hundreds of metres beneath the earth.

11.3 It is understood that shale gas exploration and extraction techniques, including directional drilling and hydraulic fracture stimulation (fracking) have been used across the oil and gas industry including the UK for many decades.

11.4 Shale gas extraction involves the extraction of the natural gas that is held in fractures, pore spaces and adsorbed in the organic material of shale. Coal Bed Methane (CBM) extraction works by releasing pressure in coal seams (by natural gas production or the pumping of water from the coal bed). Both operations involve drilling boreholes, usually to considerable depth vertically in some cases then horizontally.

Bowland Shale Well Schematic



Note: Not to scale

11.5 Where there is insufficient natural permeability in the shale or coal this may be enhanced by pumping a fluid into the well bore at pressure to create and propagate fractures in the surrounding rock formation (these may be only a few sand grains in width). At the moment our information suggests that hydraulic fracturing is most likely to be restricted to the development of shale gas in the UK although it is widely used for CBM in the United States.

11.6 Typically, the injected fluid contains sand which is used to prop open the fractures to maintain the enhanced permeability. The fluid is then pumped out to release gas and in some cases oil. The fluid is mainly water but small amounts of other substances/chemicals may be added. Overall, the process can involve the injection and return of large volumes of water which have to be subsequently disposed of.

11.7 Drilling and installation will be carried out to oil and gas industry standards, overseen by the Department of Energy and Climate Change and the Health and Safety Executive.

11.8 The recent advances in technology, mainly through directional drilling and hydraulic fracturing, have greatly expanded the application, particularly in the United States. The US Environmental Protection Agency carried out a study in 2004 of the widespread use of hydraulic fracturing for coal bed methane and concluded that there was no significant evidence that drinking water aquifers were being affected. See Link below

http://en.wikipedia.org/w/index.php?title=Hydraulic_fracturing_in_the_United_States&action=edit&section=7

Sites in the US have been developed in very large numbers and there is a corresponding increase in public concern based on some reports of pollution problems and impacts on groundwater supplies. The US EPA has embarked on further studies on the subject in recent years.

12. Activities on sites

Cuadrilla would normally drill about 9,000 ft (about two miles) down into the ground, with several metal and cement casings between the bore and the surrounding ground they pass through. After the process of hydraulic fracturing has taken place, the company gradually extracts the released gas that has been stored in the rock for hundreds of millions of years.

(Hydraulic fracturing Equipment at Preese Hall 2011)

13. Regulations

The responsible bodies for regulations are the Environment Agency, Health and Safety Executive as well as permits that must be obtained from DECC and planning permissions from the County Council.

14. Findings

This in-depth review resulted in a wide range of key issues being identified for consideration by organisations and these issues are summarised as follows:

14.1 Report by the Energy Select Committee of MPs of June 2011 - The Group considered and noted the report of the Energy Select Committee which found no evidence that the fracking process involved in shale-gas extraction poses a direct risk to underground water aquifers, provided the drilling well is constructed properly (see well integrity) It also had regard to the statement given by ESC's Chairman, Tim Yeo, who stated "There appears to be nothing inherently dangerous about the process of fracking itself and, as long as the integrity of the well is maintained, shale-gas extraction should be safe" also adding that 'Regulatory agencies must of course be vigilant and monitor drilling closely to ensure that air and water quality is not being affected"

A link to the Select Committee report is set out below:

http://www.publications.parliament.uk/pa/cm201012/cmselect/cmenergy/795/79502.h tm

14.2 The Planning Process (Shale Gas) - Concerns were identified about confidence in the planning process relating to: regulatory controls, the strength of some of the conditions imposed on the existing permissions, cross regulatory issues, monitoring/inspection arrangements, protection of groundwater services, breach issues/ enforcement arrangements, together with matters associated reactive and proactive work. On going concerns related to the robustness of the conditions at the full production stage and during the consultation process. In

addition, concerns were expressed that County have no real experience of this type of fracking operations and is heavily reliant on the advice of DECC, HSE, Environment Agency and United Utilities to assist it in its decision making.

It was also felt by the Group that the planning authority when considering any application for planning permission for shale gas operations, should ensure that any appropriate screening assessment is in place and should give appropriate weight to the need to avoid industrialisation of the countryside to the detriment of the traditional rural environment.

14.3 Government Policy – The Group acknowledged that present Government policy is that the country should have a wider mix of energy supplies rather than relying on a combination of nuclear, oil and gas (both imported and from the UK) and renewables such as solar and wind. In a document produced by Cuadrilla (see link below) it stated that as a relatively untapped energy resource, shale gas has significant potential to boost the UK's gas production and reduce the dependency on foreign energy sources and that relying too much on imported energy puts the county at risk.

http://www.cuadrillaresources.com/benefits/energy-security/

14.4 Regulations - The immediate/urgent need to introduce a comprehensive regulatory framework for the onshore shale gas sector and that such framework be robust and prescriptive in character. Throughout the process, it became increasingly evident that there needs to be specific hydraulic fracturing regulations to be in place for on-shore activities. In the absence of any legislation/ regulations, there would be concerns that other operational companies may not keep to the same standards/ best practice as set by Cuadrilla.

The regulatory framework should, in particular, cover (but not limited to) well integrity, cement quality, casing strings, annular pressures, surface methane detectors, formation integrity tests, cement bond logs, tests and thresholds for seismic activity, post-tremor actions, sourcing of water for fracking, storage, disposal and recycling of produced water and the testing of local bore holes/wells before and after operational activities

14.5 Bowland Shale - DECC and Cuadrilla state that Bowland Shale in Lancashire is the most advanced opportunity for the first significant shale extraction field in the UK.

In September 2011, Cuadrilla announced it had discovered 200 trillion cubic feet (tcf) of Gas in Place within the Bowland shale in Lancashire. The Company has stated that even if a fraction of this could be extracted at a commercial rate then this could have a positive effect on the UK's energy mix.

Cuadrilla also sated that as an untapped energy resource, natural gas from shale has the potential to:

- boost the UK's gas production, generating tax revenue for the UK

- reduce the UK's dependency on vulnerable and expensive foreign energy sources

In the last 10 years, the price of gas in the US has dropped to just a third of its original price, due in part to the increase in production of natural gas from shale. However, the Group are aware that there are no guarantees or certainties that a reduction in gas prices will happen in the borough.

14.6 Inspection Arrangements - Evidence appears to suggest that all relevant bodies only undertake a 'light touch' approach to inspections. The HSE has confirmed that it only made one announced and no unannounced visits to the operations and in addition, the Environment Agency had confirmed that it had made one unannounced visit and all remainder were announced. The Group would like to see a more regular systematic approach to inspections that we feel would be more beneficial. To ensure future robustness, the Group felt that the overseeing of such arrangements should be undertaken by the "shale gas tsar" detailed below.

14.7 Overview and Responsibility Arrangements - It is a concern to the Group that there does not appear to be one regulatory body with overall responsibility for the operations. It is felt that a situation could arise where each body would assume that the other bodies are carrying out their regulation and there appears to be scope for considerable confusion between the authorities as to who is responsible for what. Essentially, the Company will be self-regulating with limited independent verification and it was felt that the regulatory framework should provide for the appointment of a "shale gas tsar" whose remit would include (but not limited to) overseeing the development, formulation, implementation and monitoring of the regulatory framework. Their remit would include ensuring that all relevant regulatory agencies properly carry out their functions relating to onshore shale gas, and that their inspection regimes are robust and appropriate.

14.8 Appointment of a "Shale Gas Tsar" - As detailed above, the Group was of the firm view that regulatory framework provides for the appointment of a "shale gas tsar" whose remit would include (but not limited to) overseeing the development, implementation and monitoring of the regulatory framework. Such an appointment should be funded by a levy imposed on the operating companies.

14.9 Industry Advances - There were realistic concerns that the hydraulic fracturing and cement process did not appear to be technologically advanced. It was suggested that the same processes have been in place since the 93/94 period. It was felt that such practises should be technologically sound and up to date.

14.10 Economic Vitality - It is acknowledged that the exploration/full production stage may generate a significant volume of additional economic activity for the area/ Lancashire both through the activities on site at the test well locations and the accommodation and subsistence expenses of workers who are often resident elsewhere. There is also the possibility that a full extraction phase would bring more extensive economic benefits particularly as suppliers set up permanent operations in the Lancashire area. Various members of the Group took the opportunity to attend an event hosted by Cuadrilla at the Imperial Hotel,

Blackpool on 21 September 2011 on the launch of their economic benefit report. (See Link above) Cuadrilla has commissioned the report to assess the socio-economic impact of their operations both locally and across the UK and in brief, the conclusions that the report draws are that the economic benefits from commercial shale gas extraction at the Bowland play will be felt across the UK but it is in Lancashire where proportionally the greatest share of economic impacts will materialise. The Group had mixed views as to whether this would be realised in the area.

14.11 Introduction of a Levy - The Group felt that the costs of implementing and maintaining the regulatory framework, including the necessary inspection regime should be met by imposing a levy on operators of onshore shale gas activities.

14.12 Seismic Activity - The recent seismic activity in the area has been of concern to the Group and the local population. The findings of the Geomechanical Study have been considered by Task and Finish Group. The report states that it is likely that the hydraulic fracturing of Cuadrilla's Weeton well did trigger the two minor seismic events. The Group sought the advice of a Technical Advisor and a local geophysicist who had mixed and conflicting views about the seismic events. (See minutes of 14 December attached)

At that time, the Group were advised that there appeared to be a correlation between the pumping/ volume of water and the level of seismicity and as a consequence, various recommendations are being implemented including:

- Early warning detection system (traffic like system) A real time system can see minute size of seismicity even before GMS can detect e.g., If fluids enters a fault there is an ability detect etc
- Reduced volume and quicker flow backs

Since then, the government has published its review and recommendations of the Preese Hall Shale Gas fracturing which was published 17 April – Link detailed above. Such recommendations and actions are considered imperative by the Group to prevent further tremors.

14.13 Water flow back - Issues associated with the process of water flow back was considered by the Group. In brief, fluids, commonly made up of water and chemical additives, are pumped into a geologic formation at high pressure during hydraulic fracturing. When the pressure exceeds the rock strength, the fluids open or enlarge fractures that can extend several hundred feet away from the well. After the fractures are created, a propping agent is pumped into the fractures to keep them from closing when the pumping pressure is released. After fracturing is completed, the internal pressure of the geologic formation cause the injected fracturing fluids to rise to the surface where it may be stored in tanks or pits prior to disposal or recycling. Recovered fracturing fluids are referred to as flowback. Disposal options for flowback include discharge into surface water or underground injection

The Group has concerns that there appears to be no independent verification of the quantity of water flow back or the associated implications of radioactivity. Although this comes under the remit of the Environment Agency, in the past this

has not been done which in essence, has meant that there is no independent verification of the actual quantity of water flow back.

14.14 Public Safety - Of concern to the Group is that the operations are going to be carried out within 200 metres of urban areas and without a real comprehensive appreciation and understanding of the effect of the operations on public safety. Concerns were also raised about house insurance premiums and property values as a consequence of the operations.

14.15 Permits - There are no permits given for any of the sites. It is understood that the Environment Agency do not consider permits to be necessary as the operations were deemed low risk. Likewise, as for regular examination of the well construction to confirm that it has been built to the plans approved by the HSE the body confirmed that it is too expensive to inspect and is perceived to be a low risk anyway.

The Group felt that the regulatory framework should provide for a permit system under which, each stage of well construction is inspected to ensure that the integrity of its construction complies with relevant regulations.

14.16 United Utilities - United Utilities appear to have had very little input in the exploratory operations in-depth review. The Group were informed that UU had discussed the potential impacts on UU groundwater resources both internally and with the EA and given the strict regulatory controls in place and the fact that there has been in independent piece of work carried out following the earthquakes, concluded that there is no risk to groundwater resources.

14.17 Cement Bond Logs (CBLs) - CBLs provide a representation of the integrity of the cement bond to the casing of the well and the borehole. The CBL is crucial to prevent any of the gasses escaping in to the aquifers prior to collection. It should identify whether the cement is adhering solidly to the outside of the casing. The log is typically obtained from one of a variety of sonic-type tools. The log is crucial when combined with other measurements (annular pressures etc.) to give a certain level of confidence that no gasses or liquids from the lower areas can find there way out of the borehole via a cracked pipe and poor cement bonding to the upper areas (Aquifer and surface).

It is understood that Cuadrilla was carrying out CBLs for the production area of the well but such logs were not being undertaken for the intermediate or upper areas of the well. It is these areas that need a CBL to be sure there is no possibility of contamination of the aquifer. There was also some disagreement with the various bodies about who was responsible for such matters and this is an area of concern to the group that it would recommend needed resolving satisfactorily.

Cuadrilla had stated at various meetings that they would be happy to undertake such logs but this would have to be done voluntarily and as this was not deemed important by the inspecting bodies. In addition, it would prove to be a costly exercise if no other companies or competitors were expected to do it.

To have confidence in future operations, the Group would like to see CBL's carried out as a matter of course.

14.18 Gaslands' Film - Various members of the Task and Finish attended a showing of the Gas lands Video in October 2011. Whist it is accepted that the film is somewhat controversial; the fact that Frac Act is now being introduced in America to ensure strict regulation of the industry is a prime consideration. In the absence of any robust regulations and procedures within the UK, it is concern to the Group that other similar companies to Cuadrilla (but not as self regulating) could look to set up in the UK in a de-regulated environment.

14.19 Impermability of the strata below the surface - Water left below the surface is still considered to be an area that needs better appreciation and understanding.

14.20 Well Integrity - The regulatory framework should in particular provide that a well is not permitted to operate unless the integrity of its construction has been certified by and Inspector of Health and Safety as complying with relevant regulations.

Well Head

14.21 Relinquished Sites - The potential exploitation of the remaining 50% of relinquished sites by other exploration companies which will come up in 2013 is a concern of the Group.

14.22 Use of Chemicals in the water - The use of chemicals in the water and the associated transportation of water from the site is of concern to the group. There are currently 500 chemicals licensed by DECC for use in the UK although Cuadrilla had elected to use 3 of the listed chemicals.

Although Caudrilla has stated that the chemicals and their use are registered with the EA, the UK regulatory body. REACH is the European directive that regulates use of chemicals across the European Union. It requires that the use of chemicals for a particular purpose is registered under the directive if the volume of chemicals used for that purpose exceeds a certain threshold. Cuadrilla's chemical suppliers suggest that the chemicals they use are not REACH reportable due to insufficient volume.

Nevertheless, it was felt that DECC or the shale gas tsar should conduct or commission continuing credible research into (but not limited to)

- The potential effects of the use of any chemicals used in onshore shale gas exploration and production.
- The ongoing monitoring, collection, transportation and disposal of waste materials and fracked water (including radioactive waste) form the various sites in Fylde and the number of journeys required.

14.23 Integrity of other companies - There are realistic concerns about the integrity of other companies wishing to set up in the area.

14.24 Best Practice - The importance of companies being fully aware of the requirements/ risks before going into full production. In this regard it was felt that in tandem with the introduction of the comprehensive regulatory framework, an adoption of voluntary codes and practice standards including standards of transparency and accountability to local communities should be introduced.

14.25 Effects on water supplies - The use of high volumes of mains water in the fracking operations are of a concern to the Group particularly with the on-going water shortages across the country.

14.26 Mitigation of risk to water aquifers - The hydraulic fracturing process relies on companies undertaking proper measures to protect the environment from pollution. There is conflicting evidence to suggest that the process does not pose a direct risk to underground water aquifers unless it can be proved that the well casing is not intact. The Group felt that it was important to ensure that proposals are put in place to ensure that proper measures undertaken by companies are stringently regulated.

14.27 Concerns re mismanagement - If mismanaged, the hydraulic fracturing fluid may be released by spills, leaks, or through various other exposure pathways. The use of potentially hazardous chemicals in the fracturing fluid means that any release of this fluid can result in the contamination of surrounding areas, including sources of drinking water, and can negatively impact natural habitats. Mismanagement is a serious concern of the Group and the introduction of robust practices and procedures are vital in this process.

14.28 Independent Competent Person - **Well Examiner** - Currently, the inspections of wells is now falling to the Independent Competent Person appointed by Cuadrilla. In the opinion of the Group, this presents a challenge to impartially and transparency.

14.29 Community Engagement - In response to the Council's attempt to engage with the local community about the on-going shale gas operations a petition (153 signatures) calling for a moratorium on hydraulic fracturing of shale gas was sent to the Council. In addition, the Council received individual letters of objection from local residents/bodies, as well as concerns raised by Kirkham Town Council. In general terms, their objections related to the effects of traffic, noise, ground water pollution, chemical pollution, and the potential for this proposal to lead to further drilling. The application has also been subject to extensive local press/media coverage. See the following links:

- https://getsatisfaction.com/fylde/topics/shale_gas_drilling_fracking_your_views
- https://getsatisfaction.com/fylde/topics/do_we_really_understand_what_impact_fracking_could_have_on_fylde
- https://getsatisfaction.com/fylde/topics/say_no_to_fracking
- https://getsatisfaction.com/fylde/topics/jed_clampett_finds_shale_gas_in_lancashire
- http://www.fylde.gov.uk/Petitions/View/A-Call-for-a-Moratorium-on- Hydraulic-Fracturing-for-Shale-Gas--FRACKI-G-

  http://www2.fylde.gov.uk/media/Development/c65a9d8721031a4f14e7d729137f38de/C25212050814402.pdf
- http://www2.fylde.gov.uk/media/Development/c65a9d8721031a4f14e7d729137f38de/C25212050814440.pdf
- http://www2.fylde.gov.uk/media/Development/c65a9d8721031a4f14e7d729137f38de/50012050816130.pdf
- http://www2.fylde.gov.uk/media/Development/c65a9d8721031a4f14e7d729137f38de/C25212050814400.pdf
- http://www2.fylde.gov.uk/media/Development/c65a9d8721031a4f14e7d729137f38de/C25212050814401.pdf

15. Conclusion

In conclusion, it is noted that there are significant community and political sensitivities around exploration and full production of shale gas alongside potential benefits that might include reduced energy prices, improved energy security and jobs. It is also apparent to the Group of the public perception that there may be potentially significant environmental impacts including the physical impacts of the drilling itself and the potential impacts on the environment and public safety.

The Task and Finish Group discussed the possibility of seeking a moratorium on shale gas production but felt this unnecessary provided that the recommendations detailed are implemented.

If the shale activities are to go into full production, it is imperative that a strong, robust and comprehensive regulatory framework and best practice arrangements are put in place/ established to deal with on-shore activities. The confusion surrounded by the inspection and monitoring arrangements needs to be urgently addressed and the group is of the view that this can only be done by the appointment of an independent “Shale Gas Czar” and that the funding of such an

appointment would be via a levy on the operating companies. In addition, suitable robust arrangements need to be put in place for the ongoing monitoring, collection, disposal and transportation of waste material and fracked water (including radioactive waste) which includes an appropriate Radiological Impact Assessment on the likely release of RADON.

The Group feels that it is imperative that ongoing research be undertaken by Department of Energy & Climate Change into some of the key areas outlined in the report.

16. Evidence

Members of the Group considered the following evidence in relation to the terms of reference for the review that helped them form evidence based recommendations.

(a) The Select Committee Report

The Task and Finish Group considered the House of Commons Energy and Climate Change Select Committee report which included formal minutes and written evidence. In brief, the report addressed the prospects for shale gas, UK policy implications, environmental risks / carbon footprint of shale gas together with their notes on a visit to the USA and Blackpool, witness statements, written evidence and recommendations.

(b) Presentations by representatives of Cuadrilla

Representatives of Cuadrilla attended the former Community Focus Scrutiny Committee in April 2011 and the newly established Community Focus Committee in June 2011 and gave a detailed presentation on the technical aspects of the company's operations. The presentation provided an introduction and background to the company. In addition, it explained the rationale behind Cuadrilla's exploration activities, information on the use of unconventional wells and a further overview of the CWS, hydraulic fracturing and the cement and testing process. Photos depicting bowland shale, a fracturing job and on site operations at the Weeton and Elswick sites were shown.

In addition, the Chief Executive of Cuadrilla (Mark Miller) and his colleagues have attended a meeting of the Shale Gas Task and Finish Group in December.

(c) Site Visits

Throughout the year, various members of the committee have had the opportunity to attend site visits to view the operations and meet representatives of the company.

(d) Committee reports

The impact of shale gas drilling in the Fylde area has been the subject of various committee reports to the Community Focus Scrutiny Committee.

(e) Role of the Borough Council

The role of the borough council and the county council in this matter is quite distinct.

Mark Evans (Assistant Director: Planning Services) and Paul Rossington (Development Manager) gave evidence on the Council's role in the determination of county matter applications. A summary of the report including various examples is included in the notes of the meeting.

Phil Dent (Principal Environmental Protection Officer) provided an overview of the Council's role from the Environmental Health (Community Services) perspective. A summary of his report is incorporated in the minutes appended.

(f) Role of Lancashire County Council

Mr Stuart Perigo (Principal Planning Officer at Lancashire County Council) attended the meeting and provided the group with a comprehensive overview of the county planning process with particular reference to the underground investigations being carried out by Cuadrilla. An overview of the planning permissions in place are detailed above. In addition, a copy of the evidence given is contained in the minutes of the meeting appended.

(g) Role of the Environment Agency

The Group was advised that in England and Wales, the role of the Environment Agency is to ensure that they apply appropriate regulatory controls aimed at preventing pollution and encouraging high standards of environmental protection.

In all cases where the fluids being injected contain pollutants and the injection is into rock formations that contain groundwater, or where the activity poses a potential risk of mobilising natural substances to cause pollution, the Environment Agency will require the operator to hold an environmental permit under the Environmental Permitting Regulations 2010 (EPR 2010). They also require a permit for activities associated with the surface works if these involve emissions to surface or groundwater. The permit will specify the limits of the activity and any requirements for monitoring and will place a general management condition on the operator to provide a written management system that identifies and minimises risks of pollution.

For aspects of the operation that would not normally be subject to EPR 2010 permits, such as the drilling of the borehole, the Environment Agency would also have powers to serve notices under those regulations to require the operator to cease an activity or apply for a permit if we consider it warranted.

The Environment Agency considers potential impacts on water resources due to the effect on groundwater levels and flows. The Agency expect industry to notify of their intention to carry out the drilling, at which time we it will advise on measures that we consider necessary to protect water resources. There may be a requirement for control under the Water Resources Act 1991 on abstraction of groundwater. Depending on the proposal, a groundwater investigation consent and abstraction licence may be required. Operators making such applications would need to provide a supporting hydrogeological impact assessment

In relation to Shale Gas, the Environment Agency has principally 3 main roles:

- To determine whether the operation poses a risk to surface and ground waters. If there is a risk the Environment Agency will require the operator to apply for a permit. It may also require abstraction licences if the operator wanted to take water directly from the environment lakes rivers etc.
- To regulate discharges of fracking flow back water where an operator wanted to discharge directly back into surface or ground waters and to enforce waste management controls.
- As a consultee in the planning process advice to Local Authorities.

A copy of response to the questions response by the group is attached as an appendix.

(h) Role of the Health and Safety Executive

Due to the geographical location of the Health and Safely Executive, representatives of the body were unable to give evidence of the task and finish group but a detailed fact sheet addressing all the questions raised by the group is attached as an appendix.

(i) Evidence of Technical Advisor (Mr Mike Hill)

The Group's technical consultant attended most of the Group's meetings and was able to advice on the technical and engineering aspects of the operations. Some of the concerns that he had raised for consideration by the group are detailed in the minutes appended. In addition, his response to the fact sheet issued by the group is also appended.

(j) Written response from the Department of Energy and Climate Change

A written response in letter to the questions raised by the group is included as a link and as an appendix to the report.

http://www2.fylde.gov.uk/media/Development/c65a9d8721031a4f14e7d729137f38de/C25212050814400.pdf

(k) Written Response from United Utilities

United Utilities was not able to attend any meeting of the Group but a written response to the questions raised by the group is attached as an appendix to this report.

(l) Community Views

Shown on the links above

(m) Economic Impact of Shale Gas Exploration and Production in Lancashire and the UK

See link contained in the report.

(n) Information obtained for the Public Information

Days See link contained in the report.

(o) Documentary evidence of Local Geophysicist (Mr Martyn Rayson)

Mr Rayson attended one of the Group's meetings. See minutes of 29 February 2012 appended

(p) Geomechanical Study of Bowland Shale Seismicity – Synthesis Report

See link referred to in the report.

(q) "Preese Hall Shale Gas Fracturing: Review & Recommendations for Induced Seismic Mitigation and

See link referred to in the report.

17. Appendices

NAME	APPENDIX NUMBER
Shale Gas Terminology	**Appendix A**
Notes of the Various Meetings	**Appendix B**

Responses to the Issues and Response Paper	Appendix C

18. Acknowledgments

The Chairman of the Shale Gas Task and Finish Group (Councillor Kiran Mulholland) would like to thank all the individuals, organisations and groups who contributed to this in-depth review.

April 2012

SHALE GAS TERMINOLGY

TERM	MEANING
Aquifers	**An underground bed or layer of permeable rock, sediment, or soil that yields water**
Bore Holes	**Generalised term for any narrow shaft bored in the ground. In oil & gas terms it is the well drilled to explore for or produce hydrocarbons.**
Cuadrilla	**The company currently exploring the potential for commercial shale gas extraction in Lancashire via a series of test wells.**
Cement Bond Logs	**Data collected from a special wire line tool that allows for the evaluation of the cement across the potential gas-producing zones in a well.**
Shale Gas	**A natural gas extracted from shale rock formations. It is one of a number of unconventional sources of natural gas , with other unconventional sources of natural gas including coal bed methane and tight sands.**
Well Pad	**The area where a well is drilled (typical test well pad is approx 7,000 sqm in size)**
Hydraulic fracturing or fracing	**Process of creating or opening existing fractures in underground shale rock formations to release the natural gas trapped inside**
Sedimentary rock	**A rock composed of materials that were transported to their present position by wind or water.**
Sandstone	**A sedimentary rock composed of individual mineral grains of rock fragments between 1/16 and 2 millimeters in diameter and cemented together by silica, calcite, iron oxide, and so forth.** **Sandstone is commonly porous and permeable and therefore a likely type of rock in which to find**

	a petroleum reservoir
Well Integrity	**The manner in which a well is constructed in to prevent any unplanned release of well fluids or gas to the atmosphere or to other shallow formations underground, either through leakage in surface wellhead equipment, or from the well casing or cement in the wellbore**
Formation Integrity Test	**A test which determines whether the exposed rock and the cement will allow any fluid leakage at the maximum pressures that could be seen from the well, during drilling or production operations**
Regulatory Authorities	**The governmental bodies charged with overseeing and regulating the activity of oil and gas companies**
Test Well	**A well drilled and tested during the exploratory phase of operations**
Exploration License Area	**The geographical area DECC permits a company to explore in**
Surface Casing	**A large-diameter, relatively low-pressure pipe string set in shallow yet competent formations for several reasons. First, the surface casing protects fresh-water aquifers onshore. Second, the surface casing provides minimal pressure integrity, and thus enables a diverter or perhaps even a blowout preventer (BOP) to be attached to the top of the surface casing string after it is successfully cemented in place. Third, the surface casing provides structural strength so that the remaining casing strings may be suspended at the top and inside of the surface casing.[1]**
Production Casing	**A casing string that is set across the reservoir interval and within**

[1] http://www.glossary.oilfield.slb.com/search.cfm

	which the primary completion components are installed. [2]
Intermediate Casing	**A casing string(s) that is generally set in place after the surface casing and before the production casing. The intermediate casing string provides additional protection of aquifers and protection against caving of weak or abnormally pressured formations and enables the use of drilling fluids of different density necessary for the control of lower formations** [3]
Site inspections	**Scheduled and random visits which involves spot checks and tests by the visiting regulatory authority**

[2] http://www.glossary.oilfield.slb.com/search.cfm

[3] http://www.glossary.oilfield.slb.com/search.cfm

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Monday, 15 August 2011 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillor Christine Akeroyd - Vice-Chairman - Community Focus Scrutiny Committee
Councillors Tim Armit, Susan Ashton, Susanne Cunningham, John Singleton, Richard Redcliffe

Officers

Andrew Dickson - Head of Technical Services
Lyndsey Lacey - Senior Democratic Services Officer

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig - Wilson - Chairman Policy Development Scrutiny Committee

BUSINESS

1. Apologies

Apologies were received from Councillor Ken Hopwood.

2. Declarations of Interest

Councillor John Singleton declared a personal and prejudicial interest on the subject and withdrew from the meeting and future meetings of the Task and Finish Group.

3. Introduction

For background purposes, a copy of the Scoping Document relating to Shale Gas (as presented to the July meeting of the Community Focus Scrutiny Committee) was circulated at the meeting for further consideration. Members of the Group were of the opinion that the main focus of the review should be an understanding an appreciation of the regulatory and monitoring arrangements of the operations.

4. Business

A copy of a plan showing the areas/sites of all the shale gas operations within the borough was circulated at the meeting. In addition, a fact sheet (prepared by Cuadrilla) in response to the objectives set for the review and an information sheet detailing Cuadrilla's water use and disposal was also made available at the meeting.

The Scoping Document made reference to other key areas of evidence to be reviewed by the group. Members were reminded that as part of its review, the Select Committee Report on Shale Gas should be considered. An electronic copy had previously been circulated.

The Chairman made reference to a meeting that took place on the subject at the Town Hall with a concerned resident (Mr Hill). He explained that Mr Hill had previously offered to help FBC with respect to shale gas exploration issues. Members were advised that Mr Hill had experience in the gas and oil industry and had worked in Algeria and Libya.

It was reported that Mr Hill had provided some documentary evidence of correspondence that he had had with Cuadrilla, Environment Agency, Department of Climate Change , the Chairman of the Select Committee for the DECC Lancashire County Council on matters associated with Shale Gas drilling in the area.

Councillor Mulholland stated that one of the key areas that came out of the discussion was the fact that there appeared to be little or no regulation or any firm processes/ procedures in place to monitor Cuadrilla's activities on its three well sites. Essentially the company was self regulating with limited independent verification. Mr Hill found that there appeared to be significant differences between the answers to his questions from Cuadrilla and the various agencies. The key issue being that they all seem to be relying on the other to be executing the regulation but each had no idea if the other is actually doing so.

Mr Dickson reported that in the first instance, the group should consider interviewing appropriate representatives of Lancashire County Council's development control section. He made specific reference to various conditions set out within the planning decision notices and suggested that an appreciation of the detail would be beneficial to the group.

Councillor Mulholland felt that the pubic liability question had still not been addressed and in view of the fact that it had come to light that a subsidiary company (Bowland Resources Ltd) now had some involvement in the operations it was imperative that Cuadrilla provided further details on the level of public liability insurance.

Following consideration of the above, IT WAS AGREED:

1. To ask Mr Hill to present his report to the next meeting of the Group.
2. To invite appropriate representatives of Lancashire County Council's development control section to the next meeting of the Group to address members on matters associated with the planning decisions relating to the shale gas operations.
3. To seek from Cuadrilla details of its and Bowland Resources Ltd level of Public Liability insurance

5. Next Meeting

IT WAS AGREED that the next meeting of the Task and Finish group be held as soon as is practicable within the next few weeks.

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Tuesday, 27 September 2011 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillor Christine Akeroyd - Vice-Chairman - Community Focus Scrutiny Committee
Councillors Susan Ashton, Susanne Cunningham, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officers

Mark Evans - Assistant Director: Planning Services
Paul Rossington - Development Manager
Andrew Dickson - Head of Technical Services
Lyndsey Lacey - Senior Democratic Services Officer
Philip Dent - Principal Environmental Protection Officer

Other Representatives

Stuart Perigo - Lancashire County Council Development Management
Steve Molyneux - Environment Agency
Sarah Scott - Environment Agency

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships

BUSINESS

1. Apologies

Apologies were received from Councillor Tim Armit

2. Notes of previous meeting

IT WAS AGREED to accept the notes of the previous meeting held on 15 August 2011.

3. Introductions

The meeting commenced with introductions by all those present at the meeting.

4. Overview of the Borough Council's role in the Shale Gas Drilling Operations

Mark Evans (Assistant Director: Planning Services) and Paul Rossington (Development Manager) provided the group with an overview of the Council's role in the determination of county matter applications. A summary of the report including various examples is included as an appendix.

Phil Dent (Principal Environmental Protection Officer) then went on to provide an overview of the Council's role from the Environmental Health (Community Services) perspective. A summary of his report is also included as an appendix.

5. Overview of Lancashire County Council planning decisions

Mr Stuart Perigo, Group Head of Development Management at Lancashire County Council attended the meeting and provided the group with a comprehensive overview of the county planning process with particular reference to the underground investigations being carried out by Cuadrilla in Fylde borough.

The group were reminded that the following has the benefit of planning permissions in place.

- 5/09/0572 Preese Hall, Weeton
- 5/09/0813 Hale Hall Farm, Elswick
- 5/10/0091 Grange Road, Singleton
- 5/10/0634 Anna's Road, Peel, Westby

In a summary report (previously circulated) members were also advised that in addition to the above, planning permission had been granted for the following:

- 5/01/0685 Kirkham Prison – never implemented – extended by application below
- 5/07/0333 Kirkham Prison – never implemented – extended by application below

- 5/01/0184 Kirkham Prison – copy of decision notice attached

Application 5/11/0431 is the current application to extend the time period for completing investigations provided for by planning permission 5/09/0572.

Mr Perigo explained that generally some types of planning applications can be determined by the Executive Director of Environment (in accordance with the Council's Scheme of Delegation) and such delegation was extended to himself unless applications were to be refused, were contrary to policy, were accompanied by an Environmental Statement, where objections had been received, were the subject of a legal agreement and where there may be a conflict of interest with county councillors or officers. Others will be determined by the Council's Development Control Committee. He added that once an application has been submitted to the Development Management Group, it was checked to ensure it was valid. It was then given a planning application reference number and placed on their planning register and the register held by the district councils, which is open for inspection by the public. The application is then advertised and undergoes a statutory consultation procedure.

In the case of the shale gas applications, the Group was advised that the method of advertisement is prescribed by The Town and Country Planning (General Development Procedure) Order, 1995. It was explained that the consultation involved notifying and supplying copies of the application to the relevant consultees, either statutory, as prescribed by The Town and Country Planning (General Permitted Development) Order, 1995 or non-statutory, at the discretion of the planning authority. Mr Perigo explained that the applications were for boreholes to investigate the presence of shale gas which is defined as a hydro carbon and therefore fell to be determined by the County Council. He added that for developments of this nature, consultations would always include the likes of the Environment Agency and the district council and respective parish council, the highway authority and Natural England where proposals may effect the ecological importance e.g. SSSI. Mr Perigo further reported that non-statutory consultees may include such bodies as the water, gas and electricity undertakers, English Nature (statutory if the development affects a SSSI), Lancashire Wildlife Trust, MAFF, RSPB, CPRE etc. The Development Management Group also sought internal consultations to obtain further specialist advice on matters such as highways, landscape, ecology and archaeology. Mr Perigo went on to say that the opinion of the local community, parish councils and representatives from individuals are also taken into consideration. He explained that if the application was deemed acceptable then it would be subject to relevant planning conditions.

In terms of the monitoring arrangements, Mr Perigo confirmed that the County Council does undertake periodic monitoring of the site but was resource dependant. To date, Cuadrilla had complied with the planning conditions attached to their planning permissions. Fracking operations

have temporarily been voluntarily suspended by Cuadrilla following the association of their activities with ground movement in the area recorded and reported in the media as a minor earthquake and until such time as investigations had been carried out by the British Geological Survey.

The group asked various questions relating to the planning process and these related to: regulatory controls, the strength of some of the conditions imposed on the existing permissions, cross regulatory issues, monitoring/inspection arrangements, protection of groundwater services, breach issues/ enforcement arrangements, together with matters associated reactive and proactive work. These were addressed by Mr Perigo.

6. Overview of Environment Agency's role in the shale gas drilling operations

Steve Molyneux, Environment Manager Lancashire and Sarah Scott, Northwest Groundwater Technical Specialist attended the meeting and addressed the group on the role of the Environment Agency in relation to the shale gas operations.

Mr Molyneux explained that in England and Wales, the Environment Agency ensured that it applies appropriate regulatory controls aimed at preventing pollution and ensuring high standards of environmental protection.

Mr Molyneux stated that in relation to Shale Gas, the Environment Agency has principally 3 main roles:

- To determine whether the operation poses a risk to surface and ground waters. If there is a risk the Environment Agency will require the operator to apply for a permit. We may also require abstraction licences if the operator wanted to take water directly from the environment lakes rivers etc.
- To regulate discharges of fracking flow back water where an operator wanted to discharge directly back into surface or ground waters and to enforce waste management controls.
- As a consultee in the planning process advice to Local Authorities.

He explained that the Environment Agency understood that exploratory drilling has been completed at Preese Hall; is ongoing at Grange Road and is due to begin shortly at Becconsall. Fracking has been undertaken at Preese Hall since April; however following recent earthquakes in the area, Cuadrilla have suspended all fracking activities, awaiting the results of a seismic study by the British Geological Survey.

Mr Molyneux confirmed the Environment Agency have completed technical assessments for impacts on ground and surface water for three of the five sites – at Preese Hall, Grange Road and Becconsall (Talton, Nr Southport) and have not issued environmental permits at these three sites due to the low risks to surface and ground waters.

In all three cases he stated there was no deemed risk of water contamination. He added that the Environment Agency's Chemicals Assessment Unit had reviewed the chemicals used by Cuadrilla in its fracking fluid to ensure they were classed as non-hazardous for the purposes of groundwater protection.

Members were advised that should pollution or breaches of legislation occur the Environment Agency had all necessary powers to take appropriate action.

Mr Molyneux indicated that 15 Inspections had been carried out to date at the various sites. And samples of the fracking return waters taken.

The group asked numerous questions and sought further details on the Environment Agency's role in relation to this matter including: the % fracking water returns and associated ground water risks and how different types of aquifer are identified (hydrogeological impact assessments) bore hole integrity, depth of drilling together with information on the responsible body for Cement bond logs. These were addressed by the representatives of the Environment Agency.

7. Response from Cuadrilla - Public Liability Insurance

In response the Group's request at its last meeting, an overview of Cuadrilla and Bowland Resources level of public liability insurance was included as an appendix to the report.

IT WAS AGREED to seek more specific information from Cuadrilla on the matter.

8. Feedback from the reception hosted by Cuadriilla - Economic Benefit report

It was reported that various members of the Group took the opportunity to attend an event hosted by Cuadrilla at the Imperial Hotel, Blackpool on 21 September on the launch of their economic benefit report.
It was reported that Caudrilla had commissioned a report to assess the socio- economic impact of their operations both locally and across the UK. A copy of the report was made available at the event.

Members who attended the event gave positive feedback to the presentation.

9. Interim response from United Utilities

An interim response from United Utilities regarding the shale gas activities was circulated with the agenda. In brief, the company stated that in their view, there was no suggestion that that the shale gas project in the area posed a risk to groundwater sources used by United Utilities. The company went on to say that the groundwater which the company draws from geographically and geologically is entirely distinct from the location of the drilling operation.

10. Next Meeting

IT WAS AGREED that the next meeting of the Task and Finish group be held at the end of October at a date and time to be agreed.

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Wednesday, 19 October 2011 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillors Tim Armit, Susan Ashton, Susanne Cunningham, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officers

Andrew Dickson - Head of Technical Services
Mike Walker - Head of Public Protection
Lyndsey Lacey - Senior Democratic Services Officer

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig - Wilson - Chairman Policy Development Scrutiny Committee

Others Representatives

Mr Mike Hill (Technical Advisor)

BUSINESS

1. Apologies

There were no apologies received.

2. Notes of previous meeting

IT WAS AGREED to accept the notes of the previous meeting held on 27 September 2011.

3. Introduction

The meeting commenced with introductions by all those present at the meeting.

4. Report of Technical Advisor

Background

At the request of the Task and Finish Group, Mr Mike Hill (Technical Advisor) attended the meeting to address members on the technical aspects of the shale gas operations.

Mr Hill provided an overview of his professional chartered engineering background. He explained that he had been involved in the oil and gas/ fracking industry for several years during the nineties and had worked in both Algeria and Libya. His work had focused on the hydraulic fracturing operations in those countries and in Africa he had also acted the "independent competent person". He currently runs a control and automation business locally.

Mr Hill indicated that whilst he had not been involved in the industry for a number of years he had maintained a professional interest in the subject. He stated that whilst the IT side of things had moved on considerably in the fracking industry, the hydraulic fracturing and cement process had not seen quite such advances from the 93/94 period.

Documentary evidence

Mr Hill reported that he had been in regular contact with all the relevant bodies and made available at the meeting documentary evidence of correspondence that he had had with Cuadrilla, Environment Agency, Department of Energy and Climate Change, The Chairman of the Select Committee for the DECC, Lancashire County Council, The Health & Safety Executive and the local MP on matters associated with the shale gas drilling in the area.

Regulations

One of the areas of weakness highlighted by Mr Hill related to the regulation of the hydraulic fracturing industry. He advised that there appeared to be little or no regulation or any firm processes/ procedures in place to monitor Cuadrilla's activities on its three well sites. He added that outside the UK (in countries like the Middle East and North Africa) strong robust regulations and procedures had been developed for on-shore activities. He explained that as the majority of operations the UK were off-shore, the existing regulations were primarily related to those activities - ten of miles offshore and not on land and within metres of urban conurbations. He added that whilst the horizontal drilling process was the same for off shore/ on- shore, the main difference related to

public safety and the surrounding environment. It had become increasingly evident that there was a need for specific hydraulic fracturing regulations to be in place for on-shore activities and to complement this, responsible bodies should take overall responsibility for such matters.

Mr Hill further stated that there needed to be an urgent overview of the be an overview of the regulatory process with one body taking responsibility for ensuring all the other bodies were executing their tasks as required. He added that at the present time, all just assumed the others are regulating and there appeared to be considerable confusion between the authorities as to who is responsible for what. He went on to say that essentially the Company was self-regulating with limited independent verification. Mr Hill found that there appeared to be significant differences between the answers to his questions from Cuadrilla and the various agencies.

Announced / unannounced visits

Mr Hill further reported on the inspection arrangements at the various sites. He suggested that during his investigation, he had collected evidence to suggest that all the relevant bodes only undertook a 'light touch' approach to inspections. In the examples given, he suggested that the HSE had confirmed that that it had only made one announced visit and no unannounced visits. In addition, the Environment Agency had confirmed to him it had made one unannounced visit and all the remainder were announced. The period in question related to the very beginning of Cuadrilla's activities to the present date.

Water flow back

Mr Hill stressed to the group the importance attached to independent verification of the quantity water flow back. He stated that although this came under the remit of the Environment Agency, this was not done which in essence meant that there was no independent verification of the actual quantity of water flow back.

He went on to say that whilst Cuadrilla were seemingly doing all they could to be above board, without independent verification (if there was an issue) then the easy option would be to cover up and carry on. As no official body is verifying then this would not be difficult to do. He added that such corrective action as might be required by an independent inspection would normally be very expensive to correct.

Mr Hill stated that one his main concerns were that the operations were going to be within 200 meters of urban conurbations and the implication to public safety could be huge. He concluded by saying that the Environment Agency stance was that they did not consider such

operation risky as aquifers are not extracted for drinking water. There was also question raised about the lack of permits on the sites (there are none). In response, Mr Hill indicated that the Environment Agency did not consider permits to be necessary as the operations were deemed low risk. Likewise, as for regular examination of the well construction to confirm that it has been built to the plans approved by the HSE the body confirmed back that it is too expensive to inspect and a perceived to be a low risk anyway.

Cement Bond logs

Discussions took place about the requirements for cement bond logs (CBL) to be carried out. Mr Hill explained that the logs provide a representation of the integrity of the cement bond to the casing of the well and the borehole. It should identify whether the cement is adhering solidly to the outside of the casing. The log is typically obtained from one of a variety of sonic-type tools. The log is crucial when combined with other measurements (annular pressures etc.) to give a certain level of confidence that no gasses or liquids from the lower areas can find they way up, via the borehole and poor cement bonding, to the upper areas (Aquifer and surface).

Mr Hill explained that currently Cuadrilla was carrying out CBLs for the production area of the well (but such logs were not being undertaken for the intermediate or upper areas of the well. He added that it is these areas that need a CBL to be sure of no possibility of contamination of the aquifer. He suggested that there was some disagreement with the various bodies about who was responsible for such matters. HSE consider it to be a matter for DECC and DECC suggested it is the responsibility of HSE. Neither bodies insist on such logs being undertaken. Cuadrilla had intimated that they would be happy to undertake such logs but this would have to be done voluntarily and as this was not deemed important by the inspecting bodies. In addition, it would prove to be a costly exercise if no other companies or competitors were expected to do it. It was also suggested that Cuadrilla are pro regulation but in the absence of any pressure from DECC the company could do no more.

'Gaslands' film

A discussion took place about the Josh Fox 'Gaslands' film (the Halliburton-developed drilling technology of fracking or hydraulic fracturing in America) which the group were proposing to view later on that afternoon. He outlined some clear distinctions between the UK and America and stated that Cuadrilla had now introduced methane sensors. He referred to 168 cases of research which showed that whilst there was no certainty as to whether the methane was present in the water supply beforehand; in the majority of cases it was as a result of hydraulic fracturing. He also made reference to the Frac Act which was now being introduced in America to ensure strict regulation of the industry.

Of concern to Mr Hill was the fact that there were planned to be around 400 boreholes across the Fylde area and around 4,000 planned within the Lancashire/ UK area. In the absence of any robust regulations and procedures within the UK, other similar companies to Cuadrilla could look to set up in England without due concern for public safety.

Following consideration of the above, IT WAS AGREED to invite Mark Menzies MP, Mark Miller (Chief Executive of Cuadrilla) representatives of HSE and Mike Hill to the next meeting of the Group.

5. Next Meeting

IT WAS AGREED that the next meeting of the Task and Finish group be held as soon as is practicable within the next few weeks.

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Monday, 5 December 2011 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillor Christine Akeroyd - Vice-Chairman - Community Focus Scrutiny Committee
Councillors Susan Ashton, Tim Armit, Susanne Cunningham, Nigel Goodrich, Ken Hopwood,
Councillor Ben Aitken (substitute for Councillor Richard Redcliffe)

Officers

Andrew Dickson - Head of Technical Services
Lyndsey Lacey - Principal Democratic Services Officer

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig- Wilson

BUSINESS

1. Apologies

Apologies were received from Councillor Richard Redcliffe

2. Notes of previous meeting

IT WAS AGREED to accept the notes of the previous meeting held 19 October 2011 subject to the penultimate paragraph relating to announced / unannounced visits reading:

"In addition, the Environment Agency had confirmed to him that it had made one unannounced visit and all the remainder were announced."

3. Introductions

The Chairman commenced the meeting with an overview of the work of the group to date.

Councillor Goodrich made reference to a letter he had received from Mark Menzies MP in response concerns raised by him relating to shale gas matters. Councillor Mulholland asked that a copy be circulated to all members of the group.

4. Geomechanical Study of Bowland Shale Seismicity

Lyndsey Lacey (Principal Democratic Services Officer) introduced the report. In doing so, she asked members to be aware of the fact that BGS was not among the consultants who contributed to the report. BGS essentially advised on data related issues to the Government.

Attention was drawn to the summary and conclusion of the report which essentially states that it is likely that the hydraulic fracturing of Cuadrilla's Weeton well did trigger the two minor seismic events.

IT WAS AGREED to note the report.

5. Issues and Responses Statements

Lyndsey Lacey (Principal Democratic Services Officer) took the group through the various submissions received in reply to the Issues and Response Paper (previously circulated) These included submissions from the following bodies:

- Cuadrilla
- Department of Energy and Climate Change
- HSE (Off Shore Division)
- Environment Agency
- Lancashire County Council (Planning)
- United Utilities
- Technical Advisor

The Group went through the responses in detail and made the following interim comments:

- The necessity for independent inspection/ monitoring arrangements.

- When will the Government's analysis of the implications of the geomechanical report be reviewed/ known/ published?

- How do the Well Inspectors inspect the wells – how often do they do Cement Bond Logs?

- Once DECC have given consent for Cuadrilla to perform further fracking operations, how can we remain confident that other operators will conduct activities in a responsible manner.

- Co-ordination between fracking times. What arrangements are in place if there is more than one operator?

- It should be the responsibility of the HSE (not the company) to determine if and when the Cement Bond Logs are required to avoid self regulation and the need to ensure appropriate risk assessments are undertaken.

- Impermability of the strata below the surface – water left below the surface an issue.

- Radiological Impact Assessment - more information needed on the release of RADON.

In addition to the above, a suggestion was made by Councillor Threlfall that consideration be given to inviting Mr Martin Grayson (Geologist) to a future meeting of the Task and Finish Group.

6. Next Meeting

IT WAS AGREED that the next meeting of the Task and Finish Group be held on 14 December at 6pm

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SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Wednesday, 14 December 2011 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillor Christine Akeroyd - Vice-Chairman - Community Focus Scrutiny Committee
Councillors Susan Ashton, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officers

Andrew Dickson - Head of Technical Services
Lyndsey Lacey - Principal Democratic Services Officer

Other Representatives

Mark Miller - Chief Executive (Cuadrilla Resources)
Sam Schofield - Communications Advisor (PPS)
Leon Jennings - Health and Safety Director for Cuadrilla
Mike Hill - Technical Advisor

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig-Wilson - Chairman Policy Development Scrutiny Committee

BUSINESS

1. Apologies

Apologies were received from Councillors Susanne Cunningham and Tim Armit.

2. Introductions

The meeting commenced with introductions by all those present at the meeting.

3. Site Visit – Exploratory Well at the Hesketh Bank site

Councillors Nigel Goodrich and Ken Hopwood reported on their attendance at the recent site visit to the exploratory well at the Hesketh Bank site.

Various questions arising from the site visit were raised with the Chief Executive of Cuadrilla including: the 5 years exclusivity and licence arrangements, use of chemicals, partners and integrity of other companies.

In addressing these matters, Mr Miller made reference to the exploratory and full production arrangements and the requirements of DECC to produce a full Business Plan (Field Development Plan) if the company was to go into full production.

4. Issues and Concerns

Councillor Redcliffe stated that whilst there is increasing confidence of Cuadrilla being a responsible company, there are realistic concerns about the integrity of other companies wishing to set up in the area. In response, Mr Miller stated that the strong controlling mechanism for future arrangements would be Lancashire County Council (Planning) in that, all future developments would be subject to individual planning applications and in essence, other operators would need to demonstrate that they are doing things right. In addition, they would also need a DECC licence for the extraction phase.

Mr Miller went on to say that other interested companies could only be invited to operate (at the full production stage) in the Bowland Shale area when Cuadrilla relinquish 50% of its licensed area. He added that oil companies such as Shell and Exon had approached Cuadrilla to set the bar to confirm industry best practice was followed which he explained, would act as a potential competitor advantage. An example was given by Mr Miller of other companies working in other basins in the UK in particular, the shale basins in Wales whereby Cuadrilla had been asked for advice about best practice.

Mr Miller acknowledged that whilst he did have a good PR team who worked with residents and maintained safety factors built in to the operations, it was hoped that by setting the standard right as the company moved forward, future regulations would be carved out based on their good practice.

Councillor Mullholland made reference to the Halliburton incident and reiterated the importance of putting the right measures in place to ensure good practice is the norm.

A discussion took place about the number of wells anticipated. Mr Miller confirmed that there would be between 400 and 800 wells at the end of the process.

Mr Hill enquired about the 36 licence applications to drill in the UK. Mr Miller confirmed that Cuadrilla has an exclusive licence for the Bowland Shale area for 5 years and that it was only after that period other companies would have the opportunity to apply for licenses.

Mr Hill then went on to refer to Lancashire County Planning arrangements and suggested that as a body, it had no real experience of this type of hydraulic fracturing operations and was heavily reliant on the advice of DECC, HSE and EA to assist in its decision making. Mr Hill added that the latest regulations for this type of operation date from 1995 and are exclusively for off shore operations and not specific to the hydraulic fracturing industry. In addition, they do not relate to drilling near conurbations. In response, Mr Miller confirmed that the off shore regulations did apply to the on shore activities and that the HSE regulations relating to borehole integrity were also relevant and applicable.

Andrew Dickson asked for further clarification on the arrangements for well inspections and the role of the Well Examiner.

Mr Hill further reported that the HSE appeared to be tied up with Gulf of Mexico incident in that, many resources were focused on those off shore operations. He went on to suggest that such arrangements had an adverse effect on the inspection and monitoring arrangements of the wells. Essentially, such inspections were now falling to the Independent Competent Person – Well Examiner (appointed by Cuadrilla) which presented a challenge to impartiality and transparency. He was advised that such arrangements are not uncommon. Mr Hill added that there must be a tighter mechanism in place to ensure that technically Cuadrilla and other competitors are doing what they say they are doing.

Councillor Mulholland echoed that statement and suggested that the company is essentially determining everything that is required from the operational side of things to the written report stage. Mr Miller provided an assurance that Cuadrilla was meeting all requirements and did not want to violate trust.

Mr Hill stated that Tim Yeo had recently called for regulations but to date, the Government had not responded. In response, Mr Miller suggested that there could be some movement on that and it seems that the regulations (based on Cuadrilla's best practice) were forthcoming in particular on the water management side of things. He added that his

company continued to apply the right techniques and technology and that any recommendation would be included in the Field Development Plan.

Mr Hill further stated that as a result of the HSE not undertaking regular verification, inspection, monitoring or testing of the wells, it was felt that Caudrilla was over compensating for such matters. An example was given about Cuadrilla running extra Cement Bond Logs which are not mandatory under current regulations. Mr Hill made particular reference to the intermediate and upper areas. In response, Mr Miller referred to a questionnaire issued by DECC which sought the views of various operational companies about the use of Cement Bond Logs and the benefits of increased regulation with particular reference to those prescriptive regulations imposed on companies in the USA.

Mr Hill reiterated his concerns about the confusion between the various regulatory authorities (who should be regulating what) and the fact that there was no overall regulator. In addition, he referred to the produced water at sites and suggested that the Environment Agency was not checking the produced water for fracking chemicals or quantity of the flow back and it tended to rely on the number of trucks leaving the site. In response, Mr Miller pointed out that any flow back (including water intended for fracking but not used) had to have appropriate treatment.

Mr Hill suggested that there were 490 chemicals available in the UK for usage and that DECC would consider approving the use if asked. In response, Mr Miller stated that there were in fact 560 fracturing chemicals used around the world. He added that typically no more than 4 to 6 of these are ever used in a single fracturing treatment, and they are chosen based on the local water quality, and the wellbore and reservoir conditions. In Cuadrilla's case, they have been able to successfully fracture the Bowland Shale with only 1 chemical, a friction reducer that is used at a very dilute concentration.

Mr Hill also expressed his concerns about the amount and type of water left down the well and the fact that there was no real understanding of where that water goes or indeed whether it did come up the well. In response, Mr Miller stated that whilst he could not offer any guarantees, he was most certain that the water stayed at the bottom of the well. A discussion took place about condensate tanks. Councillor Goodrich mentioned that the Environment Agency had previously assured the group that the water could not come back up through the geology.

Councillor Redcliffe commented that if Cuadrilla is expected to set the bar on industry best practice, then the serious message is that off shore regulations are not adequate and that such factors need to be taken in to account.

Councillor Ken Hopwood sought further information on the recruitment requirements for each well site. Mr Miller confirmed that typically, there would be around 25 to 30 people on a rig site from the operational to support side of things and that such operators would be experienced in

the oil/ gas field. Mr Hill disputed the figures and suggested that when the well moved in to full production the work would be highly automated and the likely recruitment figures might not transpire.

5. Synthenis report of the Geomechanical Study of Bowland Shale seismicity

The Group sought the views of Mr Miller in respect of the recent seismic activity in the area.

Mr Miller confirmed it was likely that the hydraulic fracturing of Cuadrilla's Weeton well did trigger the two minor seismic events. He added that there appeared to be a correlation between the pumping/ volume of water and the level of seismicity. Mr Miller went on to say that as a result of this; various recommendations are being implemented including:

- Early warning detection system (traffic like system) A real time system can see minute size of seismicity even before GMS can detect e.g., If fluids enters a fault there is an ability detect etc

- Reduced volume and quicker flow backs

Mr Miller stated that there were no guarantees in science just probability factors and as such, the probability of recurrence once all the measures were in place was small.

In relation to this matter, Mr Hill stated that the seismic report concentrated on the production area of the well. Whilst it mentioned that everything was fine above 8,000 feet, there was no real evidence of this. In response, members were reminded of the findings of the report which showed the depth at which the tremor took place. It identified where the tremor had impacted on the well and this was found to be at the bottom of the well. There were general concerns about the cement standards used in the industry the associated problems of fracturing in the cement. In addition there were general concerns about fracking fluids and methane around the regional seal. Mr Hill suggested that there could be no guarantees if no Cement Bond Logs are taken. Mr Miller explained about the gradings relating to cement and confirmed that the cement that the company used was the same as used off shore (American Petroleum Institute (API) standard Mr Miller went on to say that the company now use a methane detector. For clarity, these monitor the aquifers as a protection so that if there are any issues they can be picked up quickly. It also enables them to determine a background level of methane.

Councillor Redcliffe asked what danger/ damage chemicals in the water could create in particular if water did get under the strata. Mr Miller stated that Cuadrilla had listed a total of 3 chemicals that could possibly be added to their fracturing fluid, but to date, only 1 has been needed. He also stated that the chemicals chosen by the company do not pose any risk because they are non-toxic / non hazadorous at the diluted concentrations used, and are essentially at the low end of hazardous

scale. Mr Miller then went through a list of Cuadrilla's fracturing chemicals, and gave examples of other day to day applications of these same chemicals, including purification of drinking water, use in the food industry, and use in cosmetics and other household products. He explained that the Environmental regulations require that all chemicals whether hazadourous or not need to be properly disposed of and classed as hazadourous waste/ treated as industrial fluid. Any thing that comes out of well bore is classed as hazadorous waste.

Following detailed discussion IT WAS AGREED:

1. At the Chairman's discretion to consider inviting a local geologist (Mr Martin Grayson) to the next meeting of the group to seek his views on the areas discussed.

2. To discuss further at the next meeting the issues identified above with a view to formulating recommendations to be incorporated in the final report.

6. Next Meeting

IT WAS AGREED that the next meeting of the Task and Finish group be held in the New Year at a date and time to be agreed.

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Wednesday, 29 February 2012 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillor Christine Akeroyd - Vice-Chairman - Community Focus Scrutiny Committee
Councillors Susan Ashton, Suzanne Cunningham, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officers

Andrew Dickson - Head of Technical Services
Lyndsey Lacey - Principal Democratic Services Officer

Other Representatives

Martin Rayson (Local Geophysicist)
Mike Hill - Technical Advisor

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig-Wilson - Chairman Policy Development Scrutiny Committee

BUSINESS

1. Apologies

Apologies were received from Councillor Tim Armit.

2. Notes of previous meeting

To approve the notes of the previous meeting held on 16 December 2011.

3. Introduction from the Chairman

The Chairman, Councillor Kiran Mulholland welcomed Mr Martin Rayson (local Geophysicist) to the meeting. In doing so, he asked for clarification on the roles of a geophysicist and geologist.

In response, Mr Rayson stated that the geophysicalist team would use techniques allowing them to help determine the stratigraphy which is primarily used help determine the potential for sedimentary rocks containing hydrocarbons.. He added that this work tended to be undertaken in the early stages of any exploratory work. He added that similar types of surveys (site surveys) were conducted to examine the integrity of near surface conditions such as soil, rock, groundwater and other natural conditions prior to major drilling or construction projects. .

In terms of the work of geologists, Mr Rayson advised that they are the scientists who study the actual rocks and rock formations that constitutes the Earth as well as the processes and history that has shaped it. The geological teams examine the rock samples recovered from the drilling process. Together the geophysicists and geologists also at the forefront of examining natural hazards and disasters and will assist, studying earthquakes, volcanic activity etc; their studies are used to warn the general public of the occurrence of these events usually engage in studying geology.

Mr Rayson then went on to refer to the geophysical studies undertaken in the Fylde in the 1980s which provided detailed information of rock structures to help determine the sites for the exploratory wells drilled then. He made particular reference to the well at Elswick, which has been extracting natural gas since 1996.

Mr Rayson advised that wells would tend to chosen from research previously undertaken/ recent surveys on subsurface structures and on advice received geologists in conjunction with geophysicists. These sites tended to be selected from 3D geophysical surveys such as the one commencing on behalf of Cuadrilla Resources by CGGVeritas.

4. Evidence of Local Geophysicist

By way of introduction, Mr Rayson indicated that as a general rule of thumb, oil and gas only occurs in a fairly limited number of geological structures although it is not an exact science, drill rigs would never be set up at random. Clear geological and geophysical evidence would be required prior to siting a drilling rig.

Mr Rayson then went on to refer to Cuadrilla's proposed new Geophysical Survey which was due to start imminently. He explained the survey is a study of the subsurface geology - that is, the various layers of rock beneath the surface. He explained that this would provide a better understanding/picture of the geological conditions beneath the proposed drilling locations and would yield a significant amount of knowledge of the

geological structures (beds / faults etc.) that occur within the bowland shale area and the formations below to a depth of normally around 5,000 to 15,000 feet.

Members were advised that using advanced imaging technology and other processes, the Survey will map the layers of rock in the region improving and enhancing the scientific and academic knowledge of the area's subsurface geology.

A full discussion took place about the various stages involved in the survey and the technical advanced methods that would be used during the process to determine the geographical extents and thicknesses of the shale bed formation.

Mr Rayson stated that although there is some understanding from the similar survey carried out around 30 years ago and from exploration exercises going back decades, improved technology will allow the Company to identify the depths of rocks, particularly the shale, in far greater detail.

This Geophysical Survey work, used alongside information from Cuadrilla's wells, will mean that future work can be better targeted, with fewer well pads recovering more gas.

Councillor Redcliffe asked whether the proposed survey would provide greater clarity on the commercial benefits v environmental concerns. In response, Mr Rayson stated that there was a lot to gain from the survey in that, it would provide better characteristics of the shale bed (e.g. what is its thickness) and as such, would result in less disruption to the locality and the environment and less redundant time. Mr Rayson added that ultimately, when the production drilling commences, the company would want to optimise their drilling program by drilling at as few sites as possible (with multiple wells drilled at each location / vertically and laterally) and only concentrating on those which are deemed economically viable. In essence, if the whole exercise went ahead, there would be far less impact and disruption in the areas concerned then people fear.

In addition, a discussion took place about the amount of drilling pads proposed to be used by the Company. Councillor Mulholland stated that the Company had originally talked about 400- 800 well sites being used. Mr Rayson stated that whilst the company may drill that many wells, what one has to consider is the number of sites from which the wells will be drilled.

Mr Hill commented that Cuadrilla had since confirmed that they were not going to drill more than 10 per pad and that 80 pads were proposed with 10 crews set up to drill these. However, this was yet to be confirmed as the exploratory program was far from complete.

Members commented about the potential exploitation of the remaining 50% of relinquished sites by other exploration companies which will come up in 2013. Mr Rayson stated that whilst DECC could invite other companies to take up the relinquished areas, less advantageous gas fields may prove unsound and not economically viable to other companies. There would be no guarantee that other companies would drill there at the moment. The Chairman clarified that this would be at the full production stage and not for consideration at this point. Mr. Hill pointed out that these sites may well be drilled and explored even if 'less advantageous'. This would put pressure of the finances of such a company but would not necessarily stop them drilling.

Councillor Mulholland asked whether the Survey would give the local residents greater comfort and a better understanding of risks particularly after the recent seismic events/ tremors. In response, Mr Rayson stated that the survey itself would give a better picture of the main fault lines and the subsurface geology. He further added that the tremors were largely caused by water pressures being pumped into the rock formations and that this was a learning curve for the Company. As part of their remit, the Geologists will monitor appropriate increase or decrease pressure in the areas being drilled to help determine any induced seismicity.

Councillor Goodrich commented about the accuracy of the Survey in that it appeared to suggest that it would provide crucial detailed information on rock structures and fault lines within the area which was definitive. Mr Rayson stated that all major fault lines would be identifiable from the seismic cube generated from the 3D seismic survey. He added that the Company will gain a substantial amount of information about the geological conditions as part of the exploration exercise.

Councillor Mulholland further enquired about the volumes of water that were being used during the fracking process with particular reference to the percentage of flow back and the percentage of water that stays down the well. He went on to say that concerns have previously been raised about the amount of chemicals used, issues of radioactivity and the quality of the regional seal. Mr Rayson confirmed that if water was going down such a depth then there was only two ways the water could return to the surface, either up the planes of major fault lines or back through the hole drilled. Mr Rayson stated that there were contrasting figures mentioned on the volume. Mr Hill confirmed that flowback is 50% at the moment and that the amounts of water pumped down the well was in the region of 2 million gallons.

Further to the above, a full discussion took place about the use of chemicals in the water and the associated transportation of water form the site. Mr Hill stated that currently Cuadrilla had elected to use 3 chemicals although DECC had licensed 509 for use in the UK. He added that the amount of NORM measured in the flowback has been recorded as between 10 Bq/L and 90 Bq/L. The max permissible (by the EA) is 1

Bq/L. So now (since 1st October 2011) the EA demands that all flowback water requires a Permit.

Councillor Redcliffe commented that Cuadrilla appeared to be setting the bar for other exploratory companies particularly with its support for a framework of legislation. In the absence of any legislation/ regulations, there would be concerns that other companies would not keep to the same standard as set by Cuadrilla.

A full discussion took place about the self regulation and environmental impact requirements. Mr Hill reiterated that the regulations were only really applied to offshore exploration and were outdated. Cuadrilla had made it clear that as a Company they are fully supportive of increased regulations by DECC, EA, HSE etc and as such, would like to see them introduced for the quality of cement, formation integrity tests, CBLs, the methane detectors, tremor actions etc. The Chairman reemphasised that the main issue appeared to be about better regulations and monitoring of on site activities. Comparisons were made with the USA where there had been a big turn around of requirements. Ideally to meet safety regulations there should be private independent verification at key milestones of the drilling process etc and an active presence on site.

Councillor Threlfall made reference to a meeting that he had had with Mark Miller, Chief Executive of Caudrilla who shared the Council's concerns about regulations and monitoring.

Councillor Mulholland stressed the importance of companies being fully aware of the requirements/ risks before going into full production. Further to this Councillor Redcliffe stated that the Council was in a precarious position in scrutinising this matter. He had cautious optimism in that it was essential to ensure that the local population were safeguarded as well as enabling opportunities. There was no room for complacency or a laissez faire style of management.

Mr Rayson endorsed this and suggested that if the Council wanted to fulfil its duty of care then it needed to ensure that appropriate regulations were in place.

A further discussion took place about the need to set up specialist independent monitoring/ audit position which would act as a third party to ensure the ongoing regulation and monitoring. It was suggested that a levy be set (which is ring fenced) and is paid for by the exploration companies for such purposes.

In conclusion, the Chairman made reference to some suggested recommendations put forward by Councillor Hopwood and Mike Hill and asked that they by emailed to all concerned prior to the next meeting.

Following detailed discussion IT WAS AGREED note the report at this stage to allow further debate and the formulation of conclusion/recommendations at the next meeting.

5. Next Meeting

IT WAS AGREED that the next meeting of the Task and Finish group be held in on 14 March in the Reception Room at the Town Hall, St Annes commencing at 5pm.

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Thursday, 14 March 2012 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland – Chairman – Community Focus Scrutiny Committee
Councillor Christine Akeroyd – Vice-Chairman - Community Focus Scrutiny Committee
Councillors Susan Ashton, Susanne Cunningham, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officers

Paul Rogers

Other Representatives

Mike Hill – Technical Advisor

Observers

Councillor Thomas Threlfall – Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig-Wilson – Chairman – Policy Development Scrutiny Committee

BUSINESS

I. Apologies

Apologies were received from Councillor Tim Armit.

2. Discussion and Conclusions

Councillor Kiran Mulholland reminded Members that the previous meeting had not been able to provide any conclusions in relation to the Shale Gas issue but that he was hopeful that the group would be able present appropriate recommendations to Scrutiny committee at this meeting.

Mike Hill, Technical Advisor, submitted a list of recommendations (a copy of which is attached to these notes) for consideration by the group.

Councillors Ken Hopwood, Nigel Goodrich and Richard Redcliffe also submitted separate lists of recommendations (copies of which are attached to these notes). The Group was in agreement that Councillor Hopwood's recommendation for the moratorium in order to evaluate all activities surrounding shale gas would effectively close down the shale gas drilling in the north west for at least 3 years. Councillor Hopwood took the view that the reasoning for his recommendations was to enable all the organisations to consult each other and to form a way forward with appropriate regulations in place thereby safeguarding residents of Fylde. Members were not in favour of a moratorium.

Councillor Mulholland reminded the group that any form of monitoring by the Health and Safety Executive and Environment Agency does cost money and that one way to fund those agencies would be to impose a levy on exploratory operators thus providing such funding.

Councillor Mulholland suggested to Members that Mike Hill's recommendations took on board the points made in Councillor Hopwood's recommendations but excluded the suggestion of a moratorium. He was of the view that a moratorium would not be the best way forward due to central government's current stance with regard to the shale gas drilling in the north west. He further suggested that it would be in the Council's interest to inform the government that provided the contents of its recommendations on the way forward on the shale gas issue were put in place immediately, the Council would not proceed with a recommendation for a moratorium. This would then suggest that the Council had not dismissed the possibility of requesting a moratorium.

Councillor Redcliffe stated that the concerns of the group were for Fylde residents and that even though the Council would not have any control over certain elements of the shale gas drilling, the Council had to be satisfied that the government viewed health and safety issues as paramount. He added that the Task and Finish Group had underlined the necessity for regulation and monitoring to be put in place.

Councillor Thomas Threlfall advised the group that as portfolio holder for Environment and Partnerships, he would be writing a letter to the appropriate government department regarding issues relating to the shale gas drilling. He asked Councillor Mulholland if he would help prepare the letter. Councillor Mulholland informed Councillor Threlfall that with the agreement of the Group he would gladly participate in writing the letter. He added that he would use the final recommendation of the Task and Finish Group as approved by Scrutiny and Cabinet as his basis to help write the letter.

The Task and Finish group agreed that

(i) Councillor Mulholland, in consultation with Lyndsey Lacey, prepare a draft recommendation which will take on board the suggestions made by Mike Hill, Councillors Hopwood, Goodrich and Redcliffe with any reference to requesting for a moratorium on the shale gas drilling being on the basis that the government does not agree to regulation and monitoring as suggested by the Council and such recommendation to be submitted and agreed by the Task and Finish Group at its next meeting; and

(ii) The next meeting of the Group be held when the recommendation referred to in (i) above is ready for consideration.

SHALE GAS TASK AND FINISH GROUP

Notes of a meeting of the Shale Gas Task and Finish Group held on Monday, 23 April 2012 at the Town Hall, St Annes.

PRESENT

Members

Councillor Kiran Mulholland - Chairman - Community Focus Scrutiny Committee
Councillor Christine Akeroyd - Vice-Chairman - Community Focus Scrutiny Committee
Councillors Tim Armit, Susan Ashton, Nigel Goodrich, Ken Hopwood, Richard Redcliffe

Officers

Ian Curtis – Head of Governance
Andrew Dickson - Head of Technical Services
Lyndsey Lacey - Principal Democratic Services Officer

Other Representatives

Mike Hill - Technical Advisor

Observers

Councillor Thomas Threlfall - Portfolio Holder for Environment and Partnerships
Councillor Fabian Craig-Wilson - Chairman Policy Development Scrutiny Committee

BUSINESS

1. Apologies

Apologies were received from Councillor Susanne Cunningham.

2. Notes of previous meetings

To approve the notes of the previous meetings held on 29 February and 14 March 2012.

3. Preese Hall Shale Gas Fracturing – Review and Recommendations for Induced Seismic Mitigation

In advance of the meeting, members of the Group were provided with a copy of the report "Preese Hall Shale Gas Fracturing: Review & Recommendations for Induced Seismic Mitigation" published by the Department for Energy and Climate Change on 17 April. The report, by a panel of independent experts, examined the causation of the seismic events experienced last year during hydraulic fracturing ("fracking") operations at Preese Hall, and made recommendations to mitigate the risks of similar events in future fracking operations.

The group was advised that DECC had asked for responses to the recommendations by 25 May.

Following detailed discussion IT WAS AGREED to write to DECC along the lines agreed at the meeting incorporating the recommendations to be contained in the full report.

4. Recommendations arising from the work of the Task and Finish group

A full and comprehensive report of the recommendations arising from the work of the Task and Finish Group was circulated with the agenda for consideration.

IT WAS AGREED to incorporate the recommendations in the final report subject to the amendments/ modifications made at the meeting.

5. Draft Final Report – Shale Gas

A copy of a draft final report on the findings of the Task and Finish group was circulated with the agenda for members' consideration. The Group was advised that the document was work in progress and that any additional comments/detail to be included in the report would be welcomed.

IT WAS AGREED to make appropriate arrangements to submit the final report including the findings and recommendations of the Shale Gas Task and Finish Group to a Special Community Focus Scrutiny Committee on 17 May 2012.

Responses to Task and Finish Group enquiries

ISSUE ONE

A) Issues have been raised about the fact that the Government has no specific regulations on "unconventional"frackinggasoperations)explorationandthatthere is (a heavy reliance on old regulations developed for "off shore" wells.

B) Who is the regulatory authority inspecting the Cuadrilla operations? It is suggested that no government body has overall responsibility for monitoring the operation sites. On this very point, there appears to be confusion between the DECC, EA and HSE about who has responsibility for what.

A lack of government regulation has been widely blamed for explosions and pollution in the US, where hydraulic fracturing or "fracking" is taking place. France, Switzerland and several US states have banned fracking, but British ministers and officials in the DECC insist no additional regulation or delay is needed.

C) In addition, the recent energy and climate change select committee inquiry into shale gas did not consider tightening regulations, citing a lack of resources.

Cuadrilla Response

A) There are no special issues with respect to wellbore design and construction that are unique to unconventional reservoirs. As such, the UK onshore regulations for drilling into conventional reservoirs are completely applicable to drilling into unconventional reservoirs. The regulations that apply to Cuadrilla‟s onshore Bowland Shale drillingto governpro all UK onshore operations, with the Elswick well (which was hydraulically fractured in exploration activities in Wytchestablished Farmexamples. in the 90‟s

Hydraulic fracturing is used on both conventional and unconventional wells. While the overall procedure is very similar for injection water and sand into a reservoir (whether its sandstone, limestone, dolomite, coal, shale,), the one aspect that is different for shales is the size of the fracturing job, and the volume of water used. With that said however, there are a lot of conventional reservoirs around the world that are fractured with volumes equal to, or greater than what is used in a typical shale job. But in general, shale fracturing jobs require more water that for typical conventional reservoirs, and that results in more water that is produced back to surface. In the UK the EA closely monitors and regulates all of our activities with respect to the chemicals added to our fracturing fluid, as well as the composition of any fluid that is returned to surface. They also regulate the on-site storage, transportation and disposal of all fluids that are produced from the well following a fracturing treatment.

Additionally, we now know that we must take special precautions to monitor seismicity associated with our hydraulic fracturing operations in the Bowland Shale. This is not an issue with other shale operations around the globe, and may be isolated only to the Preese Hall well. But if we are given approval to re-start fracturing operations it will be granted subject to having a very robust seismic monitoring system in place, along with reporting requirements and maximum allowable seismic limits. At this point we do not know which regulatory body will be responsible for oversight of the seismic monitoring and reporting, but we would expect it will be assigned to the HSE.

B) That is correct, there is no single regulatory authority that looks after every aspect of the well, but this is consistent with oil and gas operations in other countries throughout Europe. In the UK there are 4 regulatory bodies that oversee our operations. The DECC is responsible for granting exploration and

production licenses, and ensuring that all license terms and conditions are met. HSE is responsible for ensuring that the well design and construction meet the highest industry standards, and that all work is carried out in a safe manner, and that wellbore integrity is intact.. The EA is responsible for ensuring that groundwater protection procedures are in place, and that operations at the surface comply with all environmental regulations, and the terms and conditions of waste handling permits. And local temporary planning permission for the Bowland Shale project has been granted by Lancashire County Council (LCC) with a number of project-specific requirements including ecology studies and transportation, lighting and noise surveys.

C) The Energy and Climate Change Select Committee Inquiry into shale gas exploration did not recommend tighter regulation as the Committee believed existing legislation was sufficient. However, we stand by statements we have made previously, that we would welcome any future regulatory revisions to may be implemented, and we stand ready to provide constructive opinions, if asked to do so by any of the regulatory authorities.

ISSUE TWO

A) It has been suggested that various environmentalists and engineers fear that shale gas extraction will destroy the environment, potentially devastate water supplies near where fracking takes place (because methane or chemicals used in the process could leak into ground water) and generally make people"s lives a misery in many places.

Cuadrilla Response

A) Cuadrilla is aware of the view held by campaigners and some members of the public.

As stated above, our operations have been approved by a number of regulatory authorities. The method used to extract gas is no different from that employed in the hundreds of wells drilled in the UK for decades, *except* for the formation it is extracted from. To ensure the aquifer is protected, our wells feature three layers of casing (each with a cement bond) which extends at least 500 ft below the aquifer.

The few cases of water contamination reported in the US were due to a poorly constructed well which allowed the leakage of gas into shallow formations, including the aquifer, due to the well having fewer casings. Cuadrilla incorporate the use of an intermediate casing which was recently made a requirement by New York state in their recommendation to allow hydraulic fracturing to resume.

ISSUE THREE

A) It has been suggested that an Environment Impact Assessment/Survey should have been conducted by the Environment Agency or Lancashire County Council. Who has such responsibility? Has this been done? If not, what are the implications?

Cuadrilla Response

A) If an EIA is required, it is the responsibility of the applicant to provide this; however, one was not required in this instance. However, it is our understanding that an EIA will be required before we are given approval to proceed with a field wide development and production.

With respect to Cuadrilla"scurrentexploration program, our site selection policy is to choose sites which adhere (as closely as possible) to the following criteria in order to have a minimal effect on the

surrounding area:

- Away from population centres
- Not in areas of outstanding natural beauty (AONB) or Site of Special Scientific Interest (SSSI)
- Good transport links
- An amenable landowner

In addition, as Cuadrilla"s operations onlygger theo requirement for an EIA (which the applicant is responsible for submitting).

Other issues that would trigger an EIA is the process beyond the exploration phase, in an AONB, within a SSSI, within an ancient woodland, i.e. an area where a site/operation is likely to damage the environment or protected species.
During Cuadrilla"ssitesearch,thecompany considers all these aspects and many more and selects a site which fulfils its criteria and is of geological interest. Following this, a screening opinion is prepared before it is submitted it to LCC for their judgement as to whether they agree that an EIA is not needed.

ISSUE FOUR

A) There is some dispute about the amount of announced/ unannounced inspections made at the operational site. What inspections to date have been carried out by the responsible bodies? How many announced/unannounced inspections have been made?

Cuadrilla Response

A) Cuadrilla does not distinguish in its record keeping between unannounced and announced visits, therefore, the committee will have to rely on the EA and HSE for this information. However, we estimate that the EA makes site visits 8 to 12 times each month.

ISSUE FIVE

A) There is still no outcome on the possible links between the small earthquakes and the fracking operations. When is the BGS report due?

Cuadrilla Response

A) The report was commissioned in early June 2011 following on from discussion with DECC about the second seismic event near the Preese Hall well.

The report was authored by a team of independent experts in relevant fields and was led by Dr Hans de Pater of StrataGen and was made public on 2nd November. After careful analysis, it is concluded it is highly probable that the fracing at Preese Hall-1 well triggered the minor seismic events due to an unusual combination of factors including the specific geology of the well site, coupled with the pressure exerted by water injection.

To ensure the effect of seismicity is minimised, the report recommends adopting a real time “early detection system”.Widely used in the Netherlands and Germany, the system will ensure that should there be any repeat of events that led to the tremors in April and May, we can recognise them very early and take mitigating actions that we know will work.

The report is now being reviewed by the BGS and DECC, with regulators needing to be comfortable

with the report‟s conclusions and recommendati be made.

ISSUE SIX

A) How can we be sure of the prevention of water pollution below the surface? Which body is responsible for confirming such matters?

B) There are environmental concerns about the release of methane and the potential for the chemicals used in the wells to contaminate water either through cracks forced open in the rocks by the fracking process, explosions from the release of methane gas or through drilling bores through aquifers.

Cuadrilla Response

A) As a gas exploration company, Cuadrilla‟s pr and prevent any accidental leakages, with the EA being the body charged with monitoring this.

B) Ensuring good well bore integrity is fundamental in preventing any unplanned release of well fluids or gas to the atmosphere or to other shallow formations underground. It is important to highlight that the standards for wellbore design and construction are identical for all types of oil and gas reservoirs, whether the reservoir is comprised of sandstone, shale, limestone, dolomite, etc.

By running the layers of metal casing that are each lined with cement, Cuadrilla is able to protect the aquifer during the exploration and extraction process.

In terms of gas leaking through gas bearing zones, the Manchester Marl (a thick impermeable formation) is the Bowland Basin‟s regional sea

The depth of this shale rock and its low permeability (it is these very characteristics which facilitates the pressure needed to yield large volumes of gas), gas is unable to escape from the formation via the *naturally* occurring and induced fractures into shallower formations.

The perforation zones created during the fracing process creates a pathway of least resistance, which allows gas to flow through the sealed well to the wellhead during the production phase.

ISSUE SEVEN

A) There are general concerns about well integrity (particularly on the cement casings of the boreholes) and the associated checks undertaken. Proper casing and cementing of oil and gas wells is very important to protect water supplies and improve public safety.

B) It is understood that current rules do not provide enough details on safely casing and cementing wells. Also, existing rules do not address the need for an immediate response by operators to a gas leak complaint. And, they do not require operators to inspect wells regularly. It is also understood that verification of an individual well is not the role of the HSE as the resource implications would be immense. The “Well Inspector” is an employee o

C) In addition to the above, it is also unclear as to who is responsible for Cement Bond Logs and that regular logs are not undertaken. Is the Company self regulating?

Note: *Tim Yeo, chair of the Commons energy select committee that investigated shale gas exploitation earlier this year, accepts that there is a potential conflict of interest if companies self-monitor: "We concluded that while there is a risk of conflicts of interest affecting the judgment of independent competent persons (ICPs) who assess the design of wells, we had no evidence of such conflicts presented to us," he wrote.*

Cuadrilla Response

A) As highlighted above, achieving good well integrity is essential in mitigating the environmental risks associated with oil and gas exploration. See the Well Integrity included as an appendix.

B) Detailed information about the design o http://www.cuadrillaresources.com/ but in the interest of brevity, can say that a conscious decision was made to over-design our wells. Whilst the Well Examiner is paid a very small fee by Cuadrilla (typically less than £1000), this person is obliged to independently assess the design of wells, with all gas and oil exploration companies going through this process; the practice of paying for independent sign-off is common practice. [1]

The HSE will have to feel comfortable with the Examiner‟s as the necessary permit from DECC.[2] Additionally, the HSE employs its own Well Inspector. Oil and Gas companies are required to provide weekly reports (every Monday by 15:00 hours) to the HSE Well Inspector, and the report must accurately relect every detail of the weekly operations.

C) Proper well design and well construction ensures water contamination is prevented. A Bond Log simply guarantees the effectiveness of the frac treatment and therefore the commercial viability of the well.

Our policy regarding bond logs is to run them on surface and intermediate casings if we do not get circulation back to surface, or if we incur problems with getting a good cement mix during the cementing job. For our production casing we automatically run those to identify any place where a poor bond may exist due to hole washouts, etc. If we did actually identify any poor bond quality, our policy is that we would prepare a remedial cement program, submit to our independent well examiner for review, then notify the HSE before we proceed.

Bond logs are to be submitted with all other well data in the End of Well Report that is sent to DECC when a well is finished.

ISSUE EIGHT

A) Unclear understanding of the monitoring arrangements conducted by the company to monitor, measure or analyse the pollutant liquids that come back up the boreholes

[1] A useful analogy would be when drivers pay a mechanic to MOT test their car before the Vehicle and Operator Services Agency provides a certificate.

[2] Cuadrilla would be happy to explain this process, however, feel that this should be done by DECC. Should the Committee remain unclear, Cuadrilla will provide more information about this.

Cuadrilla Response

A) When our water arrives from United Utilities, it is stored in clean steel tanks.

From 1st October 2011, the EA introduced new regulations which now means that flowback fracing fluid will be subject to a permitting regime. Cuadrilla will be applying for a permit in due course.

It is important to highlight that only the fracing fluid will be subject to a permit. All other waste water, including drilling mud, will not require a permit under the new regulations.

All of Cuadrilla‟s waste water-approvedwillwatercontinuedisposalcompany before being tested and treated by a wastewater treatment plant.

ISSUE NINE

A) What is the likelihood of permanent planning permissions being applied for in the area?

Cuadrilla Response

A) After the careful analysis of the data received from the Weeton and Singleton wells, Cuadrilla estimates 200tcf of gas-in-place in the Bowland shale. If 10 per cent of this amount could be extracted, this would significantly aycontributleadtocheaper energy bills and significant investment in Fyl

Commercial production is subject to the resumption of fracing operations and further exploration; if a decision to proceed with production was made, permanent planning permission would be sought.

Continuing with the company‟s open communicat consult with residents and stakeholder prior to the submission of the planning application and a license application to DECC. During this time, the company would work with local stakeholders to ensure the community benefitsareafrom. Cuadrilla‟s

As a result of Fylde being the hub of our operations, there would be significant investment from the company and our suppliers. The findings of an independent report commissioned by Cuadrilla found that around 1,700 jobs may well be created in Lancashire in a production scenario. In addition to the amount the Exchequer would receive in taxes, proposals from the Coalition government would see local councils, such as Fylde Borough Council, receive a portion of the business rates Cuadrilla pays to LCC.

Cuadrilla firmly believes that if operations moved to the production phase, Fylde would witness the long-term clustering of training and service industries (so-called „Aberdeen significantly benefit from operations.

ISSUE TEN

A) The 2010 U.S. documentary film „Gasland‟, which focuses on the i critical of the industry's assertions of its safety and its exemption from the Safe Drinking Water Act in the Energy Policy Act of 2005.

B) It highlights that chemicals are added to the water to facilitate the underground fracturing process that releases natural gas. Only about 50% to 70% of the resulting volume of contaminated water is recovered and stored in above-ground ponds to await removal by tanker. The remaining "produced water" is left in the earth where it can lead to contamination of groundwater aquifers, though this is highly unlikely.

Cuadrilla Response

A) *Gasland* was an incredibly provocative and captivating film, however, was littered with inaccuracies which have since been rebutted by state agencies in the US. The Frac Act introduced in the US will require exploration companies to make public the composition of their fracing fluid, something Cuadrilla already does (see above)

While Cuadrilla recognises that there have been rare cases of bad practices in the US, the oil and gas industry in the UK is subject to stringent regulation.

B) In terms of the „chemical cocktail" claims approved and is comfortable with the use of the ingredients (mainly water and sand) in our fracturing fluid. Although Cuadrilla is permitted to use three chemicals in the fluid (polyacrylamide, hydrochloric acid and a biocide), only polyacrylamide has been used during operations[3]

Over the next 50 years, around 30-40 per cent of the water used will be produced back, but as far as being able to leak back to the surface, it cannot physically go through 5,000 feet of solid rock and find its way into the aquifer, nor through the three layers of casing and cement which lines the well.

The only pathway for this to happen is if there is a faulty well bore due to a poor well-design. If the wells are properly designed and the right cas chance of the water finding its way into a shallow zone (such as the aquifer) is eliminated.

Regarding the contamination of rock formations-off"-waterwhich goes into the matrix of the rock. Due to shal this formation, therefore, during the fracing phase water wets the face of the fracture (which is held open by sand grains).

Water tends to stay in the sand pack, then water wets the sand grains and wets the face of the fractures. As a result, only a miniscule amount of the actual matrix of the rock is wetted, which is why the water flows back easily.

[3] Cuadrilla"s fracing fluid is a minimum - of0.25% 99iscomprised.75% of waterthree and sa additional ingredients:

- Around 0.075% is a friction reducer called Polyacrylamide, which can be found in facial creams, soil sealants, and contact lenses

Two other additives may be used:

- Around 0.005% is a biocide used at this very low concentration. This will be used if and only if the domestic water from United Utilities is not pure enough; therefore if the water is sufficiently pure, the biocide will not be used
- Around 0.125% is a weak hydrochloric acid to help open the perforations to initiate frac fluid injection and again will only be used if needed. This is the same acidmulatethatwaterproduction,can andbein used in some cases used in swimming pools. It is also the food additive E507 that is commonly used in UK food products

Response from Department of Energy & Climate Change

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE ONE

Issues have been raised about the fact that the Government has no specific regulations on "unconventional" gas exploration (fracking operations) and that there is a heavy reliance on old regulations developed for "off shore" wells.

Who is the regulatory authority inspecting the Cuadrilla operations? It is suggested that no government body has overall responsibility for monitoring the operation sites. On this very point, there appears to be confusion between the DECC, EA and HSE about who has responsibility for what.

A lack of government regulation has been widely blamed for explosions and pollution in the US, where hydraulic fracturing or "fracking" is taking place. France, Switzerland and several US states have banned fracking, but British ministers and officials in the DECC insist no additional regulation or delay is needed.

In addition, the recent energy and climate change select committee inquiry into shale gas did not consider tightening regulations, citing a lack of resources.

As for all other industrial activities, including major-hazard industries such as oil refining and nuclear power, there is no single body which has responsibility for all regulation of oil and gas exploration and production activities, including unconventional gas. So far as England and Wales are concerned, each of the HSE, the Environment Agency and DECC have responsibilities relevant to oil and gas activities, and each conducts monitoring of these activities, within the framework of the relevant legislation, which is appropriate to its responsibilities. As regards inspections, see the response to Issue 4 below.

On the experience in the US, the Committee may find it helpful to look at the 90-day report of the US Secretary of Energy's Advisory Board shale gas production subcommittee, published on 11 August (available at

http://www.shalegas. energy.gov/resources/081111_90_day_report.pdf). Though this recommends various measures to encourage adoption of best practice by companies active in shale gas development, and to secure better coordination between regulators, it notes that

> "Opponents point to failures and accidents and other environmental impacts, but these incidents are typically unrelated to hydraulic fracturing *per se* and sometimes lack supporting data about the relationship of shale gas development to incidence and consequences."

So far as the UK is concerned, the regulatory agencies concerned have long experience of regulating oil and gas operations, including hydraulic fracturing. The HSE, the Environment Agency and DECC are also working closely together to ensure a common understanding of the issues raised by shale gas operations. Information on DECC's website sets out the sequence of permissions and relevant responsibilities at each stage – see https://www.og.decc.gov.uk/information/onshore.htm ("Summary of the roles of regulatory agencies" and "Diagram to describe the roles of regulatory agencies").

Against this background, the Government sees no need for a moratorium on shale gas exploration, though fracking activities are currently suspended while the recent seismic activity is assessed. The Energy and Climate Change Committee likewise was of the view that no moratorium was necessary. However, the Committee's comments on this point did not mention resources – see paras 12-17 of the report, available at http://www.publications.parliament.uk/pa/cm201012/cmselect/cmenergy/795/79505.htm#a4

ISSUE TWO

It has been suggested that various environmentalists and engineers fear that shale gas extraction will destroy the environment, potentially devastate water supplies near where fracking takes place (because methane or chemicals used in the process could leak into ground water) and generally make people's lives a misery in many places.

Largely issues for the Environment Agency, though issues such as noise, lights, traffic movements, etc. are for the planning system.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE THREE
It has been suggested that an Environment Impact Assessment/Survey should have been conducted by the Environment Agency or Lancashire County Council. Who has such responsibility? Has this been done? If not, what are the implications?
The legal requirements for EIAs relate to the grant of planning permission, and are therefore a matter for the planning authority.

ISSUE FOUR
There is some dispute about the amount of announced/ unannounced inspections made at the operational site. What inspections to date have been carried out by the responsible bodies? How many announced/unannounced inspections have been made?
DECC has not conducted any inspection of Cuadrilla's operations. A DECC official was present when the Minister of State, Charles Hendry MP, visited Preese Hall and Grange Hill on 11 March 2011.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE FIVE
There is still no outcome on the possible links between the small earthquakes and the fracking operations. When is the BGS report due?
Cuadrilla delivered on 2 November its geomechanical report on the recent seismic events. It is available at http://www.cuadrillaresources.com/cms/wp-content/uploads/2011/11/Final_Report_Bowland_Seismicity_02-11-11.pdf (For clarity, the BGS was not among the consultants who contributed to the report, but they are advising DECC on the report and related issues.) The Minister of State at DECC, Charles Hendry MP, stated in a Westminster Hall debate on 3 November that the implications of the report will be reviewed very carefully, in consultation with the British Geological Survey, independent experts and the other key regulators, before any decision is made on the resumption of these hydraulic fracture operations. (The record of the debate is at http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm111103/halltext/111103h0001.htm#11110367000002)

ISSUE SIX
How can we be sure of the prevention of water pollution below the surface? Which body is responsible for confirming such matters? There are environmental concerns about the release of methane and the potential for the chemicals used in the wells to contaminate water either through cracks forced open in the rocks by the fracking process, explosions from the release of methane

gas or through drilling bores through aquifers.

Largely issues for the Environment Agency.

ISSUE SEVEN

There are general concerns about well integrity (particularly on the cement casings of the boreholes) and the associated checks undertaken. Proper casing and cementing of oil and gas wells is very important to protect water supplies and improve public safety. It is understood that current rules do not provide enough details on safely casing and cementing wells. Also, existing rules do not address the need for an immediate response by operators to a gas leak complaint. And, they do not require operators to inspect wells regularly. It is also understood that verification of an individual well is not the role of the HSE as the resource implications would be immense. The "Well Inspector" is an employee of the operating company and not independent.

In addition to the above, it is also unclear as to who is responsible for Cement Bond Logs and that regular logs are not undertaken. Is the Company self regulating?

***Note**: Tim Yeo, chair of the Commons energy select committee that investigated shale gas exploitation earlier this year, accepts that there is a potential conflict of interest if companies self-monitor: "We concluded that while there is a risk of conflicts of interest affecting the judgment of independent competent persons (ICPs) who assess the design of wells, we had no evidence of such conflicts presented to us," he wrote.*

These are questions for the HSE.

ISSUE EIGHT

Unclear understanding of the monitoring arrangements conducted by the company to monitor, measure or analyse the pollutant liquids that come back up the boreholes

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

This is a question for the Environment Agency.

ISSUE NINE What is the likelihood of permanent planning permissions being applied for in the area?
Not a question within DECC's responsibilities. Only Cuadrilla can comment on their future intentions.

ISSUE TEN The 2010 U.S. documentary film 'Gasland', which focuses on the impact of hydraulic fracturing, is critical of the industry's assertions of its safety and its exemption from the Safe Drinking Water Act in the Energy Policy Act of 2005. It highlights that chemicals are added to the water to facilitate the underground fracturing process that releases natural gas. Only about 50% to 70% of the resulting volume of contaminated water is recovered and stored in above -ground ponds to await removal by tanker. The remaining "produced water" is left in the earth where it can lead to contamination of groundwater aquifers, though this is highly unlikely.
These are issues for the Environment Agency.

Response from the Environment Agency

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE ONE

Issues have been raised about the fact that the Government has no specific regulations on "unconventional" gas exploration (fracking operations) and that there is a heavy reliance on old regulations developed for "off shore" wells.

Who is the regulatory authority inspecting the Cuadrilla operations? It is suggested that no government body has overall responsibility for monitoring the operation sites. On this very point, there appears to be confusion between the DECC, EA and HSE about who has responsibility for what.

A lack of government regulation has been widely blamed for explosions and pollution in the US, where hydraulic fracturing or "fracking" is taking place. France, Switzerland and several US states have banned fracking, but British ministers and officials in the DECC insist no additional regulation or delay is needed.

In addition, the recent energy and climate change select committee inquiry into shale gas did not consider tightening regulations, citing a lack of resources.

Environment Agency Response

A suite of legislation and regulations provide a robust structure to properly regulate the "on shore" hydraulic fracturing activities in Lancashire. These were developed to protect the environment and the "on shore" / "off shore" distinction is not applicable. The legislation followed by Environment Agency in relation to Shale Gas activities include:

- Environmental Permitting Regulations 2010
- Water Resources Act 1991
- Water Act 2003
- Radioactive Substances Act 1993

Our key role is to help ensure that the environment is protected from the potential impacts of exploration and this includes protecting water resources and ensuring that the disposal of the "flow back" water from the exploratory wells is managed properly. We provide advice to government and regulate businesses to make sure the environment is protected. We:

- ensure that the exploration and development of unconventional gas is regulated effectively to manage risks to surface and groundwater resources
- are responsible for granting any necessary environmental permits (under the Environmental Permitting Regulations 2010) and have powers to serve notices where required to protect the local environment. We do this by applying a proportionate and risk-based approach to preventing pollution and protecting the environment
- are responsible for regulating water abstraction
- are responsible for regulating any discharges associated with the extraction processes
- are a statutory consultee in the planning process and will provide advice to local authorities on individual gas extraction sites

The Environment Agency has a clear role to protect the environment from the potential impacts from shale gas exploration and exploitation, as outlined in the earlier part of this response. We understand our responsibilities and regularly liaise with the Health and Safety Executive and DECC at a local and national level.

Cuadrilla's sites were assessed to pose no significant risk to viable groundwater or surface water resources, and therefore are not subject to an environmental permit. In line with the Environment Agency's risk-based approach under the Environmental Permitting Regulations 2010 we would not normally undertake independent monitoring of chemical concentrations/volumes used, the content of return fracking fluids or waste drilling mud, or other site processes. However, a recent change in the permitting regulations means that a permit related to disposal of return fracking fluids may now be required – see further under Issue 2 below - and this is currently under discussion with Cuadrilla.

Irrespective of permitting considerations, Cuadrilla's operations include the first unconventional gas fracking in the UK and so we have taken a responsible approach and undertaken some independent monitoring of return fracking fluids from Cuadrilla's Preese Hall site. Additionally we monitor Cuadrilla's activities with visits to their sites and through written and telephone communications. A schedule of visits is in table 1, and we publish the results on our web site (http://www.environment-agency.gov.uk/business/topics/126689.aspx) under current activities.

The issue of regulation is a matter for Government, including the Departments of Energy and Climate Change and of Environment, Food and Rural Affairs. The Environment Agency considers that the current environmental regulations are adequate to prevent pollution of ground and surface waters and to protect water resources but we are keeping that under review as the industry develops and advising the Government.

ISSUE TWO

It has been suggested that various environmentalists and engineers fear that shale gas extraction will destroy the environment, potentially devastate water supplies near where fracking takes place (because methane or chemicals used in the process could leak into ground water) and generally make people's lives a misery in many places.

Environment Agency Response

We apply a proportionate and risk-based approach to preventing pollution and protecting the environment.

Shale gas exploration can pose a risk to the environment and specifically to groundwater and surface waters. The risk to these waters may come from:

- The 'fracking fluid' (mainly water, but containing some chemicals) entering groundwater when it is injected or escaping through spills on the surface.
- Gas escaping from the well and causing pollution of groundwater.
- The 'flow back' fluid (the fluid that returns to the surface after fracturing) not being contained and polluting groundwater or surface water, or not being disposed of properly.

Other impacts to the environment come from the exploration activities and include:

- Light and noise pollution from on-site plant
- Emissions to air from on-site plant.
- Impacts from vehicles servicing the site.
- Methane gas escapes to the atmosphere.
- Disposal of drilling cuttings from sinking the borehole

Groundwater

To manage the risks to the water environment, we are involved in assessing the design of the boreholes at the planning stage to ensure their construction prevents pollution of groundwater from fracking fluid and gas. We also regulate the containment and disposal of the flow back fluid

and have sampled this to ensure it is being adequately managed.

We determined that the operations in Lancashire pose a low environmental risk to groundwater by assessing information provided by the operator together with information available from the scientific community in the UK and the US on hydraulic fracturing. By applying the principles of risk based regulation we determined that the operations do not require a permit for groundwater issues. To be permitable they would involve the discharge of a polluting material into a groundwater, or the activity would be of a nature that could mobilise a pollutant that could contaminate a groundwater. We have determined that these criteria do not apply and that the likelihood of any mobilisation of pollutants from the process that could contaminate groundwater is very remote (see issue 6). (A permit may however now be required for the storage and disposal of the flowback fluids – see further below.)

Use of water / water resources

Cuadrilla have opted to use mains water from United Utilities' supply for fracking. United Utilities is licensed by the Environment Agency to abstract sustainable amounts of water. We have assessed the risk to surface and ground waters, to protect the environment and drinking water. At this time we deem there to be no threat to local water supplies from Cuadrilla's activities.

Hydraulic fracturing fluids

We have taken a responsible approach to ensuring that the fracking fluid and flow back fluid do not present a risk to the environment. The fluid used by Cuadrilla was 99.75% composed of water and sand. The remaining 0.25% contained polyacrylamide friction reducers and hydrochloric acid. We have reviewed the chemicals used by Cuadrilla in its fracking fluid to ensure they were classed as non-hazardous under the Groundwater Directive 2006. This decision was peer-reviewed by the Joint Agencies Groundwater Directive Advisory Group which includes the Scottish Environment Protection Agency, Northern Ireland Environment Agency and ourselves.

Companies will have to disclose the chemical composition of their fracking fluids to enable us to assess their environmental impact and decide if an environmental permit is required. If a permit is required then these chemicals would be recorded on our pubic register.

If a company claims commercial confidentiality then we can use powers under the Water Resources Act to obtain this information. Currently, Cuadrilla is the only company to have carried out fracking for shale gas in the UK. They have published the chemical breakdown of their fracking fluid on their website.

Disposal of flow back fluids

We took samples of the flowback fluid at Preese Hall and sent them to our own laboratories for analysis. All of the chemicals found are those which we would expect to find in shale rock and are naturally occurring. There are notably high levels of sodium, chloride, bromide and iron, as well as higher values of lead, magnesium and zinc compared with the local mains water that is used for injecting into the shale. They also contained very low levels of naturally occurring radioactive minerals - similar to the levels found in granite rock.

The flow back water produced to date from the Preese Hall exploration site has been stored in double skinned tanks on site. It was then transported to a waste water treatment works at Davyhulme.

The waste water treatment works already treats many other industrial effluents from the Manchester area and holds a permit from the Environment Agency to discharge to the Manchester Ship Canal. It is capable of dealing with the levels of minerals contained in the flow back water.

We have been monitoring Cuadrilla closely, carrying out independent assessments, sampling, carrying out pollution prevention checks and making frequent site visits. Between March and end of October we made a total of 18 visits to Cuadrilla sites. We made 11 visits to the Preese Hall site, seven of these being arranged last-minute to sample flow back fluids. We have also made three visits to Becconsall, four to Grange Road and 1 to Anna's Road.

We have made the monitoring data publicly available on our website.

We also sent samples to an external laboratory for an analysis of any radioactivity. The analysis showed the presence of naturally occurring radioactive materials (commonly called NORM) at levels similar to that in many rocks throughout the UK, granite being a common example.

Naturally occurring radioactive materials have been present in rocks since their formation, perhaps billions of years ago. All radioactive materials undergo decay to become more stable, eventually ceasing to be radioactive. Some radioactive materials decay over very long time periods and others more quickly, and so naturally occurring radioactive materials will contain many different radioactive isotopes in differing amounts. The radioactive materials with very long decay times are usually present in larger amounts. Commonly this is Radium 226.

The initial analysis of the flowback fluid has shown Radium 226 as the radioactive material present at the highest levels, between 14 and 90 Becquerel per litre. Other naturally occurring isotopes present included potassium-40 and Radium-228.

On 1 October 2011, revised levels for naturally occurring radioactive materials were introduced into Schedule 23 of the Environmental Permitting Regulations 2010. Based on initial analysis of the radioactivity in the flowback fluid Cuadrilla will require an Environmental Permit to store and dispose of the flowback fluid.

The results of this preliminary analysis have to be viewed with caution, they are only indicative of the radioactivity present. As part of Cuadrilla's application for a permit a radiological impact assessment will be required. In determining the application we will review the radiological impact assessment with regard to public dose constraints as set out in legislation.

Other environmental impacts

Other impacts from traffic and the operation of on site plant, such as emissions to air, light and noise pollution are not within the responsibilities of the Environment Agency. Emissions to air are a matter for the local authority.

ISSUE THREE

It has been suggested that an Environment Impact Assessment/Survey should have been conducted by the Environment Agency or Lancashire County Council. Who has such responsibility? Has this been done? If not, what are the implications?

Environment Agency Response

The requirements for EIAs relate to the grant of planning permission which is a matter for the planning authority. If an EIA is required, the Environment Agency would be a statutory consultee in its preparation.

ISSUE FOUR

There is some dispute about the amount of announced/ unannounced inspections made at the operational site. What inspections to date have been carried out by the responsible bodies? How many announced/unannounced inspections have been made?

Environment Agency Response

We have been monitoring Cuadrilla closely, carrying out independent assessments, sampling, and frequent site visits – planned and unplanned. Our inspection record is appended below (Table 1).

ISSUE FIVE

There is still no outcome on the possible links between the small earthquakes and the fracking operations. When is the BGS report due?

Environment Agency Response

This does not fall under the responsibility of the Environment Agency and is a matter for DECC.

We are working alongside DECC and HSE to understand whether there are any implications for our responsibilities from the geo-mechanical study published by Cuadrilla.

ISSUE SIX

How can we be sure of the prevention of water pollution below the surface? Which body is responsible for confirming such matters? There are environmental concerns about the release of methane and the potential for the chemicals used in the wells to contaminate water either through cracks forced open in the rocks by the fracking process, explosions from the release of methane gas or through drilling bores through aquifers.

Environment Agency Response

The Environment Agency is responsible for preventing pollution to groundwater. Under statutory guidance it is for the Environment Agency to decide whether groundwater is present and whether a groundwater activity is taking or will take place.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

An environmental permit under the Environmental Permitting Regulations 2010 (EPR) is required where fluids containing pollutants (substances liable to cause pollution if released into the environment) are injected into rock formations that contain groundwater (a "groundwater activity" under EPR). An environmental permit may also be needed if the activity poses a risk of mobilising natural substances that could then cause pollution. The permit, if granted, will specify limits on the activity and any requirements for monitoring. It will also specify what chemicals will be used and in what maximum concentrations. If we decide that the activity poses an unacceptable risk to the environment, we will not issue a permit and if necessary we may issue a notice under EPR to prohibit it. If we decide that the activity cannot affect groundwater, a permit will not be necessary.

We require operators to tell us about any activities that potentially involve the discharge of pollutants into the ground and the nature of those pollutants so that we are able to make informed decisions about whether the activity is a 'groundwater activity' and must be permitted. We have powers if necessary under EPR to require such information. We also have powers under the Water Resources Act 1991 to require more general information concerning both pollution and abstraction.

The environmental permit also forces a general management condition on the operator to provide a written management system that identifies and minimises risks of pollution. This will include activities at the surface, such as the storage and use of chemicals.

We may also:

- Issue a permit for activities associated with the surface works, or with the final production of gas/oil, if these involve emissions to surface or groundwater.
- Serve notices for aspects of the operation that would not normally be subject to EPR, such as the drilling of the borehole. This would require the operator to cease an activity or apply for a permit if we consider it warranted.
- Require operators to notify us of their intention to carry out drilling. At this time we will advise on any requirement for controls under the Water Resources Act 1991 where there is the potential to impact water resources, for example, due to the effect on groundwater levels and flows. We also have the power to issue a notice to require certain measures to be taken.
- Consider any application for a water abstraction licence should a direct supply of water be needed by the operator. This would only be granted where sustainable water resources are available.

Even where we determine a permit is not necessary, such activities are still subject to the regulations. If a significant risk or an actual impact becomes apparent we may issue a notice under EPR requiring the operator to obtain a permit or in extreme situations we may issue a notice to prohibit the activity.

In Lancashire the Bowland Shale Formation that is the target for gas extraction is located between a depth of 2100m and 3100m. Above this is the Manchester Marl, a formation of siltstones and mudstones about 180m, thick, which acts as an impermeable seal to the movement of water from above or below. The operators will control fracturing to ensure that it does not penetrate up into this layer. Above the Manchester Marl there are sandstone formations which will contain water but these are buried beneath another impermeable formation, the Mercia Mudstone which is up to 500m thick. This is the rock found at ground level at these locations. The sandstone aquifers through which Cuadrilla has drilled are isolated from any surface water features and do not outcrop in this area, they also contain water that is saline, and would therefore, not be a viable drinking water source.

When the borehole is drilled from the surface to the shales that contain the gas it is lined with steel casing and cemented into the surrounding bed rock. This takes place at 2 or 3 depths as the hole is being progressed. This method of lining the borehole and cementing the casing to the rock means that there is no route up the outside of the borehole for passage of fluids or gas. The borehole is a sealed and contained structure, as the top of the hole has a control valve set onto it that can be closed to contain fracking fluids or gas. This casing (as well as the natural geology as described above) separates the shale fracturing activity at the bottom of the hole from the shallower water bearing rocks.

ISSUE SEVEN

There are general concerns about well integrity (particularly on the cement casings of the boreholes) and the associated checks undertaken. Proper casing and cementing of oil and gas wells is very important to protect water supplies and improve public safety. It is understood that current rules do not provide enough details on safely casing and cementing wells. Also, existing rules do not address the need for an immediate response by operators to a gas leak complaint. And, they do not require operators to inspect wells regularly. It is also understood that verification of an individual well is not the role of the HSE as the resource implications would be immense. The “Well Inspector” is an employee of the operating company and not independent.

In addition to the above, it is also unclear as to who is responsible for Cement Bond Logs and that regular logs are not undertaken. Is the Company self regulating?

***Note**: Tim Yeo, chair of the Commons energy select committee that investigated shale gas exploitation earlier this year, accepts that there is a potential conflict of interest if companies self-monitor: "We concluded that while there is a risk of conflicts of interest affecting the judgment of independent competent persons (ICPs) who assess the design of wells, we had no evidence of such conflicts presented to us," he wrote.*

Environment Agency Response

The Environment Agency does not regulate well integrity. This is a matter for the HSE and the operator.

The design and proposed construction of the borehole and the well are however, assessed prior to the start of any drilling. This is to ensure that the casing is sufficient enough to protect the water environment. We would request this information, if a permit for groundwater activity is necessary.

The Environment Agency does not require cement bond logs to be kept. This is a matter for the HSE and the operator.

ISSUE EIGHT

Unclear understanding of the monitoring arrangements conducted by the company to monitor, measure or analyse the pollutant liquids that come back up the boreholes

Environment Agency Response

The specific monitoring arrangements conducted by the company are a matter for Cuadrilla.

As detailed in Issue 2 we are making regular site inspections in order to keep the activity under assessment and have taken samples of the flowback fluids. These were sent to our own laboratories for analysis on a number of occasions. We looked for a wide range of elements that we would expect to see in the fluid. This is to check that they were disposed of properly. A table showing the results of these tests is appended below and is published on our website (http://www.environment-agency.gov.uk/business/topics/134511.aspx) with a comparison with the levels found in tap water (Table 2).

ISSUE NINE

What is the likelihood of permanent planning permissions being applied for in the area?

Environment Agency Response

The Environment Agency is a statutory consultee in the planning process. Ultimately, planning applications involving minerals and waste fall under the responsibility of LCC. The likelihood of an application is not a matter for the Environment Agency.

ISSUE TEN

The 2010 U.S. documentary film 'Gasland', which focuses on the impact of hydraulic fracturing, is critical of the industry's assertions of its safety and its exemption from the Safe Drinking Water Act in the Energy Policy Act of 2005.

It highlights that chemicals are added to the water to facilitate the underground fracturing process that releases natural gas. Only about 50% to 70% of the resulting volume of contaminated water is recovered and stored in above -ground ponds to await removal by tanker. The remaining "produced water" is left in the earth where it can lead to contamination of groundwater aquifers, though this is highly unlikely.

Environment Agency Response

See answers to issues 2 and 6, above. A portion of the fracking fluid will remain in the fracked shale but we have determined that at the locations currently operational there is no groundwater that is vulnerable to contamination.

The legislation followed by Environment Agency with Shale Gas activities include:

- Water Resources Act 1991
- Water Act 2003

We have reviewed the chemicals used by Cuadrilla in its fracking fluid to ensure they were classed as non-hazardous under the Groundwater Directive 2006. This decision was peer-reviewed reviewed by the Joint Agencies Groundwater Directive Advisory Group which includes the Scottish Environment Protection Agency, Northern Ireland Environment Agency and ourselves.

Cuadrilla may use the following chemicals in their fracturing process:

- Ucarcide (The Dow Chemical Company) – this is a broad-spectrum biocide that will restrict the growth of microbes and algae in the hydraulic fracturing system. The active substance is Glutaraldehyde, which is a disinfectant and also used to clean medical and dental equipment. Glutaraldehyde biodegrades rapidly in a fresh water aquatic environment. Since mains water is being used it may not be necessary for Cuadrilla to add this biocide. If it was necessary, we understand it would be used as a very dilute solution (0.005%).
- FR-40 (CESI Chemical) – this is a blend of chemicals including Polyacrylamide and is used to reduce friction between the water and the pipe when pumping into the well. Polyacrylamide is non-hazardous and has a number of uses including water treatment, soil conditioning and the manufacture of contact lenses and children's toys that expand in water. It is typically used at a rate of 0.075%.
- Stimlube-W (CESI Chemical) – this is a polymer which may be used as an alternative to FR-40. Stimlube-W is non-hazardous and we would expect it to be used in similar concentrations to FR-40.
- Hydrochloric acid – dilute hydrochloric acid may need to be added to develop the well (i.e. to clear the channels from the borehole into the shale). It has a wide variety of industrial uses and has been used for many years to help to enhance both oil and water wells. Once the acid is in the shale, clay minerals in the shale will start to neutralise it. (0.125%)

Additional Questions

Environment Agency response

What is the process for dealing with leakages/contamination?

Following our pollution prevention advice, Cuadrilla have lined all of their sites with an impermeable HDPE Geomembrane layer of the type used to line modern landfill sites. This membrane collects and contains any spillages so that they can be disposed of appropriately.

What involvement and liaison has the Environment Agency had with other agencies and organisations with this process?

We are in ongoing dialogue with out partner regulatory organisations and the DECC. The majority of our liaison has been with Lancashire County Council (LCC) throughout the planning permission consultations. We are also working closely with the DECC and the HSE at a national level to ensure our organisations are joined up in terms of regulation of Shale Gas exploitation. At a local level, we are also communicating with the HSE, district councils including Fylde Borough Council and West Lancashire Borough Council as well as LCC to ensure our site regulation activities is linked in with theirs.

What conditions are put in place in the event that the company breach any of their conditions?

The Environment Agency has carried out an assessment of the implications for groundwater from Cuadrilla's proposals for three of their five sites (Preese Hall in Weeton, Grange Road in Singleton and Bonny Bank Farm at Becconsall.) The other two sites at Hall Farm, Wharles near Kirkham, and Anna's Road, Westby near Blackpool are yet to be assessed. As detailed in our answers to issues 2 and 6 above, at present, no permits for groundwater from the Environment Agency are required. We will continue to keep this position under review as the activity develops. Should it be necessary any further conditions would be designed to protect the environment from pollution and ensure the activity meets the requirements of the relevant legislation.

A radiological screening of the flow back fluid showed that the radiological impact from its disposal is very low. However, from 1 October the change in regulations (see section 6), means that the natural occurring radioactivity levels in the fluid mean that an environmental permit is required for disposal to a waste water treatment works. Due to the very low levels of radioactivity present, the permit is likely to be a standard one and not require special provisions concerning the quantity or radiological impact of the disposals.

Please give any details of typical tests carried out

We have taken samples of the flow back fluid and sent them to our own laboratories for analysis on a number of occasions. We looked for a wide range of elements that we would expect to see in the fluid. This is to check that they were disposed of properly. A table showing the results of these tests is appended below with a comparison with the levels found in tap water (Table 2).

What emergency arrangements are in place?

The Health and Safety Executive is responsible for regulating the overall safety of the site.

The Environment Agency is a Category 1 incident responder which means we are involved in emergency situations. Our primary role would be to minimise the impact of any incident on the environment. As such we have been giving Cuadrilla advice and guidance on infrastructure and procedures relating to pollution prevention should an incident occur. We are also members of the Lancashire Resilience Forum, a group of partners which aim to strengthen Lancashire's ability to cope with emergency situations.

What other permits does the company hold?

Cuadrilla will hold permits, licences and permissions from DECC and the relevant local authorities to undertake shale gas exploration at the five sites in Lancashire. These are a matter for those authorities.

Does Cuadrilla's fracking activity pose a risk to local water supplies?

Please see our answer to issues 2 and 6 above.

What chemicals have Cuadrilla used in their fracking fluid?

The fluid used by Cuadrilla was 99.75% composed of water and sand. The remaining 0.25% contained polyacrylamide friction reducers and hydrochloric acid.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

Table 1: Schedule of Inspections

Environment Agency Inspection Record
Cuadrilla Shale Gas Sites – Lancashire

Preese Hall Farm

Inspection Date	**Inspecting Officer**	**Announced?**	**Purpose**	**Outcome**
28 March 2011	Simon Bennett	Yes	Inspection prior to first fracturing operation	No problems noted.
7 April 2011	Simon Bennett, Bob Molyneux	Yes*	Sample flow back (chemistry)	Sample taken
14 April 2011	Simon Bennett	Yes*	Sample flow back (chemistry & radioactivity)	Samples taken
28 April 2011	Simon Bennett	Yes*	Sample flow back (chemistry)	Sample taken
3 May 2011	Simon Bennett	Yes*	Sample flow back (radioactivity)	Sample taken
18 May 2011	Simon Bennett	Yes*	Sample flow back (chemistry & radioactivity)	Samples taken
8 June 2011	Simon Bennett Ali Egarr,	Yes	Pollution prevention	No problems

	Stephen Watts		inspection	identified
14 June 2011	Bob Molyneux	Yes*	Sample flow back (chemistry)	Sample taken
01 August 2011	Thomas Charlton	Yes*	Sample flow back (chemistry)	Sample taken
17 August 2011	Simon Bennett, Lee Quibell, Environmental Health	Yes	Pollution Prevention Inspection	No problems found
13 October 2011	Simon Bennett	Yes	Inspection of flowback storage tanks & pollution prevention	No problems found. Site drainage sealed.

Becconsall

Inspection Date	**Inspecting Officer**	**Announced?**	**Purpose**	**Outcome**
17 August 2011	Lee Quibell, Simon Bennett, Stuart McDonald	Yes	Pollution Prevention Inspection	No problems found
7 Sept 2011	Lee Quibell, Simon	No	Incident response (oil	Incident not substantiated. No

	Bennett		reported by Cuadrilla in nearby watercourse, also went on site)	problems on site.
28 Oct 2011	Lee Quibell, Simon Bennett	Yes	Pollution Prevention Inspection	No problems found

Grange Hill

Inspection Date	**Inspecting Officer**	**Announced?**	**Purpose**	**Outcome**
11 Feb 2011	Thomas Charlton, Jason Pusey	No	Response to report of sludge deposited on land nearby (waste management plan check)	Sludge not produced by Cuadrilla (unrelated incident). No problems noticed on site.
22 March 2011	Simon Bennett	Yes	Pollution prevention inspection (advice and guidance)	Advice and guidance given. No problems found on site.
17 August 2011	Lee Quibell, Simon Bennett,	Yes	Pollution Prevention	No problems found

	Stuart McDonald		Inspection	
13 October 2011	Simon Bennett	Yes	Pollution prevention	No equipment on site. Site secured by locked gates. No problems found

Anna's Road, Blackpool

Inspection Date	**Inspecting Officer**	**Announced?**	**Purpose**	**Outcome**
20 October 2011	Simon Bennett	Yes	First visit to site – site preparation / pollution prevention	Site visit completed.

* Sampling visits – officers checked that flow back was occurring by telephoning site that morning. Notice period < 2 hours

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

Table 2: Flow back analysis and tap water comparison

SPT_NAME	Cuadrilla Drill RigSingleton drill a Drill RigSingleton	Cuadrilla Drill RigSingleton	Cuadrilla Drill RigSingleton	Cuadrilla Drill RigSingleton	Cuadrilla Drill RigSingleton	concentration data) average Utilities web (from United Mains water
DATE	07/04/2011	14/04/2011	28/04/2011	18/05/2011	14/06/2011	
TIME	13:20	13:30	11:10	14:00	09:55	
Conductivity at 25°C µs/cm				150614	133730	299
pH				6.35	7.06	7.54
Lead (filtered) µg/l	179	<20	<2	<40	<40	
Lead - as Pb µg/l	600	<10	<10	<40	44.9	<0.417
Mercury (filtered) µg/l	0.01	<0.01	0.013	<0.01	<0.01	
Mercury - Hg µg/l	0.024	<0.01	<0.01	<0.01	0.012	<0.0127
Cadmium (filtered) µg/l	0.674	<1	1.47	<2	<2	
Cadmium - Cd µg/l	1.29	<0.5	<0.5	<2	<1	<0.04
Bromide mg/l			242	854	608	<0.444
Chloride Ion mg/l	15400	34400	22200	75000	64300	13.5
Sodium (filtered) mg/l	7950	15100	9330	28400	>200	
Sodium - Na mg/l	no bottle	15100	9380	28400	23600	22.9
Potassium (filtered) mg/l	23.2	46.4	37.8	82.1	>20	
Potassium - K mg/l	28.8	52.3	40.6			
Magnesium (filtered) mg/l	177	>50	397			
Magnesium - Mg mg/l	no bottle	586	401	1470	1350	9.21
Phosphorus - P mg/l	1.28	0.0771	<0.02	<0.1	<0.5	
Chromium (filtered) µg/l	< 3	<5	0.565	28	<10	
Chromium - Cr µg/l	25	4.03	<3	20.5	53.9	<0.349
Zinc – (filtered) µg/l	297	<50	53.6	142	411	
Zinc - as Zn µg/l	565	51.5	<30	173	435	
Nickel – (filtered) µg/l	13.8	<10	21.5	<20	<20	
Nickel - Ni µg/l Silver (filtered) µg/l Silver µg/l	20.3 < 10	<5 <5	<5 <10 <1	<20 <20 <20	<20 <10 <10	1.20
Aluminium (filtered) µg/l	< 50	<100	<10	<200	<200	
Aluminium-Al µg/l	596	<50	<50	<200	<100	<8.04
Arsenic (filtered) µg/l	5.1	<1	<1	<1	<1	
Arsenic – As µg/l	6.2	<1	<1	1.2	2.6	0.309
Iron (filtered) µg/l	36600	82800	35800	70700	106000	
Iron - as Fe µg/l	66600	80700	51800	78600	112000	<7.62
Cobalt (filtered) µg/l	< 10	<5	<10	<20	13.3	
Cobalt µg/l			4.96	<20	<50	
Copper (filtered) µg/l	27.5	<10	12.4	36	<20	
Copper - Cu µg/l	936	8.04	<5	37.6	34.4	0.025
Nitrogen - N mg/l	10.7	52.5	33.4	98.8	77.8	
V - Filtered µg/l	< 20	<10	<20	<40	<20	
Vanadium - V µg/l	< 4	<10	<2	<40	<100	

Response from the HSE

(Off Shore Division)

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE ONE

Issues have been raised about the fact that the Government has no specific regulations on "unconventional" gas exploration (fracking operations) and that there is a heavy reliance on old regulations developed for "off shore" wells.

HSE Response: The Health and Safety at Work etc Act 1974 applies to Shale gas operations, as do more specific regulations focused on general occupational health and safety, borehole operations and well integrity.

The *Borehole Site and Operations Regulations 1995 (BSOR)* applies to shale gas operations. These regulations are primarily concerned with the health and safety management of the site and require the Borehole Operator to notify HSE of well operations.

The *Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 (DCR)* apply to all wells drilled with a view to the extraction of petroleum (oil or gas) regardless of well type or whether they are onshore or offshore. These regulations are primarily concerned with well integrity. DCR regulation 18 requires the Well Operator to set up a Well Examination scheme and appoint a Well Examiner. The Well Examination Scheme and involvement of the Well Examiner is for the complete lifecycle of the well from design through to abandonment. The Well Examiner is an independent competent person who reviews the proposed and actual well operations to confirm they meet the Well Operators policies and procedures, comply with DCR and follow good industry practice.

Regulation 3 of The *Reporting of Injuries Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)* has a specific set of Wells Dangerous Occurrences contained in Schedule 2, Part I that the Well Operator has to report to HSE / OSD.

HSE consider that the Act and set of regulations provide a robust regulatory framework for the regulation of shale gas operations. Further information on these regulations was detailed in previous correspondence from HSE to the task and finish group sent on 16/09/11.

Who is the regulatory authority inspecting the Cuadrilla operations? It is suggested that no government body has overall responsibility for monitoring the operation sites. On this very point, there appears to be confusion between the DECC, EA and HSE

about who has responsibility for what.

HSE Response: The role of HSE's Offshore Division (OSD) in this context is to regulate the health and safety risks to people from shale gas operations. This is the same for any well construction project onshore or offshore. To achieve this OSD is staffed with inspectors of numerous topic specialists. The group primarily involved in regulating shale gas operations is the Well Engineering and Operations Group (Wells Group) which is staffed with experienced well engineering inspectors.

The Wells Group's mission, as stated in our strategy is *"To ensure that major accident hazard risks to people from well and well related activities are properly controlled; and to prevent a catastrophic well incident."* This mission applies to onshore shale gas operations as well as the offshore operations we also regulate.

To achieve our mission for shale gas operations the Wells Group has and will: inspect well notifications and weekly operations reports submitted to OSD, meet with the Well Operator off site, inspect the well site if required, and if an incident reported to OSD meets our mandatory selection criteria investigate it.

The Wells Group Strategy is available on the website and will expand further on how we conduct our regulatory duties. This strategy document applies to all well engineering and operations projects onshore and offshore. Further information on the Wells Group and the wells topic can be found on our website at the following link: http://www.hse.gov.uk/offshore/wells.htm

A lack of government regulation has been widely blamed for explosions and pollution in the US, where hydraulic fracturing or "fracking" is taking place. France, Switzerland and several US states have banned fracking, but British ministers and officials in the DECC insist no additional regulation or delay is needed.

In addition, the recent energy and climate change select committee inquiry into shale gas did not consider tightening regulations, citing a lack of resources.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE TWO

It has been suggested that various environmentalists and engineers fear that shale gas extraction will destroy the environment, potentially devastate water supplies near where fracking takes place (because methane or chemicals used in the process could leak into ground water) and generally make people's lives a misery in many places.

HSE Response: Appears to be for the Environment Agency.

ISSUE THREE

It has been suggested that an Environment Impact Assessment/Survey should have been conducted by the Environment Agency or Lancashire County Council. Who has such responsibility? Has this been done? If not, what are the implications?

HSE Response: The legal requirements for EIA's relate to the grant of planning permission, and are therefore a matter for the planning authority.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE FOUR

There is some dispute about the amount of announced/ unannounced inspections made at the operational site. What inspections to date have been carried out by the responsible bodies? How many announced/unannounced inspections have been made?

HSE Response: For shale gas operations as for other onshore petroleum operations OSD wells group inspectors inspect well notifications submitted to OSD as per the requirements of BSOR regulation 6(1). All notifications are inspected the frequency depends on when notifications are submitted. This inspection process conducted in the design phase of the well is where the vast majority of issues likely to have an impact on well integrity will be identified and addressed by the Well Operator.

Monitoring of the well operations is conducted by the Wells group inspectors inspecting on a weekly basis all the weekly operations reports submitted to OSD as per the requirements of DCR regulation 19.

As part of the well notification process six inspection meetings have been held with Cuadrilla both at their offices and at OSD offices in Aberdeen. Further meetings will be held as required. One on site inspection was conducted at the Preese Hall borehole site when the hydraulic fracking equipment had been rigged up but prior to the main hydraulic fracking operations commencing. If it is deemed necessary inspections may be undertaken to inspect specific well operations as detailed below.

In addition to statutory inspections the assigned specialist wells inspector has a regular ongoing contact with Cuadrilla so that he is kept up to date with shale gas operations. OSD wells inspectors started this dialogue with Cuadrilla in February 2009 over two and half years ago, so that Cuadrilla was aware of their regulatory requirements and expectations from them with regard to well integrity. Cuadrilla is coming to OSD offices in Aberdeen to present the findings of their recent report into the seismic activities at the Preese Hall well site. HSE have already asked and received assurances that Cuadrilla will determine they have well integrity prior to any further well operations being conducted at the Preese Hall well.

The same wells specialist and other HSE colleagues are in regular contact with the EA and DECC re shale gas operations.

Once DECC have given consent for Cuadrilla to perform further fracking operations it is proposed that a joint HSE and EA inspection is undertaken.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE FIVE

There is still no outcome on the possible links between the small earthquakes and the fracking operations. When is the BGS report due?

HSE Response: This is a matter for DECC.

ISSUE SIX

How can we be sure of the prevention of water pollution below the surface? Which body is responsible for confirming such matters? There are environmental concerns about the release of methane and the potential for the chemicals used in the wells to contaminate water either through cracks forced open in the rocks by the fracking process, explosions from the release of methane gas or through drilling bores through aquifers.

HSE Response: While HSE's primary role is to regulate health and safety risks. Its inspection activities in relation to lifecycle well integrity will aid in the prevention of water pollution below the surface. HSE's wells inspectors review the well design that is submitted as part of the statutory notification of a drilling operation. The review includes the casings to be installed in the well, how they are to be cemented and how the integrity of the casing and cement is to be verified. It is a feature of good well design that there are two barriers between the gas bearing rock and any shallow aquifers that would form a route for gas to escape from the well. There should be at least two sets of cemented casing across any shallow aquifer. The statutory weekly report of operations to HSE should confirm that the well is constructed according to the notified design. The design and construction of the well and its continued good order must also be verified by a "well examiner" appointed by the company. In summary lifecycle well integrity is ensured by a combination of:

- **a well design created by competent personnel in line with the Well Operators policies and procedures;**

- **a well design process that has identified any well bore hazards and mitigated them;**
- **a review of the well design by the Well Examiner;**
- **review of the well design by OSD Wells Inspector;**
- **execution of the well design by competent personnel that are monitored by well operator office based personnel;**
- **monitoring of the construction phase of the well by the Independent Well Examiner and by the OSD Wells Inspector; and,**
- **compliance with relevant regulations.**

ISSUE SEVEN

There are general concerns about well integrity (particularly on the cement casings of the boreholes) and the associated checks undertaken. Proper casing and cementing of oil and gas wells is very important to protect water supplies and improve public safety. It is understood that current rules do not provide enough details on safely casing and cementing wells. Also, existing rules do not address the need for an immediate response by operators to a gas leak complaint. And, they do not require operators to inspect wells regularly. It is also understood that verification of an individual well is not the role of the HSE as the resource implications would be immense. The "Well Inspector" is an employee of the operating company and not independent.

HSE response: Please refer to the answer for issue six in response to how well integrity is ensured. Health and safety law in Great Britain is goal setting and not prescriptive, there is no law stating how wells are cased and cemented. However the law states that employers, well operators, borehole operators must reduce risks to the health and safety of people from their operations to "as low as is reasonably practicable" (ALARP). This means they must follow good industry practice so that they can robustly demonstrate to HSE via the well notification that risks are ALARP. An example of good industry practice in relation to casing and cementing wells is given in response to issue six. It is HSE's opinion that a goal setting regime is better than a prescriptive regime. It places the responsibility for reducing risks to ALARP on the well operator etc and complements HSE stated policy that – *the persons best placed to reduce risk are those who create the risk.* Goal setting legislation requires proportionate risk reduction to be applied irrespective of the work activity. It allows

latest good practice to be applied immediately and does not have a regulatory gap whereas prescriptive legislation would require to be updated to take account of the latest practice.

HSE is unclear of what is being alluded too with regard to the, "existing rules…need for an immediate response by operators to a gas leak complaint." If it is in relation to reporting gas leaks to HSE then regulation 3 of The *Reporting of Injuries Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)* applies. It has a specific set of Wells Dangerous Occurrences contained in Schedule 2, Part I that the Well Operator has to report to HSE / OSD. These are:

- **A blowout i.e. an uncontrolled flow of well fluids**
- **The unplanned use of blow out prevention equipment**
- **The unexpected detection of H_2S**
- **Failure to maintain minimum separation distance between wells**
- **Mechanical failure of any safety critical element of a well (this would include gas leaks from a well)**

The well operator must inform HSE as soon as practicable of the incident (usually by phone) and then has ten days to notify HSE on our web based reporting system. Reporting of well incidents enables HSE / OSD to investigate those incidents that would have an effect on well integrity and ensures the Well Operator secures improvements to his operations. If an employee or a member of the public has a concern over the safety of the operation or of a well and after contacting the well operator has not had it resolved to their satisfaction. They can lodge a complaint with HSE that will be investigated.

Regulation 13 General Duty, of the *Installations and Wells (Design and Construction, etc) Regulations 1996 (DCR)* places a general duty on the Well Operator. To ensure that a well is so designed, modified, commissioned, constructed, equipped, operated, maintained, suspended and abandoned that so far as is reasonably practicable, there can be no unplanned escape of fluids from the well; and risks to the health and safety of persons from it or anything in it, or in strata to which it is connected, are as low as is reasonably practicable. In order to comply with this regulation the Well Operator would have to inspect / monitor his wells on a regular basis commensurate with the risk from that well. The Well Examiner would also independently (usually annually) review the status of the wells and findings of these inspections and make recommendations to the Well Operator.

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

Care should be taken with the use of the title "Well Inspector" and what it means to different organisations. For HSE it means a H.M. Inspector of Health and Safety appointed in writing under Section 19 of the Health and Safety at Work etc. Act 1974. The Specialist Wells Inspector is a civil servant an employee of HSE and not an employee of the operating company. The person who conducts inspections/testing of the well i.e. a Wellhead Technician may be an employee of the operating company or may be a contractor conducting the inspection/testing of the well on his behalf. This however should not be mistaken with the role of the Well Examiner. The Well Examiner would review the results of the inspection/testing of the well and "verify" the well meets the Well Operators policies, good industry practice and complies with the law. The Well Examiner is independent and separate from the immediate line management of the well operations he is examining. The review by the Well Examiner is in addition to any analysis of the inspection/testing conducted by the operating company and not instead off. The Well Examiner can be an employee of the operating company or a contractor. HSE has no evidence of pressure being brought to bear on Well Examiners or of their independence being compromised.

In addition to the above, it is also unclear as to who is responsible for Cement Bond Logs and that regular logs are not undertaken. Is the Company self regulating?

HSE response: Details of how many and when cement bond logs would be undertaken would be submitted in the well notification to HSE or in any subsequent material changes to that notification. It is the responsibility of the company to determine if and when cement bonds logs are required. This is in line with goal setting legislation and the demonstration by the company to HSE that the risks to the health and safety of people from the well, or anything in it, or in strata to which it is connected are ALARP. The company is not self regulating. It is complying with health and safety law by demonstrating the risks to the health and safety of people from its operations are ALARP. It is HSE's role to challenge the company if in its opinion the company is not doing enough to reduce risks to ALARP.

Note: *Tim Yeo, chair of the Commons energy select committee that investigated shale gas exploitation earlier this year, accepts that there is a potential conflict of interest if companies self-monitor: "We concluded that while there is a risk of conflicts of interest affecting the judgment of independent competent persons (ICPs) who assess the design of wells, we had no evidence of such conflicts presented to us," he wrote.*

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE EIGHT

Unclear understanding of the monitoring arrangements conducted by the company to monitor, measure or analyse the pollutant liquids that come back up the boreholes

HSE Response: Appears to be for the Environment Agency.

ISSUE NINE

What is the likelihood of permanent planning permissions being applied for in the area?

HSE Response: Not a matter within HSE's responsibilities.

ISSUE TEN

The 2010 U.S. documentary film 'Gasland', which focuses on the impact of hydraulic fracturing, is critical of the industry's assertions of its safety and its exemption from the Safe Drinking Water Act in the Energy Policy Act of 2005.

It highlights that chemicals are added to the water to facilitate the underground fracturing process that releases natural gas. Only about 50% to 70% of the resulting volume of contaminated water is recovered and stored in above -ground ponds to await removal by tanker. The remaining "produced water" is left in the earth where it can lead to contamination of groundwater aquifers, though this is highly unlikely.

HSE Response: Appears to be for the Environment Agency.

RESPONSE OF TECHNICAL ADVISOR

ISSUE ONE

Issues have been raised about the fact that the Government has no specific regulations on "unconventional" gas exploration (fracking operations) and that there is a heavy reliance on old regulations developed for "off shore" wells.

Who is the regulatory authority inspecting the Cuadrilla operations? It is suggested that no government body has overall responsibility for monitoring the operation sites. On this very point, there appears to be confusion between the DECC, EA and HSE about who has responsibility for what.

A lack of government regulation has been widely blamed for explosions and pollution in the US, where hydraulic fracturing or "fracking" is taking place. France, Switzerland and several US states have banned fracking, but British ministers and officials in the DECC insist no additional regulation or delay is needed.

In addition, the recent energy and climate change select committee inquiry into shale gas did not consider tightening regulations, citing a lack of resources.

Independent Response(Mike Hill)

There is no 'joined up' thinking between the regulators. There is evidence of the opposite. Example: CBL on intermediate casing string: Reason this is important is that it helps ensure no liquids/gasses can get through regional seal via poor cement. DECC initially none, then HSE responsible, then they asked for one from Cuadrilla then said it was asked for by DECC post earthquake. This is nonsense as Cuadrilla have confirmed. HSE response was no need for CBL. EA response is this is HSE issue – even though with no CBL water can become contaminated – which is then an EA issue. Regulation is falling between the regulatory stools because nobody is taking an overview.

ISSUE TWO

It has been suggested that various environmentalists and engineers fear that shale gas extraction will destroy the environment, potentially devastate water supplies near where fracking takes place (because methane or chemicals used in the process could leak into ground water) and generally make people's lives a misery in many places.

Independent Response

Any gasses/liquids from the production area, drilling mud and flow back water have the potential to pollute the aquifer and ground water. Not just near where fracking takes place but also miles from the wells also.

Well integrity is the key here to ensuring this does not happen! DECC have no idea about this and rely on HSE. HSE just ask for plans in advance of drilling and never have they once verified that what Cuadrilla said they would do , then they have actually done so ! Not once in two years has the HSE checked this !

ISSUE THREE

It has been suggested that an Environment Impact Assessment/Survey should have been conducted by the Environment Agency or Lancashire County Council. Who has such responsibility? Has this been done? If not, what are the implications?

Independent Response

This is a very good point but I am working on the regulation side as Ihave expertise there and not in th laglities of an EIA.

You can be sure the EA will say it is low risk, no risk of contamination of any drinking water etc. and so no need for an EIA.

ISSUE FOUR

There is some dispute about the amount of announced/ unannounced inspections made at the operational site. What inspections to date have been carried out by the responsible bodies? How many announced/unannounced inspections have been made?

Independent Response

There is no dispute . I have it in writing.

EA: 8 trips till June 2011 and one unannounced. There was confusion internally in the EA and also between EA and Cuadrilla.

HSE: One pre-announmced trip in 18 months and that not to cover well integrity.

ISSUE FIVE

There is still no outcome on the possible links between the small earthquakes and the fracking operations. When is the BGS report due?

Independent Response

I have been told that there is a link. The BGS also think this. I cannot say who told me but he is most certainly in a position to know and also both of us initially thought there was no link at all.

My concern is damage to the regional seal and also to the cement. Damage here will allow liquids and gasses up that the annular pressure readings would not necessarily identify.

ISSUE SIX

How can we be sure of the prevention of water pollution below the surface? Which body is responsible for confirming such matters? There are environmental concerns about the release of methane and the potential for the chemicals used in the wells to contaminate water either through cracks forced open in the rocks by the fracking process, explosions from the release of methane gas or through drilling bores through aquifers.

Independent Response

Only way to be sure is well integrity**.** To be sure of well integrity then you need CBLs combined with other instruments/tests. Formation Integrity Tests, Annular pressures and USIT logs.

You need independent regulation not independent competent persons.

ISSUE SEVEN

There are general concerns about well integrity (particularly on the cement casings of the boreholes) and the associated checks undertaken. Proper casing and cementing of oil and gas wells is very important to protect water supplies and improve public safety. It is understood that current rules do not provide enough details on safely casing and cementing wells. Also, existing rules do not

address the need for an immediate response by operators to a gas leak complaint. And, they do not require operators to inspect wells regularly. It is also understood that verification of an individual well is not the role of the HSE as the resource implications would be immense. The "Well Inspector" is an employee of the operating company and not independent.

In addition to the above, it is also unclear as to who is responsible for Cement Bond Logs and that regular logs are not undertaken. Is the Company self regulating?

Note: *Tim Yeo, chair of the Commons energy select committee that investigated shale gas exploitation earlier this year, accepts that there is a potential conflict of interest if companies self-monitor: "We concluded that while there is a risk of conflicts of interest affecting the judgment of independent competent persons (ICPs) who assess the design of wells, we had no evidence of such conflicts presented to us," he wrote.*

Independent Response

I agree with all of above.

ISSUE EIGHT

Unclear understanding of the monitoring arrangements conducted by the company to monitor, measure or analyse the pollutant liquids that come back up the boreholes

Independent Response

Yes – this is unclear. Also crucial is the quantity of water coming back up the bore hole. This is not being verified.

Additionally the EA do not even have the fracing chemicals used by Cuadrilla on their determinand list
! They are not even checking for it!

ISSUE NINE What is the likelihood of permanent planning permissions being applied for in the area?
Independent Response And for how many wells – 400, 810, 1200 ? In what areas?
ISSUE TEN The 2010 U.S. documentary film 'Gasland', which focuses on the impact of hydraulic fracturing, is critical of the industry's assertions of its safety and its exemption from the Safe Drinking Water Act in the Energy Policy Act of 2005. It highlights that chemicals are added to the water to facilitate the underground fracturing process that releases natural gas. Only about 50% to 70% of the resulting volume of contaminated water is recovered and stored in above -ground ponds to await removal by tanker. The remaining "produced water" is left in the earth where it can lead to contamination of groundwater aquifers, though this is highly unlikely.
Independent Response 50 – 70% - no not in the UK. We are looking at approx 30-40% recovered – the rest remains below ground. Though nobody can actually say how much for sure in any given well. Also in US exemption was from Clean Water Act and Clear Air act ! Remember that a well that is producing will also produce air pollution from the condensate tanks !

ISSUES AND RESPONSE STATEMENT – SHALE GAS OPERATIONS WITHIN THE FYLDE BOROUGH AREA

ISSUE ONE

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In addition, the recent energy and climate change select committee inquiry into shale gas did not consider tightening regulations, citing a lack of resources.

United Utilities Response

NA

ISSUE TWO

It has been suggested that various environmentalists and engineers fear that shale gas extraction will destroy the environment, potentially devastate water supplies near where fracking takes place (because methane or chemicals used in the process could leak into ground water) and generally make people's lives a misery in many places.

United Utilities Response

NA

There is no suggestion that the shale gas project in Blackpool would have any impact on groundwater sources used by United Utilities.

Blackpool's local water treatment works, Franklaw, treats water derived from impounding reservoirs, rivers and groundwater from the Fylde sandstone aquifer. The boreholes we use are located to the north of Preston, at least 20km from Blackpool, and are drilled to a depth of around 150 metres.

The shale gas project, by contrast will see Cuadrilla Resources take gas from within the Bowland Shale Group, which is both laterally and vertically separate from the Fylde sandstone aquifer.

It is our understanding that the exploitation of shale gas would take place at much greater depths, of around 3,000 metres. We have had no indications from the Environment Agency that there would be any risk to our groundwater sources from this drilling operation.

ISSUE THREE It has been suggested that an Environment Impact Assessment/Survey should have been conducted by the Environment Agency or Lancashire County Council. Who has such responsibility? Has this been done? If not, what are the implications?
United Utilities Response **NA**
ISSUE FOUR There is some dispute about the amount of announced/ unannounced inspections made at the operational site. What inspections to date have been carried out by the responsible bodies? How many announced/unannounced inspections have been made?
United Utilities Response *We have discussed the potential impacts on UU groundwater resources both internally and with the EA. Given the strict regulatory controls in place and that there has been an independent piece of work carried out following the earthquakes earlier this year which concluded no risk on groundwater resources, we still maintain this position.*

ISSUE FIVE There is still no outcome on the possible links between the small earthquakes and the fracking operations. When is the BGS report due?
United Utilities Response **NA**
ISSUE SIX How can we be sure of the prevention of water pollution below the surface? Which body is responsible for confirming such matters? There are environmental concerns about the release of methane and the potential for the chemicals used in the wells to contaminate water either through cracks forced open in the rocks by the fracking process, explosions from the release of methane gas or through drilling bores through aquifers.
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There are general concerns about well integrity (particularly on the cement casings of the boreholes) and the associated checks undertaken. Proper casing and cementing of oil and gas wells is very important to protect water supplies and improve public safety. It is understood that current rules do not provide enough details on safely casing and cementing wells. Also, existing rules do not address the need for an immediate response by operators to a gas leak complaint. And, they do not require operators to inspect wells regularly. It is also understood that verification of an individual well is not the role of the HSE as the resource implications would be immense. The “Well Inspector” is an employee of the operating company and not independent.

In addition to the above, it is also unclear as to who is responsible for Cement Bond Logs and that regular logs are not undertaken. Is the Company self regulating?

Note: *Tim Yeo, chair of the Commons energy select committee that investigated shale gas exploitation earlier this year, accepts that there is a potential conflict of interest if companies self-monitor: "We concluded that while there is a risk of conflicts of interest affecting the judgment of independent competent persons (ICPs) who assess the design of wells, we had no evidence of such conflicts presented to us," he wrote.*

United Utilities Response

NA

ISSUE EIGHT Unclear understanding of the monitoring arrangements conducted by the company to monitor, measure or analyse the pollutant liquids that come back up the boreholes
United Utilities Response NA
ISSUE NINE What is the likelihood of permanent planning permissions being applied for in the area?
United Utilities Response NA

ISSUE TEN

The 2010 U.S. documentary film ‘Gasland’, which focuses on the impact of hydraulic fracturing, is critical of the industry's assertions of its safety and its exemption from the Safe Drinking Water Act in the Energy Policy Act of 2005.

It highlights that chemicals are added to the water to facilitate the underground fracturing process that releases natural gas. Only about 50% to 70% of the resulting volume of contaminated water is recovered and stored in above -ground ponds to await removal by tanker. The remaining "produced water" is left in the earth where it can lead to contamination of groundwater aquifers, though this is highly unlikely.

United Utilities Response

There is no suggestion that the shale gas project in Blackpool would have any impact on groundwater sources used by United Utilities.

Blackpool's local water treatment works, Franklaw, treats water derived from impounding reservoirs, rivers and groundwater from the Fylde sandstone aquifer. The boreholes we use are located to the north of Preston, at least 20km from Blackpool, and are drilled to a depth of around 150 metres.

The shale gas project, by contrast will see Cuadrilla Resources take gas from within the Bowland Shale Group, which is both laterally and vertically separate from the Fylde sandstone aquifer.

It is our understanding that the exploitation of shale gas would take place at much greater depths, of around 3,000 metres. We have had no indications from the Environment Agency that there would be any risk to our groundwater sources from this drilling operation.

From: Perigo, Stuart [Stuart.Perigo@lancashire.gov.uk]
Sent: 10 November 2011 13:54
To: Lacey, Lyndsey
Subject: RE: Shale Gas Operations - Fylde Area

Hi Lyndsey

Again – apologies for the delay of my response. The County Council was happy to attend your authority's Task and Finish Group and assist in responding to questions by the Group. The County Council is also happy to provide advice on those matters it is responsible for associated with the shale gas exploratory operations. The role of the County Council as regulatory land use planning authority was set out to the Task and Finish Group.

However, the Issue and Response Statement is not something the County Council is prepared to contribute to in the form requested. Nevertheless, to assist in the process I would comment as follows in respect of each of the issues but such comments should not be taken as the view of the County Council and should not be summarised in the Statement.

Issue one – The County Council is responsible for determining planning applications for mineral exploration. The drilling of boreholes to establish the presence or otherwise of shale gas requires planning permission and therefore the applications were submitted to the County Council for determination.

Issue two – there are no current proposals to extract shale gas on a commercial basis and therefore it is not possible to consider the environmental impacts associated with such.

Issue three – the County Council is responsible for determining whether development constitutes EIA development for the purposes of the Environmental Impact Assessment regulations. It concluded the proposed exploration operations did not constitute environmental impact assessment development.

Issue four – The County Council employs a pro active role in monitoring mineral and waste operations throughout the county on a periodic basis. It investigates alleged breaches of planning control in accordance with its adopted enforcement policy. The County Council is satisfied that the current operations are being carried out in accordance with the planning permissions.

Issue five – Cuadrilla have recently published the outcome of their investigations and submitted them to DECC and BGS for their consideration. The report, summary and press release are available on their website.

Issue six – Details of the drilling operations accompany the respective planning applications. The Environment Agency were consulted on the proposals. Conditions were imposed to the decision notices requiring details of how ground water would be protected. Details were submitted and approved following consultation with the Environment Agency. All the submitted details, comments and decision are available on our website.

Issue seven – All companies undertaking any manufacturing or development activities are responsible for complying with relevant legislation and upon which reliance is placed on a daily basis in everything we do.

Issue eight – conditions are attached to the planning permissions for managing surface

development and preventing pollution.

Issue nine – not possible to comment on.

Issue ten - Details of the drilling operations accompany the respective planning applications. Further information on these matters is available on Cuadrilla's web site.

I hope the above is of some assistance

Regards

Stuart Perigo
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Environment Directorate
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From: Lacey, Lyndsey [mailto:LyndseyL@fylde.gov.uk]
Sent: 25 October 2011 11:48
To: Perigo, Stuart
Subject: Shale Gas Operations - Fylde Area

Hi Stuart

I refer to previous correspondence with regard to the above. The Task and Finish Group have now met on several occasions and work is still on-going. For your information, at meeting of the Group last week, I was asked to look at the feasibility of arranging a joint meeting with the MP for Fylde, representatives of HSE, the Chief Executive of Cuadrilla and a technical consultant.

The Group have also been working on the attached Issues and Response Statement and I should be grateful if you would make the necessary arrangements to complete from your side of things. Some of the questions may have already been posed to you and some will not be relevant to your area of work. Would you mind completing or stating NA as appropriate in each section?

Many thanks

Lyndsey Lacey

Website Links

https://getsatisfaction.com/fylde/topics/shale_gas_drilling_fracking_your_views

https://getsatisfaction.com/fylde/topics/do_we_really_understand_what_impact_fracking_could_have_on_fylde

https://getsatisfaction.com/fylde/topics/say_no_to_fracking

https://getsatisfaction.com/fylde/topics/jed_clampett_finds_shale_gas_in_lancashire

http://www.fylde.gov.uk/Petitions/View/A-Call-for-a-Moratorium-on-Hydraulic-Fracturing-for- Shale-Gas--FRACKI-G-

Community Focus Scrutiny Committee

Date:	Tuesday, 28 February 2012
Venue:	Town Hall, St Annes
Committee members:	Councillor Kiran Mulholland (Chairman) Councillor Christine Akeroyd (Vice-Chairman) Councillors Frank Andrews, Julie Brickles, Maxine Chew, Fabian Craig- Wilson, Susanne Cunningham, Charlie Duffy, Tony Ford, Nigel Goodrich, Ken Hopwood, Dawn Prestwich, John Singleton JP
Officers:	Allan Oldfield, Clare Platt, Ian Curtis, Kathy Winstanley, Anne Ancell, Lyndsey Lacey
Other members:	Councillor Cheryl Little (Portfolio Holder for Social Wellbeing)
Members of the public:	Approx 5 members of the public were in attendance

Public Platform

Prior to consideration of item 5 below, Mr Chris Cassidy (resident of Lytham and daily user of Witch Wood) had requested to speak under the public platform arrangements. He raised a number of questions relating to this matter. These were addressed during the course of the presentation.

In addition to the above, Dr Brian Newman and Mr John Spirley residents of North Promenade spoke on matters associated with item 6 below. The issues raised were addressed during the course of the presentation.

1. Declarations of interest

Members were reminded that any personal/prejudicial interests should be declared as required by the Council's Code of Conduct adopted in accordance with the Local Government Act 2000. No members declared any interests.

2. Confirmation of minutes

RESOLVED: To approve the minutes of the Community Focus Scrutiny Committee held on 1 December 2011 as a correct record for signature by the Chairman.

3. Substitute members

The following substitutions were reported under council procedure rule 22.3:

Councillor Fabian Craig-Wilson for Councillor Viv Willder

Councillor Julie Brickles for Councillor Kath Harper

Councillor Frank Andrews for Councillor Gail Goodman

Councillor Charlie Duffy for Councillor Paul Hodgson

4. The NHS and Public Health Reforms

Mr Mike Leaf (Acting Director of Public Health NHS Lancashire) attended the meeting to address the committee on the NHS and public health reforms.

In brief, the presentation covered the following three areas:

The Health and Social Care Bill

Healthy Lives, Healthy people - The Government White Paper on public health

Reorganisation of local systems, responsibility and the NHS

During his presentation, Mr Leaf made particular reference to the current pressures placed on the NHS, the key aims of the Bill and the new NHS landscape. He also referred to the proposed changes to upper tier local authority responsibilities and destinations of NHS responsibilities.

Councillor Hopwood asked whether any additional provision had been made in the NHS budget to accommodate the transient population within the coastal resorts. In response, Mr Leaf stated that although the uniqueness of the area was acknowledged, no additional monies had been set aside for this purpose.

Councillor Mulholland asked about the abilities for GPs to take on a greater workload and responsibilities at a time when pressures generally on the service are significant. Mr Leaf acknowledged that whilst there were complexities and challenges associated with the new structures, this would be a matter for the Clinical Commissioning Groups.

A general discussion took place about the reduced role of the strategic health authorities (which would disappear in 2013) and the proposed amalgamation under the new Lancashire cluster.

Following consideration of this matter it was RESOLVED to note the report await the emerging consultation.

(The Chairman dealt with the matter by a show of hands rather than by taking a recorded vote)

5. Witch Wood and Linnet Lane Wood, Lytham St Annes

Ian Curtis (Head of Governance) introduced the above report. In doing so, he stated that the Council had been asked to consider making byelaws or other legal restrictions to control certain activities that had led to damage to or spoil the condition of Witch Wood and Linnet Lane, Lytham St Annes. In this respect he further clarified the ownership of both woods.

In brief, the report provided an historic overview of Witch Wood and Linnet Lane Wood. It also detailed the various problems and issues identified by the Civic Society and the Council's suggested responses for addressing those issues.

Mr Curtis explained that the Council appeared to have the authority to make byelaws to control cycling, horse riding, erecting structures and climbing. The Council could also make statutory orders to control dogs and the consumption of alcohol.

Further to the above, it was reported that the Scrutiny Committee could undertake consultation on these possibilities to allow the decision on whether to go ahead with them to be taken with a knowledge of the likely reception in the community.

Various members commented on different aspects associated with responsible dog ownership and enforcement. In addition, general concerns were raised about vandalism issues in the vicinity.

Following consideration of this matter it was RESOLVED:

1. To undertake public consultation about whether the Council should do any of the following:

- Make byelaws to ban cycling, horse riding, erection of barriers, swings etc and the climbing of trees and other structures within Witch Wood and Linnet Lane Wood;

- Make dog control orders covering Witch Wood and Linnet Lane Wood to require that dogs be kept on leads and the removal of faeces;

- Designate Witch Wood and Linnet Lane Wood as alcohol control areas.

2. To report the results of the consultation to the next available meeting of the committee and invite representatives of the Civic Society and other consul tees/police to speak to the committee.

(The Chairman dealt with the matter by a show of hands rather than by taking a recorded vote)

5. The Management and Removal of Wind Blown Sand from the Highway

At the request of Councillor Tony Ford and further to consideration by the Scrutiny Mangagement Board, a report on the above was given at the meeting by Clare Platt (Director of Community Services) together with Kathy Winstanley (Depot and Contract Manager) and Anne Ancell (Sand Dunes Project Officer)

In brief, the report provided background information to dune management arrangements and the Council's statutory responsibilities under the Environmental Protection Act 1990 with specific reference to the management and removal of windblown sand from the highway. It also detailed the challenges faced by the team in dealing with windblown sand generally and the associated cost/resources involved in providing the current level of service.

A general discussion took place about the responsibilities for clearing sand from the highway in particular, alternative disposal methods for dealing with inert materials/ contaminated waste and practices in place for redepositing sand to the dune area. In addition, members sought clarification on the reasoning behind the level of contribution from the LCC towards the costs of removing sand from the highway. These matters were addressed by Ms Winstanley.

Following consideration of this matter the Committee RESOLVED to set up a meeting comprising the Vice- Chairman (Councillor Christine Akeroyd), Councillors Nigel Goodrich, Gail Goodman and Tony Ford to determine the appropriateness and merits or otherwise of setting up a task and finish group to look at this matter in more depth.

(The Chairman dealt with the matter by a show of hands rather than by taking a recorded vote)

This document/publication is also available on our website at www.fylde.gov.uk

Any enquiries regarding this document/publication should be sent to us at the Town Hall, St Annes Road West, St Annes FY8 1LW, or to listening@fylde.gov.uk.