

SUBJECT: The Committee has asked for further details in relation to shale gas exploration

Purpose

The purpose of this note is to provide the ETI Committee with answers to questions raised, following briefing by Departmental Officials regarding Shale Gas exploration.

Information Sought

The questions for answer – used as cross headings below - are as follows:

- 1. Officials suggested the Department should be able to structure communications with the RoI much better when the Forum of Shale Gas Regulators. How does the Department intend to work with the Government in the RoI regarding potential environmental issues of joint concern?**

The Shale Gas Regulators Forum will facilitate information sharing between Northern Ireland and the Republic of Ireland.

By bringing together the range of NI Departments and Bodies involved in regulation and approvals under one group, there will be a central NI contact point for issues relating to Shale Gas, making the exchange of information between the North and South much more streamlined.

- 2. As a licence was granted to Tamboran in April 2011, will the company now have to make a decision to drill a well or abandon the project before the end of March 2014? Having granted Tamboran a licence to explore for gas, and assuming Tamboran continues to act within the terms of that licence, are there any circumstances under which the Department could require Tamboran to cease its current operations prior to a decision by the company to ‘drill or drop’?**

Yes, under the terms of the licence, Tamboran must notify DETI before the end of Year 3 if they wish to drill an exploration well – if they do not, then the Licence will terminate at the end of Year 3. The Department's powers of revocation are dealt with in Clause 40 and the provisions for arbitration are given in Clause 41 of the Petroleum Production Regulations (Northern Ireland) 1987 (the 'PPR1987'), as amended by the Petroleum Production (Amendment) Regulations (Northern Ireland) 2010, (relevant legislation attached at Annex C).

- 3. Can the Department assure the Committee that hydraulic fracturing would only be permitted if full assurances could be provided that it would only be conducted in compliance with all the regulatory controls and legal requirements and that, as a result, there would be no risk to human health, no significant risk to the environment and no detrimental impact on tourism and/or agriculture?**

The Regulators Forum will be crucial in bringing together the range of Departments to ensure that the level of risk is assessed and considered centrally and cumulatively. Hydraulic fracturing would only be permitted if the Department can be assured that the appropriate controls and regulations are in place to bring the level of risk to an acceptable level.

4. How does, and how will the Department continue to, ensure that Tamboran is aware of, and complies with, all regulatory controls and legal requirements?

The Company are made aware of the legal requirements on award of licence. The Department informs the Licensee about a range of legislation and advises the company to engage with other regulatory authorities as soon as possible but this is the Licensee's responsibility. The Department also provides initial guidance for the licensee on exploration activities.

For those areas outside DETI's immediate responsibility, the Regulators Forum will act as a vehicle to bring together the various regulators to ensure that the company are made aware of all the regulatory controls and legal requirements.

5. What is the nature of the environmental baseline studies that Tamboran would be required to carry out if the company decides to proceed to Part II of the work programme? How will it be ensured that these baseline studies are accurate and objective?

The scope of the baseline environmental studies is primarily for DOE (NIEA) to decide as they will inform the assessment of potential environmental impact. DETI will contribute some recommendations through GSNI where there is a geological component to the studies (e.g. seismic monitoring or hydrogeological studies).

6. What policies, strategies, resources and experience are in place to monitor and enforce regulatory controls and legal requirements?

The current method of enforcing regulatory controls and legal requirements is via the licence agreement with the company, which includes the Model Clauses set out in the petroleum legislation, and the various checks which take place during the current work programme. DETI and GSNI also take advice from their counterparts in DECC and can call upon their lengthy experience in oil and gas regulation.

7. Given that Tamboran has provided assurances that it will not use chemicals in the process, would any future licences for shale gas extraction in the licence area be awarded on that basis?

No.

Any proposal to use high volume hydraulic fracturing in oil or gas exploration and production would be assessed by NIEA as part of its regulatory processes. This would

consider both the likelihood of pollution occurring (both at the surface and in the sub-surface) and the impact of any such pollution event. Such an assessment would take into account all potential contaminants, whether they were chemical additives to the hydraulic fracturing or drilling fluids, or naturally occurring materials brought to the surface as rock cuttings or in the produced water. It is expected that NIEA will adopt a risk based assessment approach for the protection of groundwater whereby it may restrict or prohibit the use of any substances where they would pose an environmental risk.

8. Are the various agencies charged with monitoring the potential impacts of hydraulic fracturing fully funded and equipped to carry out the necessary tasks? Do they have the resources and legal basis to investigate, analyse, approve or challenge the well designs and implementations used in the exploitation of shale gas?

No application has yet been received for hydraulic fracturing which makes it very difficult to forecast the extent of resources required to monitor the potential impacts. The Environmental Impact Assessment and additional risk analyses will be conducted once Tamboran formally apply to move to the next stage of their work programme. Only once the potential impacts are fully understood can the Department begin to assess the resources required to regulate.

The Department has a range of legislative powers with regard to well design, both in terms of approving and monitoring.

There is also a considerable body of legislation giving other Northern Ireland departments and agencies wide ranging powers in the areas of environmental protection, pollution prevention and control, and health & safety.

9. If granted a licence to conduct hydraulic fracturing, will Tamboran be required to openly declare the exact chemical composition of any additives in the injected fluid, their volumes and their concentrations? If so, how will this be monitored and controlled?

Yes.

The monitoring regime will be agreed with NIEA which is likely to assume primary responsibility of this function.

10. From where would Tamboran source the large volumes of water required to support sustained hydraulic fracturing operations and how would the active monitoring and planned management of water supplies be undertaken?

Tamboran have proposed that they obtain the water required for hydraulic fracturing from groundwater boreholes with the abstracted water stored ready for use in lined ponds at the well pads. Both the licensing of any proposed abstraction and the monitoring of water abstraction and storage is the responsibility of NIEA.

11. How would the active management of waste water from the hydraulic fracturing process be monitored and regulated?

This is a matter for the Department of the Environment which has the regulatory responsibility for the disposal of waste water.

12. What are the Department's views on the call from the University of Aberdeen for more research into the chemicals used and better geological understanding and its assertion that the risks associated with methane emissions and increased seismicity are not well known.

DETI (and NIEA) would require full disclosure of chemicals, if the company proposed to use any, as recommended in the University of Aberdeen report.

The Department agrees that having a good understanding of the local geology is essential and this is a primary objective of Tamboran's work programme prior to the submission of any drilling application.

The Department agrees that there is still some debate over the level of methane emissions associated with shale gas production but notes the introduction of new regulations by the Environmental Protection Agency in the USA, and the ready availability of proven technology, to reduce these emissions.

In terms of seismicity, the Department believes that the adoption of appropriate monitoring and mitigation measures, such as those expected from DECC later this year, should ensure that induced seismicity from hydraulic fracturing poses a negligible risk.

13. The Department now has a vision for renewable energy to 2050. Renewable energy is afforded a high priority by the Department with targets in the Strategic Energy Framework to have 10% of heat and 40% of electricity consumed through renewables by 2020. Has the Department undertaken any work to determine the impact that large quantities of readily available gas would have on these targets?

To date DETI has not undertaken any work to determine the impact that large quantities of readily available gas would have on its renewable energy targets. The Department's current focus in respect of natural gas has been related to extending that availability of gas within Northern Ireland and particularly to new customers in towns in the West and North-West, and in East Down.

The Department would also point out that renewable energy targets are, at least in part, driven by Directives from the European Union. The United Kingdom has a target of 15% renewable energy by 2020 and all of the UK needs to contribute to the meeting

of this target. Therefore large quantities of readily available gas would not necessarily mean Northern Ireland could down tools, so to speak, on renewables.

14. What magnitude of seismicity would DETI consider acceptable for hydraulic fracturing to continue?

DETI will take advice on this from independent seismological experts including those from the British Geological Survey and the Dublin Institute of Advanced Studies.

15. How would the seven golden rules from the International Environment Agency be implemented to reduce risks and allay fears about the hydraulic fracturing process.

Implementation of these golden rules – described by the International Energy Agency, as principles intended to guide regulators and operators, not rigid rules set in stone – is implicit in the approach adopted by the NI regulatory authorities. Each rule contains a number of recommendations, many of which have already been discussed in the written and oral presentations given by departmental officials to the ETI Committee. The rules go beyond the responsibility of just DETI and impact on policy makers and regulators across a number of Departments as well as operators and others. The Golden Rules and their application will no doubt be carefully considered by the Regulators Forum.

16. Following the completion of any exploration or hydraulic fracturing operations, what steps will be taken to ensure that Tamboran minimises the long-term environmental and visual impact?

The long-term environmental impact of exploration or hydraulic fracturing operations will form part of the Environmental Impact Assessment process that would be integral to any planning determination. It is usual for conditions related to restoration of sites following the completion of exploration or production operations to form part of any planning permission granted for these operations. The Licensee's proposals for the permanent abandonment of all wells must be approved by DETI under PPR1987 Clause 12 and the eventual abandonment or disuse of structures is covered by PPR1987 Clause 33.

17. In its written submission, Fermanagh Fracking Awareness Network states that the absence of any form of local consultation has left local communities feeling powerless. What consultation has the Department had to date on the matter and what consultation would be required with local communities at future stages in the process?

DETI participated in one community meeting organised by Tamboran Resources and held in Enniskillen on 6th September 2011. Since then Mike Young, Director of GSNI,

has made a presentation to Fermanagh District Council on 17 November 2011. The Department has also provided detailed responses to correspondence sent by both individuals and local organisations in relation shale gas and hydraulic fracturing.

Prior to awarding the petroleum licence, DETI wrote to Fermanagh District Council and placed advertisements in the Fermanagh Herald and the Impartial Reporter giving notice of the Department's intention to grant a petroleum licence, issuing an invitation for people to make representations and stating where further information could be obtained.

The Department fully appreciates the importance of engagement with local communities. DETI is keen to facilitate open discussion and will consider how this can be done in a constructive manner. DETI are meeting with local representatives shortly to discuss the best method for future engagement and to discuss the most conducive format for community meetings.

DETI is also in the process of developing a web page which will provide links to relevant information and research and act as a vehicle for keeping communities informed of progress.

18. How will DETI assess the likely impact of large scale shale gas extraction in Northern Ireland and promote public confidence in the regulation of the activity?

The impact of large scale shale gas extraction would be considered if and when the company apply for the development stage of their licence. To produce shale gas on a large scale, the company will require full planning permission. At this stage, DOE Planning Service would consider the possible impacts in conjunction with statutory consultees, the Regulators' Forum and the Environmental Impact Assessment which will form an integral part in the determination of the Planning Application.

DETI will, alongside the other relevant government departments, ensure that appropriate regulations are in place to mitigate against the risks identified during the assessment process and will consider how engagement with the public can promote confidence in the process.

19. Are there any circumstances under which the Department would consider providing any form of financial assistance to any business associated with shale gas extraction?

In relation to Energy Division, it is unlikely that any form of direct "energy related" support would be provided to a private company (such as Tamboran) actively involved in shale gas extraction.

It is however possible that a company could be supported by Invest NI if it can demonstrate that it intends to sell outside Northern Ireland, is actively pursuing growth plans and will contribute to increasing productivity and innovation in Northern Ireland.

Any such business would also have to demonstrate that now, or over the next three years, it will have:

- Total sales of over £100,000 per year; and
- Sales outside Northern Ireland greater than 25 per cent of turnover, or greater than £250,000 a year.

If there are any aspects of the project involving equipment design or manufacturing equipment for export, there may be an opportunity to be considered for Research & Development support. This could be where a project represents a significant innovation for the company concerned and significant risks should be associated with the challenge of developing a new product, process or service.

However, it must be stated that this guidance is not set in context of NI policy around shale gas extraction utilising hydraulic fracking, as such the above advice must be aligned with the NI Policy on this specific activity which is outside Invest NI's remit. Further, public support to gas extraction projects may be subject to European Commission rules and guidance as overseen by the Directorate General (DG) Energy, again outside Invest NI's remit

20. Where has shale gas been extracted without the use of chemicals?

Ecosphere technologies Inc., based in Florida, has developed a proprietary system (Ozanix®) which uses advanced oxidation techniques to clean hydraulic fracturing water and eliminate the use of chemicals. Since 2008 their system has been used to treat over 1.8 billion gallons of water in around 500 wells in the USA. About half of these wells are in the Fayetteville Shale of Arkansas which Tamboran regard as a geological analogue for the Bundoran Shale in Ireland. Their system can be used on both the water for the initial hydraulic fracturing and to treat and re-use flowback and produced water. Further details and examples of its use are given in a paper available for download at the web address below.

http://content.stockpr.com/esph2/files/techreports/SPE145454_Paper_November_2011.pdf

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GSNI

Clauses 40 & 41 of the Petroleum Production Regulations (Northern Ireland) 1987, as amended by the Petroleum Production (Amendment) Regulations (Northern Ireland) 2010, dealing with the Department's power of revocation and associated provisions for arbitration

Power of revocation

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(1) If any of the events specified in the following paragraph shall occur then and in such case the Department may revoke the Licence and thereupon the same and all the rights hereby granted shall cease and determine but subject nevertheless and without prejudice to any obligation or liability incurred by the Licensee or imposed upon him by or under the terms and conditions hereof.

(2) The events referred to in the foregoing paragraph are-

(a) any royalties or any part thereof being in arrear or unpaid for two months next after any of the days whereon the same ought to have been paid;

(b) any breach or non-observance by the Licensee of any of the terms and conditions of this Licence;

(c) the making by the Licensee of any arrangement or composition with its creditors;

(d) the bankruptcy of the Licensee or, if the Licensee is a company, the appointment of a receiver or any liquidation whether compulsory or voluntary;

(e) any breach or non-observance by the Licensee of the terms and conditions of a development scheme;

(f) the Licensee's ceasing in the case of a company to have its central management and control in the United Kingdom;

(g) any breach of a condition subject to which the Department gave its approval in pursuance of Clause 39(2) of the Licence;

(h) any breach of Clause 39(4) of the Licence;

and where two or more persons are the Licensee any reference to the Licensee in sub-paragraph (c) to (g) of this paragraph is a reference to any of those persons.

(3) The Department may revoke the Licence, with the like consequences as are mentioned in paragraph (1) of this clause, if:-

(a) the Licensee is a company; **and**

(b) there is a change in the control of the Licensee; **and**

(c) the Department serves notice in writing on the Licensee stating that the Department proposes to revoke the Licence in pursuance of this paragraph unless such a further change in the control of the Licensee as

is specified in the notice takes place within the period of three months beginning with the date of service of the notice; **and**

(d) that further change does not take place within that period.

(4) There is a change in the control of the Licensee for the purposes of paragraph (3)(b) of this clause whenever a person has control of the Licensee who did not have control of the Licensee when this Licence was granted; and sub-sections (2) and (4) to (6) of section 416 of the Income and Corporation Taxes Act 1988 shall apply, for the purpose of determining whether for the purposes of this paragraph a person has or had control of the Licensee, with the modifications specified in Clause 39(3A) of the Licence.

(5) Where two or more persons are the Licensee and any of them is a company, paragraphs (3) and (4) of this clause shall have effect as if-

(a) sub-paragraph (a) of paragraph (3) were omitted;

(b) in sub-paragraph (b) of that paragraph, after the word "of" there were inserted the words "any company included among the persons who together constitute"; **and**

(c) for the word "Licensee" in any other provision of those paragraphs there were substituted the word "company".

Arbitration

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(1) If at any time hereafter any dispute, difference or question shall arise between the Department and the Licensee touching the construction, meaning or effect of the Licence or any clause or matter therein contained or any instruction given by the Department or the rights or liabilities of the Department and Licensee respectively under the Licence or otherwise however in relation to the premises, then every such dispute, difference or question shall, save where it is expressly provided by the Licence that the matter or thing to which the same relates shall be determined or decided by the Department or the Licensee, be referred to arbitration in accordance with the provisions of the Arbitration Act 1996, the arbitrator to be appointed by agreement between the Department and the Licensee.

(2) In the case of any such arbitration which relates to a development scheme the Licensee shall, unless the arbitrator otherwise determines, perform and observe the terms and conditions of the development scheme pending the decision of the arbitrator.