Unconventional Gas and Oil Extraction Working Group
Final Report

September 2015

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Part I: Overview & Key Lines of Questioning

1. Role and Function of the Working Group

The Cross Party Working Group remit is to advise the Executive on its key Findings following an investigation into the issues for the Borough associated with conventional and unconventional on-shore gas and oil techniques.

The Working Group is not a decision making Committee of the Council. It has been tasked with undertaking a fact-finding exercise to help better inform the Council about unconventional gas and oil techniques that might be relevant to the Borough. The working group has not been asked to come to a view on whether the Council should support or not support unconventional oil and gas exploration and extraction in the Borough.

From the outset the Working Group has sought to challenge assumptions when not supported by evidence and to pursue key lines of inquiry to seek clarification on key issues.

The Findings set out in this report will help to better inform the Council in its role both in terms of meeting its regulatory function in determining planning applications and ensuring it continues to meet the needs of its community, environment and economy.

The report is split into two parts the first provides the narrative highlighting the key lines of questioning under each themed meeting; the second (Key Issues) attempts to contextualise the issues, helping to raise further questions and provide a steer to the Council in terms of its role. (Terms and Conditions, Guidance Note and Scope of the Working Group is set out in Appendix 1)

2. Background

In April 2014 Cheshire West and Chester's Executive decided that a small Cross Party Group be established to consider how the Council will understand the unconventional gas and oil techniques and inform the policy development process. Further justification for establishing the working group is made by the following emerging issues:-

- There is a clear National focus on unconventional gas and oil extraction, with Government pursuing a clearer regulatory pathway to support the Shale Gas industry. As a Council we want to be clear about what our role is within the regulatory landscape.

- From geological surveys, potential shale gas reserves have been identified in the Borough. The benefits of this resource need to be fully understood as do any potential dis-benefits as a consequence of its extraction.

- Strong concern has been expressed by residents in the Borough. A number of "Frack-free" groups have formed and presented local and community concerns to the

Council. We want to ensure any evidence that residents and community groups have to support their concerns is made available to members of the Council.

- Cheshire West and Chester Council as the Local Planning Authority expects a growth in the number of planning applications it receives for both exploration and extraction of shale gas. Members of the Council making decisions on future applications need to be better informed across a wide range of issues in order to be better prepared to come to a balanced view when applications are submitted.

3. Operation of the Working Group

Operating in an advisory capacity, the Working Group has followed a Commission of Inquiry model to examine key issues in detail, setting out specific questions, returning an opinion and producing a report to the Council's Executive. Presentation of evidence on the relevant core topics were planned through a series of meetings involving experts, advisors, academics, practitioners, policy makers and local interest groups.

It was critical from the outset to be clear about what was to be investigated at each meeting. Key lines of inquiry were set out for each stage, articulating what was to be investigated and agreeing a series of specific questions that the Working Group would seek to have answered with the assistance of expert witnesses.

The Working Group agreed to:-

- Operate on the same lines as a Commission of Inquiry.
- Meet on a "Task and Finish" timetable.
- Report progress to the Executive.
- Produce and submit to the Executive a Report of its Findings.

4. Invited Speakers

At each meeting key speakers were invited to attend and present evidence to the working group. Speakers were chosen based on their knowledge and expertise within the four key themed areas. From the outset it was always the intention to try and gain a balance in the evidence delivered at the meetings.
Those invited to speak were requested to deliver a short keynote presentation on the relevant core topics, this was followed by an opportunity for the Working Group members to seek clarification, discuss points with invited experts and advisors and call for any required follow-up information.

List off Invited speakers:-

1st meeting – Regulatory Framework

- Duarte Figueira – Department of Energy and Climate Change (DECC)
- Gordon Whitaker & Steven Molyneux – Environment Agency
- Tony Almond – Health and Safety Executive
- Fiona Hore – Local Planning Department, Cheshire West and Chester Council

2nd meeting – Environment

- Doug Parr – Greenpeace
- Helen Rimmer – Friends of the Earth
- Simon Talbot – Ground Gas Solutions Limited
- John Blaymires -IGas

3rd meeting – Economy

- Tom Crotty – Ineos
- John Balymires – IGas
- Stephen Elliott – Chemical Industry Association
- Peter Benson – Local Interest Groups / Friends of the Earth

4th meeting – Community

- Dr David McCoy – Medact
- Andrew Needham – Campaign to Protect Rural England
- Ken Cronin – United Kingdom Onshore Oil and Gas
- Dr Mariann Lloyd-Smith – *Senior Australian* Toxicologist (Community Group)

5th meeting – Community

- Andrew Miller – MP for Ellesmere Port
- Professor Joe Howe – University of Chester

5. Public Speaking

In addition to the invited speakers 15 minutes was allocated at each meeting for public speaking. Members of the public have delivered a number of statements to the Working Group, now included in the notes of meetings. Over the course of the themed meetings, requests to speak were only received from local interest groups and residents.

List of speakers:-

1st meeting – Regulatory Framework

- James Cameron
- Phil Coombe
- Matt Bryan
- Naomi Luhde-Thompson (Planning Advisor, Friends of the Earth)

2nd meeting – Environment

- James Cameron
- Matt Bryan
- Peter Benson

3rd meeting – Economy

- James Cameron
- David Young
- Matt Bryan
- Huw Rowlands

4th meeting – Community

- Stephen Allman
- Fiona Young

5th meeting – Community

- Phil Coombe
- James Cameron
- Chris Matterson
- Fiona Young

In addition to Public Speaking time, during the 4th and 5th Sessions, time was also allocated for Councillors to speak. Cllrs Andrew Dawson and Lynn Riley spoke at the 4th Session and Cllr Hugo Deynem at the 5th.

6. Submission of Evidence to the Working Group

A call for evidence was posted in advance of each meeting on the Council's web site. All submissions of evidence were welcomed by the Working Group, these were then made available to members of the Council to view and consider. Access to the evidence and all the submitted material was made through the use of an internal Council share-point site that all members of the council have access to.

A great deal of detailed evidence was submitted which was then made available to the Working Group. The Working Group is grateful to have received all the evidence and would like to thank all those who were able to provide submissions.

The working group believes that the process undertaken has provided greater transparency by giving the public and other interested parties including the oil and gas industry the opportunity to view its operation as well as submit evidence.

Following the conclusion of the working group all the evidence and documentation will remain accessible to members of the Council and officers as a point of reference and information. Members may want to view this evidence as supplementary information when planning applications are made to the Council.

7. Key Themes Investigated

The Working Group wanted to identify a key line of Inquiry for each meeting, to clarify what was to be investigated and to agree a set of specific questions that the members of the group would seek to have answered with the assistance of expert witnesses.

The working group identified the following four key themes to be investigated:-

I. **Regulatory Landscape** – To gather evidence from bodies that have a statutory responsibility for the regulation and granting of permissions for the operation of onshore unconventional gas and oil operations. This has helped to clarify the role of the various statutory and public bodies and in particular the role of Cheshire West and Chester Council.

   The following questions were set out as a guide to those invited to speak and to provide a context for the submission of evidence.

   - What is the Geology of West Cheshire; how well informed are we about the likely areas of reserves of unconventional resources in the Borough?
   - What are the technical facts behind Conventional and Unconventional gas and oil exploitation, for example what it involves, what does it look like and the likely scale of the operations?

- Current Planning Policy and Guidance for Oil and Gas Exploration & Development/Extraction. What is the Role of LA's and their decision taking powers?
- What is the role of the Regulatory Agencies; this includes their role in areas such as Licencing / Consents / Mineral Rights?
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II. **The Environment** – To help better understand the issues facing the environment in the exploration and extraction of shale gas. This has been recognised as the largest area of concern for the local community, reflected by the amount of evidence submitted to the working group on this theme. The working group has been able to view the evidence to gain a greater overview of the issues not only in terms of the risks but also what measures need to be taken to mitigate any potential impacts on the environment to help manage risk.

The following questions were set out as a guide to those invited to speak and to provide a context for the submission of evidence.

- What is the evidence of potential risks to the environment of both exploration and extraction?
- Are there any short, medium and long-term impacts on the environment that we need to be aware of?
- Recognising that any form of drilling operation would have some level of impact on the environment, what would be considered to be environmentally acceptable?
- What assurances can be offered that any impacts on the Environment will be closely monitored?

III. **The Economy** – To increase awareness of the potential economic benefits / dis-benefits to the Borough and its residents. The working group wanted to gain a better understanding of the extent to which the development of the shale gas industry might be viewed as an opportunity for the local economy, jobs and economic growth.

The following questions were set out as a guide to those invited to speak and to provide a context for the submission of evidence.

- What are the potential economic benefits of shale gas extraction to the borough?
- Are any economic benefits likely to be short, medium or long-term?
- Are there any long term economic costs we need to be aware of resulting from extraction and production?

- What is the likely contribution of the extraction of shale gas in the Borough to the Country's future energy security?
- Are there any negative economic impacts that we need to be aware of?

IV. The Community – To learn about the issues that are of concern to the local community of the borough and the scope and extent of any opportunities that might be available to local areas from the operation of the industry.

The following questions were set out as a guide to those invited to speak and to provide a context for the submission of evidence.

- Are there potential benefits of shale gas extraction to the local community?
- Are residents right to be concerned about exploration and extraction?
- Community concerns seem to be wide ranging, from the impact on the environment to impact on health. Can these concerns be evidenced and put into the context of the potential scale of operations if shale gas was to be extracted?
- Is there a view regarding the balance of community benefits that might include supporting jobs, prosperity and economic growth?
- Is shale gas too important an issue that might help strengthen the nation's energy security, and as such it should overrides local community concerns?

8. **Summary of the Key Issues identified by the Working Group during questioning of the Invited Speakers.**

1st Meeting covering the Regulatory Landscape

Issues raised by the Working Group following the presentation made by Department of Energy and Climate Change (DECC).

- Concern that all potential risks will not be managed. The response from DECC provided assurances that Strategic Environmental Assessments would be undertaken. But in terms of assessing the operating company, only their financial and technical competence is assessed.

- Concern from the Working Group that the credibility of companies to operate sites is largely based on the content of Company Reports.

- A Traffic Light monitoring system has been put in place by DECC to control operations in the event of any seismic activity. Assurances given by DECC that drilling would be suspended if a magnitude greater than M 0.5 (0.5 0n the Richter scale) is detected. Concern expressed by the Working Group that no further monitoring would be undertaken once Extraction Operations on the site ceased.

- The Working Group wanted to highlight the existence of conflicting evidence, quoting as an example some conclusions drawn from a report by the Chartered Institute of Environmental Health "Shale gas and fracking: examining the evidence". Such as, job leakage resulting in job losses in other industries and the potential diversion of investment from low-carbon energy to shale gas. The Working Group recognised the challenge in having to balance all the evidence and the conflicting concerns to be presented to them over the life of the working group.

- The Working Group questioned the part played by the Precautionary Principle. DECC explained their approach was "risk-based".

- The Working Group raised the issue of where gas comes from and the UK gas production versus demand. DECC highlighted the position in 2013 when reserves started to decline. As a result of this and a shift away from fossil fuels towards more renewables and nuclear, there is still a gap in meeting our energy needs which places a reliance on gas. The Working Group may wish to explore the potential of future alternative energy.

Issues raised by the Working Group following the presentation made by the Environment Agency.

- Assurances need to be given that risks will be minimised and managed. The EA explained that each site would be different in terms of its geology and in terms of

what the operator wishes to do. The EA provided assurances that some of the risks would be managed through the issuing and control of permits.

- The Working Group questioned the amount of water required for the extraction of gas, as well as raising concerns regarding where the water would be sourced and what happens to the waste water. The EA suggested in the region of 8,000 – 10,000 cubic metres would be required (the capacity of about 5 – 6 swimming pools). Although the actual amount would need to be assessed at the application stage through the Environmental Impact Assessment. The waste water would normally be disposed of as either industrial affluent and taken through a number of possible treatment routes. The Working Group wanted to find out more about the volume of water required as it was unclear if the figures given related to just one well and if the scale of the operation would also influence the figure given? *In its response to consultation, the Environment Agency has clarified that Hydraulic fracturing for shale gas typically uses 10 to 30 million litres per well.*

- The Working Group sought assurances and comfort from the EA that they would be able to deal with any environmental issues if they were to arise. The Agency places conditions on the Environmental Permits and if not met they would suspend the permit*. In its response to consultation, the Environment Agency has clarified that its powers include enforcement notices, suspensions and revocation of permits, injunctions and ultimately criminal sanctions including prosecution. Any enforcement action we take will be proportionate to the risks posed to people and the environment and also to the seriousness of the breach of the law. We can also require operators to undertake remedial works to rectify the environmental damage.*

- The Working Group sought clarification as to whether issues such as population density and food production are a consideration when issuing permits? The EA would not consider these, but suggested it would be up to the Local Authority to do so when determining planning applications. These "other considerations" might be covered in the Environmental Impact Assessment.

- In response to a question from the Working Group of how often the EA might visit a well site, the EA stated it would be in the region of 16 times over a four month period. It was also clarified that the permit is issued to the operator and not the site. *In its response to consultation, the Environment Agency has clarified that this is an example of one site, as detailed it depends on the situation and risk.*

- Following a question from the Working Group regarding the selling-on of permits issued to operators, the EA stated that they could be transferred. However the EA was less able to provide a definitive answer to the question from the public attending the meeting, of what would happen in the event of a company going bust? This will need to be further clarified.

Issues raised by the Working Group following the presentation made by the Health and Safety Executive (HSE)

- The Working Group asked if the well sites would fall under COMAH (Control of Major Accident Hazards)? Where high-hazard industries or where dangerous quantities or substances are stored. The HSE reported that well sites do not fall under COMAH, but are satisfied that robust regulatory checks are in place to ensure safety. The Working Group commented that as this was a new industry there is uncertainty regarding the risks posed and as such it should be tightly regulated.

- It was stated by the HSE that a site would be monitored for a period of 6 months after being declared as being abandoned. Concern was expressed regarding this short time period, as problems might arise on the site in future years. This was an area that the Working Group wanted to seek further clarification and assurances from the regulatory authorities.

- Some clarification was requested regarding the definition of "abandonment". This was considered to involve the capping of a well and the pouring of a concrete fill into the bore hole to a depth beyond 100 metres.

- A question from the Public attending the meeting, raised the issue of whether as part of the approval process undertaken by the HSE, the use of independent examiners might include the appointment of employees of drilling companies. The HSE assured the Working Group that they would always checked the competence of external companies used.

- Concerns were raised by a member of the public attending the meeting that the integrity and safety of the well / bore holes could not be guaranteed in future as the materials used to encase the bore hole (concrete and Steel) corrode over time.

Issues raised by the Working Group following the presentation made by the Local Planning Authority.

- The Working Group wanted to better understand the issues that could be taken into account when determining a planning application for exploration and extraction. Planning considerations would include those areas listed as "material considerations" and would be applied in the same way as for all other applications dealt with by the Council.

- It was clarified that in terms of Planning , Section 55 of the Planning Act (1990) states that, development means the carrying out of building, engineering, mining or other operations in, on, over or under land or the making of any material change in the use of any buildings or other land.

- The Local Planning Authority is not able to set a maximum or minimum drilling depth for exploration.

- The Working Group were assured that any breaches of conditions placed on an application would be dealt with in the normal way by enforcement.

- The Working Group wanted to reinforce the need to ensure local residents and communities are fully consulted when applications are submitted to the Council for determination. It was acknowledged that Parish Councils are automatically informed and consulted, but in areas that are un-parished, it was suggested that local interest and community groups representing the community would need to contact the Council.

- The Planning system does not allow for financial resources to be allocated and taken from the applicant as part of the planning conditions for the purposes of remedial works to the site once operations have ceased.

- The Working Group indicated it would like to find out more about what is considered to be in and out of scope when determining a planning application for the exploration of gas and to better understand the part played by an Environmental Impact Assessment, including what it would cover and who would be asked to contribute to it?

- The Working Group noted the concerns expressed from the members of the public attending the meeting that coal bed methane exploration should also be subject to an Environmental Impact Assessment no matter what the size of the operations proposed.

- It was put to the Working Group from the Public that there was the potential in Cheshire to establish 600 wells. The Working Group asked if this potential scale could be substantiated by evidence.

2nd Meeting covering Environmental Issues

Issues raised by the Working Group following the presentation made by Friends of the Earth and Green Peace

- When questioned on what measures and conditions might be put in place to make unconventional gas and oil operations more acceptable, based on the evidence brought to the working group both Friends of the Earth and Green Peace stated that they would not see any form of operations as acceptable.

- Suggested that a moratorium be placed on any decisions made on Unconventional exploration and extraction to allow time to look further at all the issues, and that:

    - The cumulative impact is looked at.
    - Environmental Impact Assessments should be made mandatory.
    - Ground water to be assessed and protected.
    - Impact on air quality needs to be taken into account.

- It was clarified that the 9 – 29 million litres of water needed per frack as stated in the presentation would equate to four wells.

- The "displacement" argument made by the Department of Energy and Climate Change was challenged by Friends of the Earth and Green Peace. Studies undertaken by Manchester University found that globally there would continue to be an increase in the burning of fossil fuels. Placing a greater reliance on Shale gas would not reduce the global burning of fossil fuels.

- Questions were raised regarding the difference between drilling for Shale gas and Coal Bed Methane (CBM). One of the differences involves the use of Chemicals, where they are used for Shale Gas but not CBM.

- The Working Group wanted to better understand the differences between the USA and UK in terms of potential impacts. Differences were highlighted of population density, where in the USA shale gas is being extracted from areas of low population, this would not be the case in the UK. Licences to drill and the regulatory regime are also very different.

- The Working Group questioned why in the USA, despite all the health scares and the issues that have been broadly publicised in the media regarding the impact on the environment and people's well-being that such an advanced country continues to extract shale gas, possibly against the wishes of local residents and who are now realising the implications of the operations. It was suggested the USA has a permissive regime.

- The Working Group raised the question of how we might measure any impacts on health. Some health issues may not come to light immediately and as such all the potential issues regarding health cannot at this point in time be fully evidenced, as such 100% assurances cannot be provided that there will be no health implications as a result of the operations. Suggested that health needs to be one of the considerations taken into account as a matter of judgement by Council Members when making decisions on the granting of planning permission for unconventional Gas and oil operations.

- Air pollution raised as a further issue of concern that will need to be taken into account. The Working Group noted this, but expected it to be covered by Environmental Impact Assessments when carried out for individual applications.

- The Working Group acknowledged the approach adopted in the EU of taking the precautionary principle. This was raised and noted at the first meeting which focused on the regulatory landscape.

- The Working Group asked for an overview of the immediate impacts on the environment resulting from the operations on unconventional gas and oil sites. These were listed as noise, light pollution, venting, traffic, waste water management

and treatment. The way in which these are planned to be managed or mitigated is unclear. There is particular concern regarding the management of waste water. The Environment Agency has not provided any guidelines to the industry regarding limits of contamination of waste water.

- The Working Group were informed that the lifetime of operations on sites (wells and pads) are likely to stretch to eight years. The potential of any impacts on the environment, such as methane leaks could not be viewed as just a short-term risk. It was confirmed that surface water storage would be covered to prevent evaporation.

Issues raised by the Working Group following the presentation made by Ground Gas Solutions Limited

- The Working Group wanted to gain a view on whether the regulatory framework and policies that are currently in place are strong enough (adequate and fit for purpose). The views from those who operate in or advise the industry feel that it is, although there are some aspects that still require further work.

- Concern was expressed regarding the cuts being made to one of the key regulators the Environment Agency and their current focus on flood resilience, which would potentially have an impact on their ability to monitor drill sites. It was suggested that the money raised from permit fees would be used to help pay for monitoring.

- At this stage it would be difficult to fully identify who is most likely to benefit and to what extent, including the local community. This is why, it was suggested we need to undertake exploration.

  In its response to consultation, the Environment Agency has commented that funding for setting up the regulatory regime comes from Defra grant-in-aid. The Environment Agency's work to regulate individual sites is financed through the charges raised for environmental permits and licences, which is not subject to spending cuts.

- Direct comparisons cannot be drawn with the USA for a number of reasons. One of the main differences lies with the regulatory framework, where it is accepted that in the UK the rules and regulations around the industry are very much more tightly drawn. In comparison regulations in the USA are considered to be weak.

- Questions raised regarding the dangers posed to the Environment from drilling techniques used for unconventional gas and oil, based on evidence from existing sites. Some of the reasons provided point towards errors such as fracking fluid leaking into a geological fault, causing a seismic shift.

- Suggested baseline data on air pollution is collected to help in the monitoring of sites if they are to be introduced in future.

Issues raised by the Working Group following the presentation made by IGas

- One of the main areas of concern is that of well integrity (uncontrolled release of hydrocarbon gas, escape of fracking fluids and water). Ensuring the integrity of wells is critical in order to prevent any leakage of materials that would contaminate soil and ground water. The industry places a great deal of importance on this issue and is keen to demonstrate the robustness of the drilling operation and techniques. Operators such as IGas issue their own guidance.

- Some concern and suspicion expressed that the industry is itself responsible for appointing well examiners. Suggested by IGas that this should be viewed in the same way as companies that appoint and pay for independent auditors. Health and Safety Executive has limited resources and as such focus on the more dangerous and high risk well sites.

- The Working Group sought clarity regarding responsibility and liability for the site, wells and drilling/fracking areas post abandonment. The law is currently weak on this, but responsible operators should, it is understood take on full responsibility post abandonment.

3rd Meeting covering the Economy

Issues raised by the Working Group following the presentation made by the Chemical Industry Association (CIA)

- Members wanted to gain a better understanding of the likely impact that supplies of Shale Gas from the USA might have on the UK. In the opinion of the representative from the Chemicals Industry, it was too early to say at this point in time due to the price differences between the USA and UK. But it wouldn't be long until products from the USA would be competing with our markets. This would happen if we do not address the price differential that is currently between two and a half to three times greater in the UK.

- The current level of subsidies to renewables was highlighted. This was raised alongside the time it would take to place shale gas on a regular supply to the industry. The view from the Chemical industry is that the immediate priority is to try and safeguard and retain the 30,000 jobs in the sector. Having new gas resources on-line by 2020 will help to secure these jobs. In terms of subsidies, these tend to change for different energy sources over time.

- Members pointed to the fact that the Chemical Industry is a big consumer of energy. The perception is that it is not in favour or renewables and is more strongly in favour of shale gas, the Working Group asked if this was indeed the case and if so why? The response to the Working Group from the industry was that it is not against the development of alternatives, but given the narrow time frame, pursuing one single track of renewables might only be viable in the short-term. The approach to energy is

to use a broad mix of energy of which shale gas is only one. Shale gas is not the sole option for the Chemical Industry.

- It was put to the invited speaker that Fracking is untested in the UK, so why is the industry pursuing a high risk strategy to put this in place, even ahead of nuclear? A secure and affordable energy source is a priority for the industry. There is real concern about having to become reliant on imported energy. As a consequence there is a strong argument to explore energy from our own sources. The clear message from the industry is that gas and to some extent coal will continue to play a significant part of the short to medium term energy mix.

- It was put to the Working Group that in the region of 30,000 jobs needed to be safeguarded and that not having an affordable and reliable energy source might impact on the future of the energy intensive industries that support these jobs. It is not possible to state how many of these jobs would be directly threatened if Shale gas is not exploited in the UK. But what can be stated is that there have already been a number of companies that have now gone partly due to high energy costs, including those involved in the production of glass and paper.

- The Chemical Industry Association does talk to other sectors and industries and through formal groups is able to gain a broader understanding of the issues they all face. Issues such as energy efficiency and renewables are looked at.

- The following quote from the report of the Government's Chief Scientific Advisor was put to the key speaker; "delayed recognition of adverse effects leads to massive expense and reduction in competitiveness". This was made in reference to the possibility that Fracking might in future turn out to be more costly to the nation due to the possible emergence of a number of unknowns. The point was also made that there would be a cost to the economy if there was a delay in the seizing of opportunities. The working group was reminded of the need to focus on facts rather than opinion.

- Suggested that the only way to find out the true potential for jobs and for the economy is to start exploring.

- In response to a question the CIA clarified its interest in Shale gas as an energy consumer.

Issues raised by the Working Group following the presentation made by Ineos

- One of the sites operated by Ineos is located at Runcorn; the Working Group asked Ineos if it had considered investing in renewables at this site given its potential to exploit for example, energy from wind? The Working Group were informed that this had been looked at, but at the moment it was considered not to make economic sense, or was practical due to the unpredictability of wind as a reliant source of energy.

- The use of coal was also raised as an alternative source of energy to gas. Coal however would double C02 emissions and there would need to be a further investment in coal-burning stations. It is also considered to be a short-term option.

- The importance of Shale gas to the local chemical industry was highlighted as an efficient feedstock and power source. It was highlighted that if we don't produce our own gas we will increasingly need to become more reliant on imported gas. We already import 50% which on current projections is likely to rise to 80% within the next 10-25 years. This raises issues of energy security and competitiveness.

- Growing competition from the USA as a result of cheaper energy from Shale Gas was put to the Working Group as a possible threat to industries in the UK. The USA is now investing heavily in energy intensive industries such as steel manufacturing. The message from Ineos to the Working Group is that jobs will be lost if we don't address the supply of gas to industry and in particular the chemical industry within the UK.

- The Working Group asked if new infrastructure to help deliver energy to the area would be of any significant benefit. In response this is considered to be more of a long term rather than short term benefit.

- The need to be able to bring the local community on board in any future development and investment is acknowledged.

- The view from the industry is that economic benefits are not based on the assumption that gas prices will fall. It is widely acknowledged that the price of energy is not likely to fall as has happened in the USA as a result of the shale gas industry. The UK is currently experiencing closure in chemical facilities due to growing competition rather than a fall in the demand for their products. Prices have increased and will continue to do so continuing to place pressure on high energy dependent industries.

- The current priority is to safeguard existing jobs in industries that are energy hungry. For those with a heavy reliance on gas, this will only be possible if they find alternative sources of gas, lessening their reliance on imported gas.

Issues raised by the Working Group following the presentation made by IGas

- Clarification was sought regarding the extraction of oil alongside shale gas. The two are related, but here in the North West, because of the geology only Gas can be extracted with only some light end liquids.

- It was stated that the life-time of shale gas extraction sites could vary between 10 to 25 years. With only about 10% of the gas resources contained in the rock able to be extracted, given current technology.

- The state of our own gas supply reserves from the North Sea has been put at between 6-7 years. This means that we have to import large amounts of gas (over 50%). Companies therefore have to buy gas from the places that have it such as the USA, which in turn also means that we are spending our money abroad supporting the US economy rather than our own.

- IGas want to ensure communities are brought alongside. There are strong regulatory rules in place that ensure operators are environmentally responsible and operate safely. Assurances offered that what happens in the USA in terms of how the industry is regulated bares little resemblance to how regulation is dealt with here in the UK. The point being that our regulations are much stronger, whilst the process of gaining the permissions to explore and extract is significantly more detailed and time intensive. In the UK there is a step-by-step approach, which also means that the cost base will be higher than the USA.

- The interpretation of a paper by the Government's Chief Scientists (Innovation: managing risk, not Avoid it) is that risks have to be assessed.

- Concern about shale gas extraction has been raised by some local businesses such as Chester Zoo.

Issues raised by the Working Group following the presentation made by Friends of the Earth

- Members raised the question of job creation and the claims made for the number of potential jobs that would be created by the shale gas industry as opposed to jobs that could be developed from the energy-efficient methods. The Working Group wanted to better understand the significance of this. It was suggested that there are no benefits or dis-benefits to fracking if energy efficient jobs are created.

- The Working Group posed an observation, that if by stopping the import of fuel from the USA wouldn't this also reduce the carbon footprint from the supply of energy?

- The Working Group wanted to seek further evidence in support of the figures set out by Friends of the Earth for the potential investment and jobs from renewables and energy efficiency.

- Clarification was sought whether in the view of Friends of the Earth the article by the Royal Society (Shale gas extraction in the UK: a review of hydraulic fracturing, 2012) was considered to be impartial?

4th Meeting covering the Community

Issues raised by the Working Group following the presentation made by Medact (Health Charity)

- Members were assured that the report which formed the basis of the presentation by Dr David McCoy would be published on the 23rd March and would be sent to the working group to be considered as part of the submitted evidence. Dr McCoy was able to clarify that the report had not been commissioned, but had been produced by Medact in its role as a charity organisation and in response to the report by Public Health England in October 2013.

- Assurances were given to the working group that the information presented to them would also be found in the published report and would be referenced back to credible evidence.

- Members wanted to be use the report to help them link to specific operations proposed in a planning application when eventually submitted to the Borough. The report therefore needed to be relevant to the conditions found in Cheshire rather than the USA or Australia. It was hoped that the report would be able to make a connection with conditions in the UK.

- Dr McCoy pointed out that the issues of trying to match like with like is not that straight forward. It is true that most of the evidence has been referenced from areas that have undergone fracking as we don't have such examples in the UK. As such a number of judgements have to be made on how the evidence from other countries is applied in the UK. Based on what we know about our geology, demographics, population density etc, it's suggested that the risks are actually higher here in the UK than in the USA.

- When questioned about the use of reports commissioned by interested parties, Dr McCoy emphasised the need to steer away from evidence that can be linked to interested parties with a vested interest and who would therefore have a bias. Medact has no vested interest and is not funded by any groups that have a vested interest or otherwise in unconventional gas and oil.

- Dr McCoy was asked if he knew of any examples of where health impacts had been evidenced. In putting forward Lancashire as an example, Dr McCoy also wanted to add that the claims of protestors were found to be exaggerated. He stated that there has been some exaggeration on the potential threats of pollutants on human health, however there is also clear evidence that there is a range of toxins that will be released, even with the strongest regulations being in place. This will carry some risk but we can't be precise.

- Evidence from the USA shows that communities have been affected. The Working Group wanted to find out if risks could be managed down to an acceptable level? Dr McCoy's view is that he is not convinced it can as we are currently seeing a cut in funding to the regulatory bodies and as such a loss of skilled personal, the regulatory bodies are becoming weaker, more fragmented and under resourced.

- Dr McCoy also wanted to relay the message that Climate Change remains to be the biggest threat and that he hoped fracking was not being seen as a party political issue.

- An area of concern highlighted by Dr McCoy was the proximity of aquafers to any drilling operations. It would not be possible to substantiate the claim that aquafers would be 100% safe and that there would be no contamination, giving strength to the argument that we should adopt a precautionary principle.

Issues raised by the Working Group following the presentation made by United Kingdom Onshore Oil and Gas (UKOOG)

- Members raised a question relating to the consideration and assessment of a number of factors such as the location of aquifers and density of populations. Ken Cronin pointed to a number of reports that could better inform the working group, in particular the report of the "Chartered Institute of Water Management" and "Royal Society of Engineering Report". These would be made available to the group. The part played by Environmental Impact Assessments was also outlined, it was suggested to the working group that it also has a look at the Environmental Impact Assessment that accompanied Caudrilla's planning applications in Lancashire.

- Further explanation of the figures quoted for the use of water was requested. Members questioned the ranges given for the amount of water likely to be used in the operation of drilling sites. In response the working group was informed that the ranges attempted to account for the differences between sites that would vary in the number of laterals drilled. The likely amount of water to be used at each site would be identified in the Environmental impact Assessment.

- Members asked for clarification on:-

    - The measurement of methane gas.
    - What is considered to be independent in terms of who reports on the integrity of operations?
    - What is meant by real-time in the monitoring of the drilling site?

- Ken Cronin was able to respond, explaining that industry has agreed to undertake base-line monitoring for wells prior to any activity and then continue to monitor after

activity had ceased. Although the industry pays for the monitoring and the examiner, they must be independent of any profit making element of the industry. In terms of real-time, it was stated that examiners would be allowed on site, even during construction.

- Members were informed that the Environmental permits would cover all receptors, such as soil, water and air, and would include methane and ground water.

- Members have to date heard evidence from a number of regulatory bodies, operators and interest groups. Along with the evidence submitted to the working group there seems to be a number of contradictions made to the working group regarding safety and health implications. It was put to the working group that four regulatory bodies are in place which should be able to offer a level of robustness.

- Members wanted to find out what guarantees could be offered to ensure local communities would receive the resources outlined as community benefits. There was some concern that the money would be directed to Local Councils and would not necessarily be spent within the local community affected by the drilling operations. In response the working group were told that the industry has tried to create a balance between the very local and wider community. For clarification £100,000 for exploration will go directly to the Community, as will the 1% of the production revenue. At the moment the industry has set up pilot schemes, involving an independent charity (UK Community Foundation) to help create a local community Working Group that will help to spend any resources given to the community on local needs and issues. Industry will hand over money directly to the charity.

- Members were told that community benefits schemes were nothing new and had been in existence for a number of years, examples given of windfarm developments.

- It is only possible to estimate how much revenue might be created for each site and as such how much potential funding might be gained by the local community. This is dependent on the success of the site.

- Members asked for a definition of the local community. Ken Cronin acknowledged that this was not so straight forward, but in general a radius could be drawn around a drill site to identify the geography as a starting point. This could then be developed and adjusted over time.

Issues raised by the Working Group following the presentation made by the Campaign for the Protection of Rural England (CPRE)

- Members wanted to try and get a feel for CPRE's overall view to Unconventional oil and gas exploitation. The response given by Andrew Needham is that CPRE is not

opposed, but would want to ensure strong conditions are put in place. This has been the approach taken by CPRE in Lancashire, where 22 recommendations have been put forward, seven in relation to surface impacts (including noise, pollution, impact of traffic, water contamination); and ten regulatory including planning issues and five relating to the community and greenhouse gases.

- Members highlighted the reference made to COMAH (Control of major accident hazards) as they wanted to emphasise the point made by the Health and Safety Executive when it addressed the working group that it had no plans to cover Fracking. It was suggested that it would be helpful if the principles of COMAH were applied to any future fracking sites.

- The position taken by CPRE in Kent was put to Andrew Needham. It was noted that CPRE Kent had taken the stand that it didn't want fracking in the County, but Lancashire had taken more of a considerately view in its approach.

Issues raised by the Working Group following the presentation made by Dr Mariam Lloyd-Smith *(Senior Advisor to the Australian National Toxics Network)* representing the Community

- Members wanted to find out how a 2km exclusion zone had been successfully put in place in Australia as part of the conditions attached to drilling and extraction? This, it was reported was partly due to the strength of evidence put to Government. Dr Lloyd-Smith suggested that in light of further evidence this should be extended to 10kms. *In response to consultation, a representative of the community groups comments that there is no exclusion zone at all in the UK so that is a dramatically lower standard of regulation.*

- Members were informed that drilling had been undertaken in both urban and rural areas. However most of the wells have now been forced to close down due to the detection of chemicals, flow back issues and the inability of treatment plants to take contaminated water. The detection of BTEX (Benzene, Toluene, Ethyl benzene, Xylene) has been of particular concern. (*BTEX chemicals are components of drilling fluids and are also naturally occurring Volatile Organic Compounds in coal and gas deposits and are found in associated groundwater. Their short term health effects can include skin, eye and nose irritation, dizziness, headache, loss of coordination and impacts to respiratory system. Chronic exposure can result in damage to kidneys, liver and blood system.*)

- Following on from what was put to the working group from previous speakers regarding community benefits and community engagement; Members asked for any

evidence of whether involving the community at an early stage, undertaking Environmental Impact Assessments and making assurances that operations would be regulated properly would result in making everything safe? In response Dr Lloyd-Smith firstly quoted from the United Nations report that "*you can't regulate the industry into safety*". It was also noted that Queensland undertook public consultation, but there have been issues in being able to obtain a full disclosure of chemicals. The reality is that industry will not be able to address the basic problems, no matter how much consultation is undertaken.

- When asked about the effectiveness of the regulatory framework to be able to protect communities, in Dr Lloyd-Smith's view it would be near impossible to regulate properly and that industry would pollute, even though not intentionally.

- A question was put to Dr Lloyd-Smith regarding the impact on local communities. This was reported in one case as being tragic, as six families had to be financially bought-out of their properties due to health impacts as result of exploitation operations. Some of the health implications, particularly those suffered by children would however be long lasting. The overall impact on small communities was bad and seen as a change for the worse, with an influx of workers and change in the dynamics of small tightknit communities.

- Comparisons were drawn with the UK. Having visited the UK a number of times, in the view of Dr Lloyd-Smith it would be difficult to imagine how the UK would be able to accommodate and cope with the operation of wells. In Australia impacts were being felt km's away from the drill sites. In the view of Dr Lloyd-Smith, based on the experiences in Queensland Australia, the UK would find it very difficult to manage.

- Radioactive substances are now starting to be found in the areas that have been drilled. It appears that radioactive / nuclear substances are being re-mobilized through the soil and entering the atmosphere.

5th Meeting covering the Community

Issues raised by the Working Group following the presentation made by Andrew Miller MP

- Members sought a view on the future use of shale gas as a bridge or an alternative to low carbon energy? It was acknowledged that we have an energy gap that cannot be filled by renewables alone. We also have a limited nuclear energy supply industry that will require anther 4 to 5 additional plants to meet current energy needs. The need to reduce our dependency on other countries was put to the Working Group .

- We don't as yet have the full regulatory controls needed to properly regulate the industry. However the Infrastructure Act (2015) offers some of the safeguards needed whilst local Authorities will have some of the additional powers needed, particularly in relation to planning.

- Other Regulatory bodies such as the Health and Safety Executive although held in high regard, will nonetheless need to develop new skills sets.

- During the first session which focused on the Regulatory Framework, the Working group were informed by the Health and Safety Executive that onshore Unconventional gas and oil drilling sites would not be covered by COMAH (Control of Major Accident Hazards). But despite this they also stated that they were confident of being able to regulate the industry. The Working Group remained unconvinced of this and wanted to seek the views of Andrew Miller M.P. It was suggested that Regulatory measures in place in Australia and the US are not as strong as here in the UK, however work is still needed to ensure the UK has stronger regulations in place.

- Members wanted to further explore the potential use of water in the operation of drill sites. There is little evidence coming forward from the water companies that provides a view on our ability to supply the operation of drill sites. Research is being undertaken to look at the use of sea water. In terms of environmental impacts, some can be managed through regulation, such as noise and traffic movement. However, there are concerns about how this might be managed in densely populated areas.

- The safety of wells post operations was raised. It was suggested that Local Authorities have powers as a Local Planning Authority, they can place strict conditions on any planning approval to insist on the long term monitoring of the site. However, in order to do this baseline measures are needed.

- It was suggested that drill sites could be restored once operations had ceased.

- In terms of health issues, this was described as belief verses science where there is very little sustainable evidence. Any long-term exposure to any chemicals is accepted as being a bad thing. The target should therefore be for zero chemicals and leakages. Reports into the health implications show very little physical health issues, for

example the report prepared by the Director of Public Health in Lancashire highlighted some of the stress related mental health issues.

Issues raised by the Working Group following the presentation made by Professor Joe Howe

- Members of the working group are urged to have a look at the Environmental Impact Assessment undertaken for Lancashire.

- Water has been raised a number of times during previous sessions. It was suggested that investment in research and technology will help to develop processes where water might be processed (cleaned) on site. It was also clarified that the amount of water required for each site is the range of 6 Olympic sized swimming pools per well (assumption is that there would be in the range of 12 wells per pad).

- It was put to the Working Group that there is currently a lack science and evidence based information which is now needed to help inform public policy. This also needs to take account of the sensitivities of place.

- The Working Group wanted to find out more about the potential benefits to the local community. These were listed as, creating high value jobs, helping to stem a local brain-drain away from the local area and creating social sustainability.

- It was explained that the example of the Marcellus Shale Field provided by Professor Joe Howe was very different from our Borough, different in terms of geology, population density and breadth of the shale field. This re-enforced an important issue for the Working Group, of trying to make a judgment on how to compare areas that are very different on a number of levels. The need to compare “apples with apples” was made.

- No funding has to date been made available to help investigate and carry out research into health, it was suggested that this would be welcomed by the academic community.

Part II: Key Issues

9. Overview of the Key Issues emerging from the 1st Meeting on the Regulatory Landscape.

Members of the working group pursued the following key lines of Inquiry.

- What is the Geology of West Cheshire; how well informed are we about the likely areas of reserves of unconventional resources in the Borough?
- What are the technical facts behind Conventional and Unconventional gas and oil exploitation, for example what it involves, what does it look like and the likely scale of the operations?
- Current Planning Policy and Guidance for Oil and Gas Exploration & Development/Extraction. What is the Role of LA's and their decision taking powers?
- What is the role of the Regulatory Agencies; this includes their role in areas such as Licencing / Consents / Mineral Rights?

The Unconventional Gas/Oil onshore industry is a new and emerging industry in the UK and as such the Working Group understands it to be as yet untested both in terms of how the Regulatory bodies are able to provide guarantees for the safe management of the process and in terms of any potential impacts that operations might have on the environment, local communities and the economy. However in stating this, we were given assurances from the Regulatory Bodies that risks would be managed primarily through the control of permits.

The first meeting focused on the Regulatory landscape. During our questioning of the invited key speakers we expressed concern over the robustness of the current regulatory bodies to be able to fully manage the process and any potential associated risks. This view was buoyed by the quality of the responses provided to us by the Regulatory Bodies, with a failure in part to give a full and comprehensive response to some of the questioning. We recognise the constraints of time placed on those presenting evidence and as such we are of the view that further questions need to be put to the regulatory bodies to help gather a more comprehensive response to key lines of inquiry.

Despite the assurances conveyed to us by the Regulatory Bodies of having in place a risk-based approach, the meeting concluded with a number of unanswered questions, particularly in relation to the responsibility and accountability of the long-term legacy left to future generations. All of the risk mitigation measures seem to focus on the short-term and are limited to the duration of live operations on the exploration and extraction sites.

We have attempted to seek assurances through the evidence presented that the Regulatory framework responsible for the issuing of permits and permissions and also in part, the control, management and monitoring of Unconventional Gas/Oil Extraction has robust checks and balances in place.

In pursuing a number of key lines of inquiry, we received only partial responses in relation to the following questions:

I. What happens if the operating company issued with a licence goes into liquidation?

The Working Group wanted to seek assurances that any potential risks would be managed and that full accountability would be taken for the site.

II. The amount of water required for operations on site, where it would be sourced and how it might be disposed of?

The response provided to the Working Group was strongly challenged. In particular the volume of water required was thought to be understated. There was concern regarding high volumes of traffic needed to transport water.

III. The number of potential wells that could be established in the Borough?

The number of potential wells was suggested to be in the region of 600. This was put to the Working Group by members of the public in attendance. The Working Group asked for evidence of this number.

IV. Monitoring of sites continues for a period of 6 months following abandonment of the well. After that time who becomes liable for the site?

No one organisation or Government body would automatically assume responsibility for the site. This raises further concerns regarding accountability for addressing any issues that may arise after the 6 month period. This is one of the issues that currently remain unresolved; there is a strong view that it will need to be pursued in order to help identify a body that can be vested with any liability for abandoned wells, in the same way for example, that the UK Coal Authority provides that role for the coal industry and where resources are held back for future decommissioning.

V. When is an Environmental Impact Assessment required?

It is unclear when an Environmental Impact Assessment is required. There is some ambiguity regarding the planning process and the cross-over of responsibility for some areas, such as the consideration of specific environmental issues and whether they are to be dealt with when determining planning permissions or considered as part of the Environmental Impact Assessment.

A number of the responses received as a result of the consultation attempt to address the questions raised. These can be read in Appendix 3, in particular Consultation response Ref Number UGO 3, 6, 7, 8.

10. Overview of the Key Issues emerging from the 2nd Meeting on the Environment.

Invited speakers included representatives from Environmental groups and those directly involved in the exploration and extraction industry to hear evidence regarding the potential level of impact operations might have on the environment. Members of the working group wanted to pursue the following key lines of inquiry:

- What is the evidence of potential risks to the environment of both exploration and extraction?
- Are there any short, medium and long-term impacts on the environment that we need to be aware of?
- Recognising that any form of drilling operation would have some level of impact on the environment, what would be considered to be environmentally acceptable?
- What assurances can be offered that any impacts on the Environment will be closely monitored?

Those presenting evidence on behalf of Environmental and Local groups suggested a moratorium be placed on any decisions to be made on unconventional exploration and extraction to allow time for further evaluation of all the issues such as protection of ground water and impact on air quality. A blanket moratorium has been suggested but not supported nationally.

A similar call was made to the House of Commons, but rejected. The call was for an amendment of the Infrastructure Bill to place a "Moratorium on onshore unconventional petroleum". The House of Commons Environmental Audit Committee on the Environmental Risks of fracking also suggested a moratorium. We have also noted that Scotland has now placed a moratorium on planning consents for onshore unconventional oil and gas wells.

We acknowledge the range of issues listed as having a potential impact on the environment. The Council will want to ensure Environmental Impact Assessments (EIA) are robust and cover the range of issues highlighted as areas of concern. It might also want to consider how it could best publicise the Environmental Impact Assessment before the planning application is submitted, (an EIA is required where a development is likely to have a significant effect).

The potential impact on people's health is acknowledged as an area of concern. How this might be measured is not entirely clear as any health implications might not immediately come to light, current evidence is not robust enough to be considered as proven. However, despite the lack of evidence from the UK it might be prudent to include health implications when considering future operations for unconventional gas and oil operations. We are unclear how the Council would be able to ensure health issues are considered due to the lack of evidence, but nonetheless given the Council's responsibility for Public Health we suggest it should not be overlooked.

Water has been highlighted to us as one of the key environmental concerns. How waste water is treated and avoiding contamination of ground water aquifers are high on the list of potential threats to the local environment from unconventional gas and oil extraction. The management regimes for waste water will need to be carefully scrutinised and enforced by

the Environment Agency, our Final suggest that the Council may want to seek assurances that this will be undertaken.

Following on from the first meeting that focused on the regulatory framework, we recognise the link between the regulatory agencies and the implementation of environmental safeguards.
We noted that for the industry well integrity is the main area of concern, more so than the actual process of hydraulic fracturing as this could result in the uncontrolled release of hydrocarbon gas and escape of fracking fluids and water. We are aware that ensuring well integrity is therefore critical in order to prevent any leakages of materials that would contaminate soil and ground water. As such we were pleased to hear from the industry that it places a great deal of importance on this issue and welcome its willingness to demonstrate the robustness of the drilling operation and techniques. In our view Members may wish to ask for further evidence from the operators to how well integrity is to be assured when applications for extraction are submitted to the Council.

We feel it would be prudent at each pre- application stage for the Council to enter into discussions to seek answers to a number of outstanding issues or to seek further clarification on issues that may be a cause of concern. This may include such issues as well integrity and responsibility for the well post abandonment.

In terms of the Council's policy approach, this is largely restricted to planning and its regulatory role in the determination of planning applications both for exploration and extraction. As the local planning authority we are able to attach conditions to planning agreements and request additional information to help in the determination of applications. This might be in the form of requests for clarification and detail on the mitigation measures to be introduced to help safeguard against any potential impacts on the environment. As such planning will need to be satisfied that such measures can be put in place alongside a robust monitoring regime.

At this moment in time it is unclear what the planned level and intensity of hydraulic fracturing might look like based on what the industry sees as being economically viable. In the event of growth in future extraction activity within the Borough, as a planning authority it might be prudent to consider the impact of a number of scenarios in terms of different levels of activity including well numbers, life-time off the wells and the likely intensity of operations that will include issues such as traffic movement and noise. This would translate in the need for an assessment and the need to have a clear understanding of the "cumulative impact" of potential hydraulic fracturing activities in the Borough.

11. Overview of the Key Issues emerging from the 3rd Meeting on the Economy.

Members of the working group pursued the following key lines of Inquiry.

- What are the potential economic benefits of shale gas extraction to the borough?
- Are any economic benefits likely to be short, medium or long-term?
- Are there any long term economic costs we need to be aware of resulting from extraction and production?
- What is the likely contribution of the extraction of shale gas in the Borough to the Country's future energy security?
- Are there any negative economic impacts that we need to be aware of?

We received a strong and compelling set of economic arguments for the exploration and extraction of shale gas from those representing the chemical and energy sectors. Safeguarding current employment and helping to secure future viability of the energy intensive users and energy operators was put forward as being reliant on future supplies of gas. We did not disagree with or challenge the points made that both price and energy security are key issues for industries that operate within a global market. We also noted that the price of energy is unlikely to fall in the UK as a result of Shale gas exploitation.

We have noted the future scenarios put forward by the Chemical and Energy sectors, acknowledging the potential impact for the local economy, but also challenging some of these assumptions with a call for a more considered view to be taken on the potential of renewables and the need for greater levels of investment to be made in the local area, noting in particular the opportunities of energy from wind along the Mersey Estuary.

Although a key justification for a UK based Shale gas supply is built around the need to safeguard jobs, it appears from the questioning of experts from the energy intensive industries that it is not possible to state a time frame for the potential loss of jobs. We have noted what seems to be a long lead-in time if shale gas production was to be undertaken in the UK. The point made that there could be a cost to the economy if there was a delay in the seizing of opportunities is also noted. Current assumptions seem to be based on the evidence that there has been a decline in some industries, notably those producing glass and paper. We suggest the need look further into these assumptions and seek more detailed analysis of the likely impact on local employment particularly over time.

We have taken note of the finite state of our own gas reserves from the North Sea and the increasing need to import gas, which from the evidence presented suggests it currently stands at above 50%. The potential of this rising to 80% by 2020 needs to be evidenced along with gaining a better understanding of the implications of this for the Borough and the industries that it hosts.

One of the key issues to emerge from the questioning of the invited speakers is the extent to which jobs in the Borough would be impacted upon given the various scenarios forwarded; in particular the claims of job creation from both the Shale gas industry and renewables / energy efficiency. We have taken note of the job numbers submitted as evidence and have

since the meeting also taken note of the Friends of the Earth report “Making a better job of it” that was not available at the time of the meeting.

A powerful argument has been put forward by the Chemical and Energy Industries presenting evidence to the Working Group regarding the economic benefits and the potential opportunities for the NW and in particular for our borough. A vision of economic opportunity was articulated built around shale gas ranging from gas extraction, skills and technology development to a growth in high energy user industries. This vision was likened to the success that Aberdeen has experienced from its off-shore oil and gas industry. We recognise this vision as an economic ambition. It is unclear however to what extent this high level of growth might actually look like on the ground and the level of impact that it would have on other areas such as the environment and people’s health. The level and scale of development and investment needed to realise this ambition is unclear and needs to be better understood, as will the potential impact in terms of the wider implications for the Borough’s environment and its residents from the exploitation of its natural resources and the further development of land.

In response to consultation a representative of the Community Groups comments that one key point that the working group doesn’t appear to be following up specifically is that across the USA and Australia the industry has historically made claims for substantial numbers of new jobs for local people. These have repeatedly been found to be dramatically exaggerated. He suggests the working group should look for independent evidence over whether the current claims of large numbers of new, local jobs is justified.

Peter Benson also comments that there seems to be no further interest on the negative impacts on the local economy and asks if the group is going to look at the short and long-term economic impacts on the Borough? Listing impacts of farming, tourism, potential impacts from water contamination on farming water boreholes, the Zoo’s three water boreholes, Peckforton Water’s borehole. Potential impacts on health resulting in costs to NHS, lost working days. Increased costs for highways maintenance due to dramatically increased numbers of large HGV’s. Costs to the authority for clean-up for abandoned wells if company goes bankrupt. Finally, impact to households and businesses, property prices and higher insurance.

12. Overview of the Key Issues emerging from the 4th and 5th Meetings on the Community.

Members of the working group pursued the following key lines of Inquiry

- Are there potential benefits of shale gas extraction to the local community?
- Are residents right to be concerned about exploration and extraction?
- Community concerns seem to be wide ranging, from the impact on the environment to impact on health. Can these concerns be evidenced and put into the context of the potential scale of operations if shale gas was to be extracted?
- Is there a view regarding the balance of community benefits that might include supporting jobs, prosperity and economic growth?
- Is shale gas too important an issue that might help strengthen the nation's energy security, and as such it should overrides local community concerns?

Those presenting evidence provided a wide range of issues for consideration, ranging from the health and social impacts on local communities through to the provision of community benefits in the form of financial compensation.

We were struck by the amount of evidence that is now coming forward on the health impacts on residents that live near to drilling sites. We recognise that the evidence provided by Dr Marianne Lloyd-Smith is based on the events in Queensland Australia and as such we are very much aware that we cannot fully compare like with like, but nonetheless this has given us a great deal of food for thought particularly in terms of the potential risks to the health of our communities in the UK. Dr David McCoy's view that a number of judgements have to be made on how evidence from other countries is applied in the UK is acknowledged and is certainly something the working group hopes would become clearer with further research.

Both presentations given on health impacts on the community by Dr David McCoy and Dr Marianne Lloyd-Smith made statements that given the geology, demographics, infrastructure and population densities the risks posed by the operation of unconventional gas and oil exploitation would be higher here in the UK than in the USA or Australia. We have noted this and would like to seek the view of the drilling industry on this issue. Given what we have already heard in the preceding sessions, we expect to receive in part a response that suggests we have a stronger regulatory framework in place here in the UK.

In terms of the regulatory measures, we have been given a view from Dr Lloyd-Smith. In her response to our questioning regarding the effectiveness of the regulatory framework to be able to protect local communities, she suggested it would be near on impossible to regulate properly, stating that "you can't regulate the industry into safety". Dr McCoy acknowledges there is some exaggeration from those opposed to fracking on the potential threats on human health, but that there is also evidence that there are a range of toxins that will inevitably be released even with the strongest regulations in place.

We listened to Ken Cronin representing United Kingdom Onshore Oil and Gas, who offered assurances to how risks would be managed. The part played by Environmental Impact Assessments (EIAs) is central to any application and would provide local communities with the opportunity to comment on the suggested safeguards. Based on what the industry is telling us and what we have so far seen in Lancashire, we would want to better understand the scope of EIA's to ensure we secure the best conditions in the likely event of the Council receiving an application. This links to and reinforces our Final for the first themed session that focused on the regulatory framework.

We now have a better grasp of the range of potential funding to be made available to the local community. We are not however entirely clear how resources will trickle down. When questioned about the role of the Local Authority and the part played by the charity (UK Community Foundation) tasked with helping the community to make best use of the resources that might be allocated to them, the response given did not entirely help to provide us with the level of clarity hoped for. Some ambiguity therefore remains regarding funding; whilst acknowledging the approach of trying to place a financial cost on community welfare, having listened to the residents attending the public meetings this seems to sit at odds to what communities want. As a local Authority our role might be to ensure communities received the maximum benefits, but also ensuring that this is not understood to be payment of compensation for failures in safeguards that impacts on the health and wellbeing of local communities.

The fifth meeting continued to take evidence on the community theme. Some of the concerns we have regarding the ability of Regulators to regulate the onshore drilling industry were reinforced by comments drawn from Andrew Miller MP. We understand that the Infrastructure Act has now put in place additional safeguards, but there are still a number of weaknesses. We will need to carefully view section 50 of the Infrastructure Act to determine what additional safeguards we might need to include in future planning conditions.

We will need to take a careful look at the Environmental Impact Assessment (EIA) undertaken for the proposed drilling sites in Lancashire. Reference has been made to this document a number of times over the course of the meetings. Given the level of detail in the EIA we might want to ensure any future applications submitted also contain as a minimum the same level as that undertaken in Lancashire.

In taking evidence on the impacts and benefits to local communities, we have a clearer view and understanding of the opportunities on offer from the academic community. We also recognise the part science can play in providing credible evidence, more of which is now needed to better inform public policy and in particular issues around health.

13. Summary of Key Issues

The key issues are set within the context of the role of Cheshire West and Chester as a Local Authority and in particular the Local Planning Authority. Issues that the Council is unable to act upon and influence are not included. We have however, raised a number of points where there is a need for further clarification to help address the issues raised during the themed sessions.

A. The Unconventional Gas and Oil onshore industry is a new and emerging industry in the UK and as such the Working Group understands it to be as yet untested. In listening to the evidence on the effectiveness of the regulatory framework to be able to protect local communities, we recognise the view that it would be near on impossible to regulate to a level that would provide a 100% safety guarantee. We would like to seek further assurances from the Regulatory Bodies that risks can be fully managed either through the control of permits or through robust monitoring regimes.

B. The majority of the risk mitigation measures seem to focus on the short-term and are limited to the duration of live operations on drill sites. Further clarity would be welcomed from the Regulatory Bodies regarding the responsibility and accountability of the longer-term legacy of the sites, particularly post abandonment.

C. In pursuing a number of key lines of inquiry, we received only partial responses to a number of questions, further detail is now requested from the Regulatory Bodies to help fully answer the following questions:-

   - What happens if the operating company issued with a licence goes into liquidation?
   - The amount of water required for operations on site, where it would be sourced and how it might be disposed of?
   - The number of potential wells that could be established in the Borough?
   - When is an Environmental Impact Assessment required?

D. The Council will want to ensure Environmental Impact Assessments (EIAs) are robust. It also may want to consider how it might best publicise the EIA before an application is submitted.

E. The potential impact on people's health is acknowledged as an area of concern. We have been urged to read the New York State Study (Public Health Review of High Volume Hydraulic Fracturing for Shale Gas development Dec 2014), it concludes that "a guarantee of absolute safety is not possible" and that "an assessment of the risk to public health must be supported by adequate scientific information" the study also found that "current scientific information is insufficient" adding that "studies that have been published have significant scientific limitations".

F. The management regimes for waste water will need to be carefully scrutinised and enforced by the Environment Agency.

G. The Council may wish to ask for further evidence from the operators to how Well integrity is to be assured.

H. As a planning authority it might be prudent to consider future scenarios in terms of impacts arising from different levels of activity including number of wells and pads, life-time of the wells and the likely intensity of operations. This would translate into coming to a view and having a better understanding of the "cumulative impact" of potential hydraulic fracturing activities in the Borough.

I. The level and scale of development and investment needed to realise the economic ambition that was put to the working group by the Chemical and Energy industries is unclear and needs to be better understood. The potential impact on the environment and local residents also needs to be fully understood if this ambition is to be met.

J. We would like to seek the views of the drilling industry in response to the concerns expressed to us that the risks posed to the UK (by the operation of fracking) would be higher than the US and Australia due to our geology, demographics, infrastructure and population densities.

K. Further clarity is needed to how resources identified as "community benefits" are planned to be distributed and what guarantees are to be put in place to ensure they reach and benefit communities.

L. We will need to carefully view Section 50 of the Infrastructure Act (2015) to determine what additional safeguards we might need to include in future planning conditions.

In its response to consultation the United Kingdom Onshore Oil and Gas has set out some specific comments on the above issues. These can be read in full in Appendix 3, consultation response Ref Number UGO 6.

In its response to consultation Peel Environmental Ltd has set out some specific comments on the above issues. These can be read in full in Appendix 3, consultation response Ref Number UGO 7.

In its response to consultation IGas Energy PLC has set out some specific comments on the above issues. These can be read in full in Appendix 3, consultation response Ref Number UGO 8.

14. Summary Statement

We have received and listened to a great deal of evidence both for and against the exploitation of unconventional gas and oil and found there to be little science based evidence which provides a truly independent overview that is jointly supported and endorsed by both supporters and opponents.

To reiterate, and for the avoidance of any misunderstanding, the working group has not been tasked with arriving at a view (based on the evidence submitted) on whether Cheshire West and Chester Council should or should not support hydraulic fracturing in the borough. Rather the aim has been to strengthen the Council's understanding of unconventional gas and oil.

One of our key concerns in trying to evaluate the evidence submitted is the lack of UK based evidence, and as such we are not fully at ease in drawing direct comparisons with Countries that host different conditions, both in terms of geology, population density and regulatory operations. We cannot therefore assume that the issues put to us as having occurred in both the US and Australia will also occur in the UK. However, in stating this we were struck by the amount of evidence presented to the working group, this will now be used to help us question the industry and regulators when applications are submitted to the Council.

We are also mindful of the New York State Study (Public Health Review of High Volume Hydraulic Fracturing for Shale Gas development Dec 2014). The study found there to be a lack of scientific information and significant scientific limitations in published studies. This supports the frustration that we also encountered in not being able to find credible science based evidence and vindicates many of the issues we face that point to the need for further evidence.

As a local planning authority we will be required to process and consider Shale Gas planning applications with due process and fair hearing (Appendix 2). In the absence of an overall national consensus view informed by independent and balanced evidence and a lack of science based evidence that can fully inform public policy, it very much falls on local decision makers to ensure they are themselves as fully informed as possible of the key issues. The process undertaken by the Working Group of gathering and debating credible evidence is helping the Council to do this. We strongly believe that as a result of this fact finding investigation Members of the Council will be better informed when determining individual planning applications for unconventional gas and oil exploitation.

Appendix 1

Terms of Reference, Guidance Note & Scope

Terms of Reference of the Unconventional Gas/Oil Extraction Working Group

i. Background

On the 30th April 2014 Cheshire West and Chester's Executive decided that "an Executive small Cross Party Group be established on a 4:3 basis to consider how the Council will understand the unconventional gas and oil techniques".

A written response from the Chairman to a question from the public outlined further details regarding the establishment of the Working Group. In summary the Working Group will:-

- Establish its terms of reference and agree on its way of working.
- At the Chairman's discretion, invite interested parties to submit evidence to the group.
- Ensure representatives and experts from both sides of the argument are given an opportunity to contribute and question the evidence.
- Ensure the evidence and Final are published for consultation and accuracy.
- Develop from the consultation and Final a series of conclusions and draft policy for consideration.

The Working Group will run independently of the Council's decision making process for determining planning applications. Planning applications made to the Council will not be put on hold, nor will the Local Plan timetable be delayed until such time as the Final of the Working Group are known. The Final will help to inform the approach to be taken through the Local Plan Part Two to inform land allocations and detailed policies in relation to proposals for conventional and unconventional oil and gas extraction.

ii. Purpose

The Cross Party Working Group remit is to advise the Executive on its key Final following an investigation into the issues associated with conventional and unconventional on-shore gas and oil techniques. To identify the main issues, concerns and opportunities that may be associated with oil and gas development in the Borough.

iii. Membership

Membership to the Working Group is limited to seven elected Members allocated on a 4:3 cross party basis. Members have been selected by the Political Groups on the basis of their personal qualities, experience and representative roles.

Cllr Mark Williams – Chairman
Cllr Howard Greenwood

Cllr Keith Board
Cllr Eveleigh Moore Dutton

Cllr Reggie Jones
Cllr Mark Henesy
Cllr Andy Williams.

Membership is representational and as such members may appoint a deputy to attend on their behalf.

Secretariat will be provided by Democratic Services with officer and lead technical support provided by the Growth and Prosperity Directorate.

iv. Role and Operation of the Working Group

Operating in an advisory capacity, the Working Group will follow a Commission of Inquiry model to examine key issues in detail, setting out specific questions, returning an opinion and producing a report with its Final to the Executive. Keynote presentations and evidence on the relevant core topics are to be planned through a series of hearings involving experts, advisors, academics, practitioners and policy makers.
It's critical from the outset to be clear about what is to be investigated at each Inquiry Stage. Key lines of Inquiry are to be set out for each stage, articulating what is to be investigated and agreeing a series of specific questions that the Working Group would seek to have answered with the assistance of expert witnesses.
The working Group will:-

- Operate on the same lines as a Commission of Inquiry.
- Meet on a "Task and Finish" timetable (to be agreed by Executive of the Working Group membership prior to the first Inquiry Stage meeting).
- Report progress to the Executive on a regular basis.
- Produce and submit to the Executive a Report of its Final.

Guidance Note

i. Protocol for Presenting Evidence

Proceedings are to be fair and balanced, mindful of the interests of all parties.
The Chairman will invite experts and interest group representatives (witnesses) to the public hearings to provide evidence and answer questions before the Cross Party Working Group.

Only the Chairman and Members of the Working Group will put questions to the expert witnesses and those invited to contribute, to provide additional technical information or respond to points of clarification. This allows the Working Group to follow up points of interest from those who have made a submission, in order to amplify points and give additional information.

Although proceedings are guided by a number of rules, they are to be informal and not adversarial allowing members to discuss issues informally and not be constrained by party lines, allowing Members to assess issues in the interest of the public.

ii. Involving the public

The public are to be given as much information as possible about the proceedings commensurate with the proper conduct of the hearings and the interests of the parties involved.

A call for submissions from the public will provide opportunities for interest groups, academics, experts and individual citizens to inform the committee of their views on particular topics.

Members of the public, organisations and key stakeholders will be asked for written submissions. This will be undertaken by posting on the Council Web-site or writing to persons or organisations with specialist knowledge or a particular interest.

iii. Timetable

Operating as a Task and Finish Group, the proceedings will aim to conclude within a ten month period from the Groups inception. This will include, the hosting of up to five hearings/sittings and consideration of the evidence towards the production of a report to Executive.

A schedule of meeting dates and themes to be covered will be made available to the public.

Scope of the Working Group

The Working Group has identified the following as being either in or out of Scope for the purpose of its investigation:

In Scope

- Conventional and Unconventional Gas and Oil exploration techniques.
- The Economic costs and benefits for the Borough of Gas and Oil exploration and extraction.
- Environmental impacts for the Borough of Gas and Oil exploration and extraction and restoration and aftercare
- Issues relating to the Community of Cheshire West and Chester.
- Credible published evidence (for example scientific, geological, economic, health)
- Climate Change in relation to the Local plan

Not in scope

- Individual and specific sites and locations.
- Individual Planning Applications
- Subjective evidence that cannot be substantiated.
- Geo-thermal energy exploration.
- The wider impacts on global climate change

APPENDIX 2

Planning Issues to be considered by the Local Planning Authority

National planning policy guidance for onshore oil and gas identifies the principle issues which should be addressed at the planning application stage for any oil and gas development. These include:

- noise associated with the operations
- dust
- air quality
- lighting
- visual intrusion
- landscape character
- archaeological and heritage features
- traffic
- risk of contamination of the land
- soil resources
- the impact on best and most versatile agricultural land
- flood risk
- land stability / subsidence
- internationally, nationally and locally designated sites
- nationally protected geological and geomorphological sites and features
- Sites restoration and aftercare

The Council can only take into consideration comments that are valid planning issues or are 'material ' to the application. Examples of what are NOT valid planning issues include:

- Effect on private property values
- Loss of a view across somebody else's land
- Personal issues with the applicant
- Private rights of way
- Land ownership or boundary disputes
- Matters covered under other legislation, e.g. waste management licensing
- Trade competition

Industry Regulation

The onshore oil and gas industry is regulated by the UK government, with input from the Environment Agency, Health and Safety Executive, the county council, the district council and Department of Energy and Climate Change (DECC). Each of these organisations has a role to play in the approval of drilling and the enforcement of conditions.

There are a number of matters that are regulated and these include:

- Induced seismicity is regulated by the Department of Energy and Climate Change
- Well design, construction, and integrity is regulated by the Health and Safety Executive
- Mining waste is regulated by the Environment Agency
- The chemical content of fracking fluid is regulated by the Environment Agency
- Flaring or venting of gas is regulated by the Department of Energy and Climate Change, and the Environment Agency
- The impact on water resources and the disposal of water following fracking is regulated by the Environment Agency

APPENDIX 3

Responses to Consultation on the Specific Issues Raised by the Working Group under Chapter 13 of the Report Key Issues (A – L)

Ref UGO 3 : Consultation Response submitted by: Antony Poole, Environment Agency

Page 10 -
The Working Group wanted to find out more about the volume of water required as it was unclear if the figures given related to just one well and if the scale of the operation would also influence the figure given?

Comment - *Hydraulic fracturing for shale gas typically uses 10 to 30 million litres per well.*

The Working Group sought assurances and comfort from the EA that they would be able to deal with any environmental issues if they were to arise. The Agency places conditions on the Environmental Permits and if not met they would suspend the permit.

Comment - *Our powers include enforcement notices, suspension and revocation of permits, injunctions and ultimately criminal sanctions, including prosecution. Any enforcement action we take will be proportionate to the risks posed to people and the environment and also to the seriousness of the breach of the law. We can also require operators to undertake remedial works to rectify the environmental damage.*

In response to a question from the Working Group of how often the EA might visit a well site, the EA stated it would be in the region of 16 times over a four month period. It was also clarified that the permit is issued to the operator and not the site.

Comment - *This is an example of one site - as detailed it depends on the situation and risk.*

Page 13
The Working Group asked for an overview of the immediate impacts on the environment resulting from the operations on unconventional gas and oil sites. These were listed as noise, light pollution, venting, traffic, waste water management and treatment. The way in which these are planned to be managed or mitigated is unclear. There is particular concern regarding the management of waste water. The Environment Agency has not provided any guidelines to the industry regarding limits of contamination of waste water.

Comment - Unclear on this -have we been approached to respond?

Page 14
The Working Group wanted to gain a view on whether the regulatory framework and policies that are currently in place are strong enough (adequate and fit for purpose). The views from those who operate in or advise the industry feel that it is, although there are some aspects that still require further work.

- Concern was expressed regarding the cuts being made to one of the key regulators the Environment Agency and their current focus on flood resilience, which would potentially have an impact on their ability to monitor drill sites. It was suggested that the money raised from permit fees would be used to help pay for monitoring.

- At this stage it would be difficult to fully identify who is most likely to benefit and to what extent, including the local community. This is why, it was suggested we need to undertake exploration.

Comment - *Funding for setting up the regulatory regime comes from Defra grant-in-aid. Our work to regulate individual sites is financed through the charges we raise for environmental permits and licences, which is not subject to spending cuts.*

This covers all aspects of regulation not just monitoring

Consultation Response Ref Number: UGO 6
Received: 31 / 07 / 2015

Consultation Response submitted by: James Robottom & Ken Cronin , United Kingdom Onshore Oil and Gas

A. The Unconventional Gas and Oil onshore industry is a new and emerging industry in the UK and as such the Working Group understands it to be as yet untested. In listening to the evidence on the effectiveness of the regulatory framework to be able to protect local communities, we recognise the view that it would be near on impossible to regulate to a level that would provide a 100% safety guarantee. We would like to seek further assurances from the Regulatory Bodies that risks can be fully managed either through the control of permits or through robust monitoring regimes.

UKOOG believe that describing the unconventional oil and gas industry in the UK as “emerging” is to under estimate an industry that has been around for over 100 years, having drilled over 2100 wells, 10% of which have used hydraulic fracturing techniques and today currently has some c250 operating sites. Much of the techniques used for shale gas and oil are exactly the same as have been used before with respect to both well integrity and environmental sensitivity. What is different is the nature of where the hydrocarbons are to be extracted from – typically they are to be found deeper underground tied into rock rather than nearer the surface found in reservoirs. This necessitates the need for a higher volume of water and higher pressures but the techniques are the same.

Worldwide the use of hydraulic fracturing has been extensive for over 65 years. Wells in places such as Aidrie in Scotland and Beckingham in Nottinghamshire have been hydraulically fractured in the UK.

Indeed, a recent five year study of over 38,000 wells by the US Environmental Protection Agency found no evidence that hydraulic fracturing has "led to widespread, systemic impacts on drinking water resources in the United States[1]."

1 EPA Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources.

In terms of the regulatory environment we are of the view that this is robust in the UK. There have been a number of truly independent reports published over the last 12 months, which include the report for the Scottish Government by an Independent Panel of Experts:

"Many of these social (and environmental) impacts can be mitigated if they are carefully considered at the planning application stage. Added to which there are already considerable legislative safeguards to ensure such impacts are not realised" **Independent Panel of Experts for the Scottish Government June 2014.**

The industry believes through the establishment of a scientific based and transparent Environmental Baseline Assessment, the embedded control measures can demonstrate that the protection of the natural environment and disruption to local community is minimised during hydraulic fracturing operations. UKOOG has worked with the industry to develop a set of guidelines for the establishment of environmental baselines; such guidelines enable a 'site condition schedule' to be established against which permits can be granted and monitored for compliance by the regulators. This guidance has been scientifically reviewed by an independent group provided by the Society for the Environment and is now backed by the Infrastructure Act.

We were also pleased to note money being made available by the Government for independent monitoring to complement existing monitoring arrangements announce last December.

B. The majority of the risk mitigation measures seem to focus on the short-term and are limited to the duration of live operations on drill sites. Further clarity would be welcomed from the Regulatory Bodies regarding the responsibility and accountability of the longer-term legacy of the sites, particularly post abandonment.

The Environmental Regulator (EA in England, SEPA in Scotland and NRW in Wales) has the power to enforce the conditions in the environmental permits for a well or wells until the point in time that it accepts a surrender of those permits – the operator is not simply at liberty to hand back the permit.

For England and Wales, the permit surrender process is agreed with the Environmental Regulator, and for wells that are hydraulically fractured this is likely to include the need for a period of aftercare and monitoring of any potential residual environmental impacts.

With respect to the Minerals Planning Authority, planning consent for the site may also include planning conditions (which are legally binding) designed to ensure that the site is restored to its original surface condition at the end of operations.

DECC's consent is required under the terms of the operator's petroleum licence before a well can be decommissioned. The decommissioning process must be done in accordance with a specification agreed with the HSE, with reference to the Oil & Gas UK best practice on well abandonment and with the oversight of the HSE and an appointed Well Examiner.

If a well is not decommissioned in line with the approved plan, the licence holder or well-operator at the time of decommissioning can be prosecuted by the HSE for non-compliance with HSE regulations, and this could be pursued even after the petroleum licence and environmental permits have ceased to exist.

C. In pursuing a number of key lines of inquiry, we received only partial responses to a number of questions, further detail is now requested from the Regulatory Bodies t o help fully answer the following questions:-

i. What happens if the operating company issued with a licence goes into liquidation?

ii. The amount of water required for operations on site, where it would be sourced and how it might be disposed of?

iii. The number of potential wells that could be established in the Borough?

iv. When is an Environmental Impact Assessment required?

v. The Council will want to ensure Environmental Impact Assessments (EIAs) are robust. It also may want to consider how it might best publicise the EIA before an application is submitted.

(i) There are a number of measures in place to ensure that operators have adequate financial capacity.

The first set of these measures is at the licence approval stage. DECC's guidance on operatorship states that the following assurances will be considered in applications for onshore operatorship: *"In considering any request for operatorship, DECC will look at the competence of the company – more specifically the following factors: technical experience and capability to supervise, manage and undertake the proposed operation, their risk-assessment and hierarchy of decision-making, plans for public engagement and scope of relevant insurance coverage for operations and well abandonment activity. In some cases, DECC may request independent verification."*[i]

The second set of assurances is at the well consent stage. DECC's "UK Petroleum Licensing: Financial Guidance" document states: *"DECC's policy requirement is to ensure that no well consents are issued unless we are satisfied that the licensee(s) has (have) access to sufficient funds to meet its(their) share of the actual drilling costs, the plugging and abandonment of the well if it is proven to be 'dry' or otherwise non-viable and a minimum contingency of 50% of the drilling costs."*[ii]

The environmental regulator may require the operator to supply a financial bond or other form of security for performance of its permit obligations.

This is the same approach that applies to other industries. Environmental regulators and planning authorities have the power to require upfront financial bonds to address these risks. The industry does not wish to leave this to the taxpayer or the landowner. As a less expensive alternative to upfront bonds, UKOOG is working with Government on the development of an industry scheme that will step in and pay for liabilities.

(ii) Sourcing of water will clearly be a site by site decision for operators.

Water is a critical component in Hydraulic Fracturing and an important resource in facilitating onshore oil and gas in general. The industry believes water should be considered holistically throughout the planning, operational and waste management stages. The industry has established close relationships with Water UK and British Water, having also recently commenced an initiative to consider 'Integrated Water Management for Onshore Oil and Gas'.

The Environment Agency (EA), which regulates shale extraction, has investigated the likelihood of groundwater contamination in detail and judged that the environmental risks at each individual stage of exploratory shale gas operation, after proper management and regulation, are "low". The EA will not permit activities to explore or extract hydrocarbons within SPZ1. Outside SPZ1, the EA will also object when the activity would have an unacceptable effect on groundwater[2].

[2]https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297347/LIT_7660_9a3742.pdf

According to a joint Royal Society and the Royal Academy of Engineering report the risk of water contamination is very low provided that shale gas extraction takes place at depths of many hundreds of metres or several kilometres – which would be the case in the UK.

The Chartered Institution of Water and Environmental Management (CIWEM) also agree that risks to groundwater quality are generally considered to be low in the UK where the shale rock in question often exists at considerable depths below aquifers and gas would be required to migrate many hundreds of metres between source rock and sensitive groundwater.

With regards to interaction between shale and overlaying aquifers, a study by the ReFINE (Researching Fracking in Europe) project found that there was a less than 1% chance of a stimulated hydraulic fracture propagating upwards more than 350 metres, and that the maximum recorded distance was 588 metres. This study recommended that all horizontal fracking wells are drilled at least 600m below aquifers to minimize the risk of stimulated hydraulic fractures providing a pathway for natural gas to migrate upwards into aquifers.

Fears of water shortages arising from shale gas development have been overstated. The demand for water from onshore shale operators, even at high levels of activity, would be comparable to demand by other industrial users.

The Strategic Environment Assessment undertaken for the 14th Onshore Oil and Gas Licensing Round predicted that under a high activity scenario, annual water use could be up to 9 million cubic metres, representing far less than 1 per cent of total UK annual non-domestic mains water usage. Abstraction from other sources e.g. groundwater is assessed on a case by case basis by the Environment Agency only permitted in non-water stressed environments.

Technological advances are already being commercially utilised in the USA enabling recycling/re-use of Flowback fluid, subsequently reducing the water footprint.

(iii) For local operators

(iv) The environmental impact assessment is required under European legislation and as such is governed by the application of those laws by the Local Mineral Planning Authority. However the industry through UKOOG announced in 2013, it would carry out an EIA for all operations involved with hydraulic fracturing which is significantly above the European requirement.

Where hydraulic fracturing is planned, DECC also requires an environmental risk assessment (ERA) to be carried out. This is an early stage assessment that assesses environmental risks over the full cycle of the proposed operations with the participation of stakeholders, including local communities. DECC recommends this as a starting point for early engagement by operators with local authorities and other regulators as it can subsequently inform more detailed permitting, environmental impact assessment process and minerals planning consenting.

Companies in the UK are now expected to undertake detailed Environmental Impact Assessments (EIA) before any drilling can take place. These assessments make sure that environmental issues are raised when a project or plan is first discussed and that all concerns are addressed as it gains momentum through to implementation.

Recommendations made by the EIA may necessitate the redesign of some project components, require further studies, suggest changes which alter the economic viability of the project, or cause a delay in project implementation. Again, this is not yet a requirement in the US, where in some states it's possible to obtain all the necessary regulatory approvals to drill within two weeks of securing a lease granting access by a landowner.

D. The potential impact on people's health is acknowledged as an area of concern. We have been urged to read the New York State Study (Public Health Review of High Volume Hydraulic Fracturing for Shale Gas development Dec 2014), it concludes that "a guarantee of absolute safety is not possible" and that "an assessment of the risk to public health must be supported by adequate scientific information" the study also found that "current scientific information is insufficient" adding that "studies that have been published have significant scientific limitations".

We refer the working group to the comments we have already made about comparisons with other regulatory regimes.

For all sites involving hydraulic fracturing in the UK an Environmental Impact Assessment (EIA) is completed and is used as part of the planning system in order to achieve planning consent and is also used in the environmental permitting system. Both these systems allow for significant public consultation and also involve public health bodies as statutory consultees.

The founding principle and purpose of an EIA is to investigate potential environmental effects that may pose a risk to health at a development planning stage. Equally environmental permitting exists to regulate industrial processes to ensure that they operate within environmental standards set to protect health.

An EIA is carried out to investigate environmental effects that may pose a risk to health including environmental health pathways. Health pathways for example include air quality and water quality and therefore an EIA examines a health pathway before it becomes a public health issue.

The regulatory system in this country and the best practices of the industry follow international standards around the source – pathway – receptor model, i.e. it is not sufficient to have a hazard source alone; there must be a source-pathway-receptor linkage – there must be a plausible means whereby humans may be exposed to the hazard in sufficient quantities to cause harm. For instance a harmful substance (source/hazard) may not represent a significant possibility (risk) of causing harm to humans (or other receptors) if:

• There is no pathway (exposure route) by which receptors (humans) may encounter the substance physically or

• The concentration of the pollutant in the environment is so low that the substance cannot be inhaled/ingested or otherwise absorbed in a dose big enough to cause an adverse physiological or clinical impact to humans

For example, approval by the environmental regulator for the use of chemicals in the UK will only occur if consideration of the likely concentrations and pathways from a source to a given receptor is minimal. This is also why the environmental regulator insists on the use of non-hazardous products.

The Independent Panel for the Scottish Government summarises “it should be noted that the existence of a potential problem does not mean it will occur. There are numerous regulations and assessments in place to reduce or eliminate adverse occurrences”.

F. The management regimes for waste water will need to be carefully scrutinised and enforced by the Environment Agency.

Flowback fluid contains very low levels of Naturally Occurring Radioactive Material, minerals and salts which returns to the surface inside a multi-barrier well and is stored at surface within secondary containment. Flowback fluid has been assessed by the Environment Agency as a non-hazardous waste stream and can be controlled by operators at the surface with redundant storage capacity that complies with local permitting. Specific control measures are described in detail as part of an approved Waste Management Plan and Radioactive Waste Arrangements by the

Environmental Regulator in accordance with the Environmental Permitting Regulations 2010 (as amended).

Disposal of fluids, derived from Oil and Gas activities, has been an accepted activity, where treatment and disposal in the UK has taken place for many years. The industry is fully committed to storing of flowback fluids in sealed tanks as stated in UKOOGs Shale Gas Well Guidelines[3].

3 http://www.ukoog.org.uk/images/ukoog/pdfs/ShaleGasWellGuidelines.pdf

G. The Council may wish to ask for further evidence from the operators to how Well integrity is to be assured.

The Health and Safety Executive (HSE) monitors oil and gas operations from a well integrity and site safety perspective. It ensures that safe working practices are adopted by onshore operators as required under the Health and Safety at Work etc Act 1974, and regulations made under the Act.

These specifically are:

• **The Borehole Site and Operations Regulations 1995 (BSOR)** – These regulations are primarily concerned with the health and safety management of the site for onshore wells.

• **The Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 (DC**R) – Apply to all wells drilled with a view to the extraction of petroleum regardless of whether they are onshore or offshore and are primarily concerned with well integrity and well control. Note these regulations are "goal setting" and define what the operator must achieve, rather than what they must do – this philosophy has been copied around the world.

HSE works closely with the Environment Regulator, the Department of Energy and Climate Change and Oil and Gas Authority to share relevant information on such activities and to ensure that there are no material gaps between the safety, environmental protection and planning authorisation considerations, and that all material concerns are addressed.

The HSE initially scrutinises the well design for safety and then monitors progress on the well to determine if the operator is conducting operations as planned. During drilling activities, the HSE requires a weekly drilling completion and workover report focusing on well control and well integrity.

During assessment and inspection activities, HSE checks that the operator has independent well examination arrangements in place.

The Operator is required 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 Operator's policies and procedures, comply with the Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 and follow good industry practice.

The well examination scheme requires the Operator to send the following documents to the Well Examiner:

- The well construction programme and any material changes to it
- Regular reports on how the well is being constructed
- Reports on how the well is being monitored
- At the end of the well's life, a plan for how it will be abandoned.

Shale gas well operators will ask their well examiners to examine certain well integrity and fracturing operations in real time, especially during the early stages of a development, to provide a further level of independent assurance. Such periodic site visits will be made at the discretion of the examiner, in addition to assessing documentary evidence of well integrity, to observe and verify that such operations have been executed satisfactorily in accordance with the approved programme.

H. As a planning authority it might be prudent to consider future scenarios in terms of impacts arising from different levels of activity including number of wells and pads, life-time of the wells and the likely intensity of operations. This would translate into coming to a view and having a better understanding of the "cumulative impact" of potential hydraulic fracturing activities in the Borough.

Cumulative impact is clearly part of the Mineral Planning Authority's remit. However we would urge caution on going too far down the road of trying to work out what the size of the industry may look like. It is essential first for the industry to a) work out whether the oil or gas is accessible, b) whether it can be technically extractable and c) whether it can be extractable at an economic cost. The industry across the UK is looking to develop a small number of exploration sites which are temporary structures lasting no more than 2 years with most disruption in the first 6 months. Without this necessary insight it would be pure conjecture to ascertain the future shape of the industry.

One defining factor about the UK, is we know the shale layer is several times thicker than the US. This should make it possible to access significantly more gas by underground workings per physical footprint.

I. The level and scale of development and investment needed to realise the economic ambition that was put to the working group by the Chemical and Energy industries is unclear and needs to be better understood. The potential impact on the environment and local residents also needs to be fully understood if this ambition is to be met.

UKOOG would direct the council to two reports produced in the last two years. Studies by the Institute of Directors in 2013[iii] and EY in 2014[iv] both indicated the potential for the shale industry to create tens of thousands of jobs. According to the central scenario set out by the Institute of Directors of 100 sites of 2 hectares each, shale gas production has the potential eventually to reduce the UK's projected import dependency by half, reducing the import bill by £8 billion a year.[v] The EY report estimated that for each of those 100 sites the total supply chain commitment would be some £330m per site and with a total number of jobs created of 64,000.

The Government through AMEC launched a strategic environmental assessment as part of the 14th licencing round.

In November 2014 the industry launched a £1.5 million initiative to establish a National College for onshore oil and gas to fill the skills gaps identified by EY. This includes the participation of the University of Chester's Faculty of Science and Engineering at Thornton Science Park.

J. We would like to seek the views of the drilling industry in response to the concerns expressed to us that the risks posed to the UK (by the operation of fracking) would be higher than the US and Australia due to our geology, demographics, infrastructure and population densities.

It is inappropriate to suggest that risks in any one country are more or less significant than in any other, it is more accurate to consider the means through which the appraisal and management of any potential risks are framed.

Geology, for example, will vary significantly across relatively small distances and one country's geology cannot be readily compared to another; not least because each individual country has a broad ranging geology within which local and regional variations will be apparent. The UK does possess complex and varied geology, but the means through which sub-surface faulting and hydrogeology is assessed ensures that local conditions can be taken into account in the design and implementation of any oil and gas operations.

In addition, UK and European environmental regulation of the surface and sub-surface is built on a 'risk based' and science led approach, facilitating the identification, mitigation and management of environmental, social and health risks rather than a "one size fits all" approach". Potential risks are assessed through the application of recognised models; assessing the potential Sources, possible Pathways and Receptors potentially impacted by a proposal. In this way a thorough assessment of existing geological and environmental conditions, and any likely impacts can be transparently understood and appraised. It is through this approach that local technical factors such as geology and hydrogeology; social issues of demographics and population density; or the built environment e.g. infrastructure, can be equally assessed.

What sets the UK apart from other geographies is a UK wide commitment to the establishment of transparent and robust environmental baselines, being both a regulatory requirement and an industry commitment. With life-time 'compliance monitoring' and assessment of operational sites, followed by subsequent post-decommissioning monitoring in-line with regulatory specifications.

For planning purposes, approaches to unconventional hydrocarbon development are set out clearly in planning practice guidance published in July 2013[1], linked to the NPPF (National Planning Policy Framework). This recognises that there are areas of environmental, social or heritage quality that must be carefully balanced against the benefits of oil and gas from unconventional hydrocarbons[2].

Our formal planning decision making processes as governed by the Town and Country Planning Act 1990 and informed by the Government's NPPF will continue to be applied to any proposed shale development, as is the case for all other forms and

types of development and the associated regulatory mechanisms that provide provision for the assessment and protection of the natural and built environment are robust and established at a European level.

K Further clarity is needed to how resources identified as "community benefits" are planned to be distributed and what guarantees are to be put in place to ensure they reach and benefit communities.

The industry has made it clear from the outset that local communities that host our sites should be rewarded. The UK onshore oil and gas industry has also made a commitment to share the benefits of shale development with the local community. The industry has committed to paying £100,000 to the local community living near to each exploratory well site where hydraulic fracturing takes place, together with a £20,000 community benefit payment per unique horizontal well over 200 metres in length and below 300 metres in depth. This will be paid by the operator, regardless of whether or not recoverable deposits are found. In addition, the industry has committed to paying communities 1% of the value of the shale gas that is produced – for a site of 40 horizontal wells, this could be worth £5-10 million in total.

All of these commitments are based on the UKOOG community Engagement Charter which each operator has to sign up to and report annually to UKOOG. All community benefits will be reported in the UKOOG annual report. Both the annual report and the engagement charter can be found on our website www.ukoog.org.uk.

UKOOG envisages that community funding will be targeted at both the very local level with a local community fund entirely administered by local people for local needs with an appropriate cap for very small communities and a "regional" package of funding at a County level. We will be working with interested parties and councils over the course of the next few years to finalise our plans. While communities may use the funds to pay for community-wide measures, at each stage the industry will work with the local community funds to calculate the level of benefits at a household equivalent basis allowing residents to understand what their equivalent share of the benefits would be.

Uses of the community fund will be agreed in conjunction with the local community and could include (but not be restricted to) community based projects to stimulate economic growth, to improve welfare in the surrounding area, to promote energy projects or to provide the basis of collective bargaining with energy supply companies.

In addition the industry has committed to provide benefits to local communities at the exploration/appraisal stage of £100,000 per well site where hydraulic fracturing takes place. Exploration wells are typically single well sites used for the purpose of gaining geological, cost and gas flow data.

Contributions at the exploration/appraisal stages will be made on a site by site basis and will be payable upon successfully obtaining all planning and other regulatory consents and subsequently drilling, and hydraulically fracturing and flow testing the well.

The industry launched a pilot scheme for the first shale gas exploration sites in the UK which involve exploratory drilling, hydraulic fracturing and flow testing of the exploration wells.

Once planning consent has been granted and exploratory drilling operations have begun, each pilot exploration site will have £100,000 made available for the benefit of the local community. The principles we intend to apply to the pilot phase are:

- The scheme should be independent from the industry, operators or political organisations;

- The funds to be managed and distributed by an organisation with experience and integrity;

- The communities should have the lead role in identifying local priorities for the funds;

- The funds to be used for the overall benefit of local communities rather than individuals.

To ensure community benefit funds are managed and distributed independently of the operators themselves UKOOG, on behalf of the onshore oil and gas industry and operators, is partnering with UK Community Foundations (UKCF) for this pilot phase.

Once planning consent is granted UKCF and the appropriate local community foundation will manage a consultation process to engage the local community in defining local priorities and needs, including the appointment of a community panel to decide how the money will be spent once the consultation is complete.

This process will be repeated in the communities of each pilot exploration site.

The pilot scheme approach will allow us to learn at an early stage what works for the communities that we are operating in and how we can develop our schemes for the future.

[i] See https://www.gov.uk/oil-and-gas-operatorship

[ii] See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/322319/FinancialGuidance.pdf

[iii] Institute of Directors, Getting shale gas working, May 2013 http://www.iod.com/influencing/policy-papers/infrastructure/infrastructure-for-business-getting-shale-gas-working

[iv] EY, Getting ready for UK shale gas: Supply chain and skills requirements and opportunities, April 2014 http://www.ey.com/Publication/vwLUAssets/Getting_ready_for_UK_shale_gas/$FILE/EY-Getting-ready-for-UK-shale-gas-April-2014.pdf

[v] Institute of Directors, Getting shale gas working, May 2013 http://www.iod.com/influencing/policy-papers/infrastructure/infrastructure-for-business-getting-shale-gas-working

Finally, operators will pay business rates on their sites – 100% of which will go straight to the local authorities in the area

L. We will need to carefully view Section 50 of the Infrastructure Act (2015) to determine what additional safeguards we might need to include in future planning conditions.

It is worth noting that many of the safeguards introduced in the infrastructure act were already industry best practise which highlights the robustness of our regulation which makes industry think beyond a tick box mentality.

Items already industry best practise include:

- The environmental impact has been taken into account
- Independent inspection of the integrity of the relevant well
- The level of methane in groundwater monitored
- Arrangements for the monitoring of emissions of methane into the air
- Substances to be approved by the relevant environmental regulator
- The relevant (water) undertaker has been consulted
- The public was given notice of the application

Consultation Response Ref Number: UGO 7
Received: 31 / 07 / 2015

Consultation Response submitted by: Kieran Tames, Peel Environmental Ltd

A: The Unconventional Gas and Oil onshore industry is a new and emerging industry in the UK and as such the Working Group understands it to be as yet untested. In listening to the evidence on the effectiveness of the regulatory framework to be able to protect local communities, we recognise the view that it would be near on impossible to regulate to a level that would provide a 100% safety guarantee. We would like further assurances from the Regulatory Bodies that risks can be fully managed either through the control of permits or through robust monitoring regimes.

PGO response:

Since the 1850's there has been an onshore oil and gas industry within the UK, working safely and in consideration with the environment. Some operations, such as the Wytch Farm facility, Europe's largest onshore oil field, have been successfully and safely operating in highly sensitive environments. The onshore industry is therefore not a new one, but it is simply seeking to exploit a further resource of hydrocarbons for the benefit of the UK through the emergence and greater deployment of a process for the recovery of the hydrocarbons. That process

(hydraulic fracturing) is itself not new, and has been used on over 200 wells in the UK to date.

I have enclosed a Fact Sheet setting out the history of the industry produced and published on the UKOOG website (http://www.ukoog.org.uk) and it is suggested that this is read in the context of the above key issue.

In December 2012 the UK Government lifted the moratorium on hydraulic fracturing following the publication of an independent report by the Royal Society and the Royal Academy of Engineers. (royalsociety.org/policy/projects/shale-gas-extraction). Significantly, the terms of reference of the report were:

1) "*What are the major risks associated with hydraulic fracturing as a means to extract shale gas in the UK, including geological risks, such as seismicity and environmental risks, such as groundwater contamination?*

2) *Can these risks be effectively managed? If so, how?"*

The overall conclusion made by the UK Government based on the Final and recommendations of that report is that the risks can be effectively managed, and it is therefore suggested that the Working Group takes greater consideration into the significance of this report in relation to the issue of management of risks.

B: *The majority of the risk mitigation measures seem to focus on the short-term and are limited to the duration of live operations on drill sites. Further clarity would be welcomed from Regulatory Bodies regarding the responsibility and accountability of the longer legacy of the sites, particularly post- abandonment.*

PGO Response:

It is unclear what is being referred to in relation to the "longer legacy of the sites, particularly post abandonment". Once operations have ceased and a site restored to its former (or other use) by the operator, with all permitting requirements fulfilled and permit surrendered, there is no long term legacy to manage. There is no difference between the management of the long term legacy of a conventional well compared to an unconventional well.

In order for a site to be decommissioned and restored there are a number of regulatory processes that an operator will need to go through, these are:

In order to plug and abandon any well the operator needs to apply to DECC for consent, and in doing so it must do so in accordance with a specification approved by the Secretary of State. Once it has abandoned a well, the Health and Safety Executive will continue to monitor it for 6 months. If the operator wishes to fully close the site in its entirety the operator will need to comply with any restoration condition that the Mineral Planning Authority may have imposed, and usually the Mineral Planning Authority would impose an aftercare condition on the planning permission which could last for as long as the planning authority considered necessary at the time of issuing the planning permission. The aftercare condition could, in theory,

specify a monitoring regime to be applied during the course of the aftercare period should the Authority consider it necessary.

Crucially, operations would take place and be regulated by an Environmental Permit issued by the Environment Agency, and in order to be able to surrender this Permit the operator would need to demonstrate to the EA that the site could no longer pose a risk of causing harm to the environment and human health. Only once an operator has demonstrated this to the satisfaction of the EA can the Permit be surrendered.

There are therefore a number of overlapping controls in place to manage the decommissioning and restoration of sites and the long term legacy.

C: *In pursuing a number of key lines of inquiry, we received only partial responses to a number of questions; further detail is now requested from the Regulatory Bodies to help fully answer the following questions:*

- *What happens if the operating company issued with a licence goes into liquidation?*

PGO Response:

Should an operating company issued with a licence enter into liquidation the assets and liabilities will become the responsibility of the appointed liquidator who will exercise his duties according to statue and under direction from the Court. A liquidator in addition to his obligations to the company's creditors must by law act in the wider public interest.

DECC at any time during the course of the operations of a site has the power to enter onto the site and execute any works it considers necessary to ensure that harmful methods of the working are avoided, and that wells are abandoned and plugged properly.

Further, we believe it will become increasingly commonplace that licences will be owned by more than one company with the licence holders appointing an operator for development and production. The licences when held by more than one company, and irrespective of the relevant proportion in equity within the licence, are done so on a "joint and several" liability basis.

Therefore, if the operator of the licence were to be liquidated, and that operator had shared equity in the licence, if there were licence obligations to fulfil then the other licence holder would be required to adhere to them.

- *The amount of water required for operations on site, where would it be sourced and how might it be disposed of?*

PGO Response:

The amount of water will be dictated by the shale geology and techniques employed by the drilling operator. However, typically speaking around 20,000m_3

may be required in order to hydraulically fracture a lateral well.

In January 2014 the Chartered Institution of Water and Environmental Management (CIWEM) considered the implications for the water environment in relation to the exploration and exploitation of shale gas in the UK. In terms of the amount of water expected to be used by the industry the CIWEM concluded that the amount was a *"very small fraction when set in a national and regional context",* and *"compares with other industrial uses"* and that *"the supply of water to service the industry is not a concern for the water industry generally*".
The summary of this report is enclosed.

The source of water could be from a variety of sources whether it be from the public mains supply, surface water locations or from borehole supplies. In the case of the latter two sources the consent of the Environment Agency to abstract water would be required.

It is probable that a significant proportion of this injected water, up to 50%, will be returned to surface. This so, called Flowback Water can be treated and reused, therefore reducing the quantity of water abstraction significantly. Like any other industrial process, ultimate water disposal requires consent and is subject to a permit issued by the Environment Agency. or potentially through the sewage infrastructure of a statutory undertaker subject to any necessary pre-treatment as specified by the environmental regulator and the statutory undertaker.

- *The number of potential wells that could be established in the Borough?*

PGO Response:

It is too early in the exploration phase to give an accurate forecast of the number of wells established in the borough as more information on the geology is required. In any event whatever the number may be it should be borne in mind that all wells would not operate at the same time, and the operations would be phased across the identified reserve that was intended to be exploited.

As the industry is likely to develop in a way where multiple wells are drilled from a surface location it would be more appropriate for the Authority to consider the likely extent and distribution of appropriate surface locations for operations to become established.

Chester and Cheshire West Council is currently preparing a detailed policies plan for mineral extraction within the Borough, and a call for sites exercise was carried out in October 2014. We believe, and have stated to the Council in our response to that consultation document, that the Council should consult on and prepare detailed policies in relation to hydrocarbon development in the Borough. The Council has (at least from 1987) had policies relating to hydrocarbon development within its Mineral Plan, even though there has been little activity in that regard within to date. With the potential now for significantly more hydrocarbon development in the area it would be perverse for the Council

to not include revised policies relating to hydrocarbon development in its Mineral Plan making.

- *When is an Environmental Impact Assessment Required?*

PGO Response:

It is for the Council to determine whether or not an Environmental Impact Assessment (EIA) is required during the course of its handling and determination of a planning application. Usually a developer at an early stage would consult and carry out an EIA screening and scoping exercise with the Council to determine if the developer's proposal are likely to require an EIA, and if so, it can consult with the Council to determine the scope of the likely environmental issues that will need to be assessed within the EIA.

The regulations which dictate whether an Environmental Impact Assessment is required are set out within the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 ("the EIA regulations"). The application of these regulations as they apply to hydrocarbon extraction is covered within Paragraph 52 to 55 of the Planning Practice Guidance for onshore oil and gas.

According to the Regulations any activity referred to within Schedule 1 ("Schedule 1 development") will always require an Environmental Impact Assessment. Within Schedule 1 at Paragraph 14 development that involves, "*Extraction of petroleum and natural gas for commercial uses where the amount exceeds 500 tonnes per day in the case of petroleum and 500,000 cubic metres per day in the case of gas*". Should a development be proposed therefore that meets this criteria and Environmental Impact Assessment will be necessary.

However, as previously stated should the Council require an Environmental Impact Assessment of a proposed development it can require one to be prepared and submitted to the Council in order for the application to be determined. If the development was not Schedule 1 development the Local Planning Authority would assess the proposals against to criteria set out within Schedule 2 of the EIA regulations. The indicative criteria as set out in Schedule 2 for hydrocarbon development are likely to be met when the development exceeds 10 hectares or involves more than 100,000 tonnes per annum of petroleum being produced.

The Infrastructure Act 2015 additionally requires that the Secretary of State can only give a well consent if it is satisfied that the environmental impact of development has been taken into account by the local planning authority (Section 50 (3)).

D: ***The Council will want to ensure Environmental Impact Assessments (EIAs) are robust. It may also want to consider how it might publicise the EIA before an application is submitted.***

PGO Response:

The Council will no doubt be aware of Part 5 of the EIA regulations which specifically address the statutory requirements relating to the publicity of environmental statements, and procedures governing the adequacy of an environmental statement.

During early pre-application discussions with developers the Council can set out its expectations for publicity and community involvement with an application, and these may mirror those contained within a Statement of Community Involvement which the Council may already have. The Council could also set out its expectation for publicity of
EIA's relating to hydrocarbon development if it were to prepare detailed policies within its Development Plan.

E: The potential impact on people's health is acknowledged as an area of concern. We have been urged to read the New York State Study (Public Health Review of High Volume Hydraulic Fracturing for Shale Gas development Dec 2014), it concludes that a" guarantee of absolute safety is not possible" and that "an assessment of the risk must be supported by adequate scientific information" the study also found that "current scientific information is insufficient" adding that "studies that have been published have significant scientific limitations".

PGO Response:

Whilst we understand and would encourage the Authority to consider all literature available on the issue of public health we would encourage the Authority to apply greater weight to those reports produced in a UK context and by UK institutions.

In relation to the particular issue on public health in October 2013 Public Health England issued a report in which it concluded, that "the risks to public health from exposure to emissions from shale gas extraction are low if operations are properly run and regulated".

Dr. John Harrison, Director of PHE's Centre for Radiation, Chemical and Environmental Hazards, when issuing the press release that accompanied the Public Health Englandreport said:

"The currently available evidence indicates that the potential risks to public health fromexposure to emissions associated with the shale gas extraction process are low ifoperations are properly run and regulated.."".

We therefore would expect the Working Group to place significant weight on the Final of this UK based report rather than reports written in the context for foreign political and regulatory regimes.

F: *The management regimes for waste water will need to be carefully scrutinised and*

enforced by the Environment Agency.

PGO Response:

We agree with this statement and note the comments by the CIWEM in their report where they state the industry and the environmental regulator should work closely together to develop optimal solutions, which will include minimising the amount of water that is required to be disposed of by re-using much of the water on site.

G: *The Council may wish to ask for further evidence from the operators to how well integrity is to be assured*.

PGO Response:

Whilst it is understandable that the Council may wish to see the evidence of how well integrity is assured it should leave the regulatory function of ensuring the design, construction and examination of the wells to the appropriate regulatory regime. The Health and Safety Executive is responsible for this function and examination of the integrity is conducted through independent qualified experts.

The Authority when making decisions should seek advice from the Health and Safety Executive in relation to this issue, and will need to assume that the regime operates effectively and does not need to carry out its own assessment.

H: *As a planning authority it might be prudent to consider future scenarios in terms of impacts arising from different levels of activity including number of wells and pads, lifetime of the wells and the likely intensity of operations. This would translate into coming to a view and having a better understanding of the "cumulative impact" of potential hydraulic fracturing activities in the Borough.*

PGO Response:

We agree that the Authority should do this and we would expect, and encourage that the Authority discharge this function during its production of the Development Plan.

In addition the Authority should be aware that in order for the Secretary of State to issue a well consent to an operator the Secretary of State by virtue of Section 50 of the Infrastructure Act 2015 will need to be satisfied that cumulative issues have been taken into account when determining planning applications.

In relation to this, the Working Group should familairise itself with paragraphs 56 and 57 of the Planning Practice Guidance for Onshore Oil and Gas, where further detail is provided on when cumulative effects should be taken into account
.

I: *The level and scale of development and investment needed to realise the economic ambition that was put to the working group by the Chemical and Energy Industries is unclear and needs to be better understood. The potential impact on the environment and local residents also needs to be fully understood if this ambition is to be met.*

PGO Response:

Evidently the Working Group will need to consider the detail of further submissions made by the Chemical and Energy Industries on this point.

We would like to draw the Working Group's attention to the fact that as of early 2016 Ineos will be importing ethane from US shale into its plant at Grangemouth, and that shale gas in the form of LNG from the US will be capable of being imported into European – including UK – terminals in order to supply gas to UK consumers. We should be utilising our own resources where we have then in abundance and particularly when the use of our own resources would be significantly in the economic interests of the UK as a whole, but also it would be more environmentally sound than importing the gas from foreign sources. A successful industry would require a new supply chain to be established to support it, which would require £33bn of investment, and if a supply chain hub were to be established more than 13,000 jobs would be supported. The UK missed the opportunity to build on its expertise in wind energy, and the supply chain required to support that industry which is now established on the continent. We should not make the same mistake with UK shale gas.

The primary arguments put forward by the Chemical and Energy Industry was that they need secure stable sources of gas, for power and crucially as a feedstock, to ensure the future viability of their existing businesses. We understand that those businesses would like to see a UK shale industry developing in order to provide a stable source of gas so that they can continue to operate their existing businesses at the current scale of operations. This being the case then impact on the environment and local residents would be the same as it is today.

Should the Council support the development of the industry in its area we firmly believe that there will be additional opportunities to be seized which would be beneficial to local business and employment growth. As with any other development if proposals were to arise the Council will at that time be able to assess the benefits of those proposals against potential environmental and local impacts, and come to its own decision as to whether those proposals should proceed.

J*. We would like to seek the views of the drilling industry in response to the concerns expressed to us that the risks posed to the UK (by the operation of fracking) would be higher than the US and Australia due to our geology, demographics, infrastructure and population densities*.

PGO Response:

This seems to be the opinion that has been drawn by Dr.McCoy and articulated to the Working Group during the course of the 4th meeting, and it is unclear what evidence has been presented to support this opinion. We would suggest that merely trying to interpolate evidence in this way is not a credible or sensible approach to take. The Working Group should give significant weight to the conclusions drawn by the reports produced by the Royal Society and Royal Academy of Engineers, and the Public Health England report that have been referred to above.

K: *Further clarity is needed to how resources identified as "community benefits" are*

planned to be distributed and what guarantees are to be put in place to ensure they reach and benefit communities

PGO Response:

We agree that more clarity is required in distribution of community benefits, and we are aware that UKOOG are developing guidelines on the suggested approach to the distribution of these funds. It may be possible for the Council to be proactive and potentially address this issue during the course of the formulation of its Development Plan policies as they relate to onshore oil and gas.

L: *We will need to carefully view Section 50 of the Infrastructure Act (2015) to determine what additional safeguards we might need to include in future planning conditions*.

PGO Response:

The Working Group is encouraged to review in its entirety all the provisions of the Infrastructure Act as they relate to the recovery of UK Petroleum. Section 50 is a key element of the new legislation, but there are significant other parts of the Act that the Working Group need to be aware of, such as the amendments to the Petroleum Act introduced at Section 41 relating to “Maximising Economic Recovery of UK Petroleum”, and the proposed secondary legislation that will be enacted on the basis of this new Act.

On the specific point on what might be required to be considered within planning conditions the Authority will be bound to utililse the guidance contained within Annex D:
Model Planning Conditions, of the Planning Practice Guidance for onshore oil and gas.
In addition to this specific part of the guidance, the Authority will need to avoid duplication with other regulatory regimes when setting conditions on planning applications and make decisions on the basis that those other regulatory regimes are effective. In the context of this, the Working Group will need to be aware that the Local Authority can only impose planning conditions that are necessary, relevant to planning and the development proposed, are enforceable, precise and reasonable.

We would be grateful if the Working Group would consider these above comments and take them into account as it finalises its work on the issue of unconventional gas and oil extraction in the Borough.

Please could you confirm in writing that our letter has been received and the issues raised will be given due consideration by the Working Group

Consultation Response Ref Number: UGO 8
Received: 31 / 07 / 2015

Consultation Response submitted by: David Petrie, IGas Energy PLC

The Working Group has also asked for further clarification regarding the volume of water used for a typical hydraulic fracture operation and how used water will be treated and disposed of. Whilst it is difficult to place exact figures on the volume of water used, as this varies according to geology, well depth and length and the number of hydraulic fracturing stages, it is estimated that to run a hydraulically fractured shale gas well requires around 19,000m³ of water. Viewed alone, this appears to be a large volume of water but, when considered against volumes of water used in other activities it becomes clear that this volume is relatively modest.

19,000m³ of water is13:

- The amount needed to water a golf course for a month.
- The amount needed to run a 1000 MW coal-fired power plant for 12 hours.
- The amount lost to leaks in water utilities region in northwest England every hour.

Well integrity

The Working group also asked for further clarification with regard to the safety standards of operations including well integrity and the status of the independent well examiner.

Throughout our operations, robust safety measures are in place to protect the environment. Transparency and environmental responsibility are essential to the success of the industry.

The industry is committed to best practice and has introduced its own guidelines across a number of areas. In January 2015, United Kingdom Onshore Oil and Gas ("UKOOG") published guidelines for the establishment of environmental baselines. The guidelines set out requirements for monitoring, sampling, testing and scientific analysis to establish environmental baselines before operations commence. IGas puts in place monitoring pre, during and post operations, the results of which are publicly available on our website (www.igas-engage.co.uk).

Whilst there may be some concerns over the process of hydraulic fracturing it is important to remember that this activity has been taking place safely and responsibly for decades. A recent five year study of over 38,000 wells by the US Environmental Protection Agency found no evidence that hydraulic fracturing has "led to widespread, systemic impacts on drinking water resources in the United States[24]."

24 http://www2.epa.gov/sites/production/files/2015-06/documents/hf_es_erd_jun2015.pdf
25 www.hse.gov.uk/shale-gas/about.htm

There are a number of existing reports and studies by Public Health England, the Royal Society and many other responsible bodies that conclude that the risks from

hydraulic fracturing including water, seismicity and fugitive emissions can be managed in a properly regulated regime.
Key to the protection of the environment is well design. Regulations enforced by the HSE require an independent well examiner to assess the design, construction and maintenance of the well25.

The main UK legal regulations covering well design, construction and decommissioning are:

 Offshore Installations and Wells (Design and Construction etc.) Regulations 1996 (“DCR”)
 Borehole Sites & Operations Regulations 1995 (“BSOR”)
 Dangerous Substances and Explosive Atmospheres Regulations 2002 (“DSEAR”)
 Provision and Use of Work Equipment Regulations 1998 (“PUWER”)

Health and Safety Executive (HSE)

The Health and Safety Executive (HSE) monitors oil and gas operations from a well integrity and site safety perspective. It ensures that safe working practices are adopted by onshore operators as required under the Health and Safety at Work etc Act 1974, and regulations made under the Act.

These specifically are:

 The Borehole Site and Operations Regulations 1995 (BSOR) – These regulations are primarily concerned with the health and safety management of the site for onshore wells.
 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 regardless of whether they are onshore or offshore and are primarily concerned with well integrity and well control.

Note these regulations are “goal setting” and define what the operator must achieve, rather than what they must do – this philosophy is being copied around the world.

HSE works closely with the environment regulator and DECC to share relevant information on such activities and to ensure that there are no material gaps between the safety, environmental protection and planning authorisation considerations, and that all material concerns are addressed.

The HSE initially scrutinises the well design for safety and then monitors progress on the well to determine if the operator is conducting operations as planned. During drilling activities, the HSE requires a weekly drilling completion and workover report focusing on well control and well integrity.

During assessment and inspection activities, HSE checks that the operator has independent well examination arrangements in place. In order to do this, the HSE

along with, most notably, the environmental regulator, can inspect the operation at any time and without notice to ensure that the regulatory regime are adhered to.

Independent Well Examiner

The Operator is required 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 Operator's policies and procedures, comply with the Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 and follow good industry practice.

The well examination scheme requires the Operator to send the following documents to the Well Examiner:

- The well construction programme and any material changes to it
- Regular reports on how the well is being constructed
- Reports on how the well is being monitored
- At the end of the well's life, a plan for how it will be abandoned.

Shale gas well operators will ask their well examiners to examine certain well integrity and fracturing operations in real time, especially during the early stages of a development, to provide a further level of independent assurance. Such periodic site visits will be made at the discretion of the examiner, in addition to assessing documentary evidence of well integrity, to observe and verify that such operations have been executed satisfactorily in accordance with the approved programme. Regulations enforced by the Health and Safety Executive (HSE) require an independent well examiner to assess the design, construction and maintenance of the well26.

26 http://www.hse.gov.uk/shale-gas/about.htm

Not unlike the auditor of a company, the well examiner is required to be sufficiently separate from the immediate line management of the well operations he or she is examining. The examiner's task is to review the proposed and actual well operations to check that the well is designed and constructed, and is maintained, so that in 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 are as low as is reasonably practicable.

The HSE may also send its inspectors to check on well operations.

With regard to responsibility for monitoring of well integrity after operations have ceased, the well remains the responsibility of the operator whilst it continues to hold the relevant petroleum licence. When the licence comes to an end, ownership of the well transfers back to Government, via the Department of Energy and Climate Change (DECC). DECC will from then on be the party responsible for ensuring the well's continued integrity.

Concern was also expressed by the Working Group that “no further monitoring would be undertaken once Extraction Operations on the site ceased”. As recently noted by Dr James Verdon, an applied geophysicist at Bristol University, “the risk of inducing an earthquake during fracking are much lower than the risk of inducing an earthquake by other subsurface activities, such as geothermal energy, waste water injection and carbon capture and storage[29]”. Dr Verdon’s paper goes on to observe that “once injection rates are reduced, the number of events decays away as well” meaning that monitoring for seismic activity some 15 to 25 years after a hydraulic fracturing operation has been undertaken is unnecessary.

Environmental Impact Assessment (EIA)

An Environmental Impact Assessment (EIA) is an assessment of the possible positive and/or negative impacts that a proposed project may have on the environment and, as a condition of UKOOG membership, is required for every site where hydraulic fracturing is planned.

[30]Environmental Impact Assessment should not be a barrier to growth and will only apply to a small proportion of projects considered within the town and country planning regime. Local planning authorities have a well-established general responsibility to consider the environmental implications of developments which are subject to planning control. The 2011 Regulations integrate Environmental Impact Assessment procedures into this framework and should only apply to those projects which are likely to have significant effects on the environment.

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