

## What is shale gas?

### Introduction

Shale gas is a natural gas (predominantly methane) found in shale rock. Natural gas produced from shale is often referred to as 'unconventional' and this refers to the type of rock type in which it is found. 'Conventional' oil and gas refers to hydrocarbons which have previously sought in sandstone or limestone, instead of shale or coal which are now the focus of unconventional exploration. However, the techniques used to extract hydrocarbons are essentially the same. What has changed are advancements in technology over the last decade which have made shale gas development economically viable.

### What is fracking?

Hydraulic fracturing or "fracking" is a technique that uses water, pumped at high pressure, into the rock to create narrow fractures to allow the gas to flow into the well bore to be captured.

### What is the process for a drilling a shale gas well?

The process of obtaining consent to drill a well is the same whether the well is targeted at conventional or unconventional gas. DECC issues a licence in competitive offerings (Licence Rounds) which grant exclusivity to operators in the licence area. The licences however do not give consent for drilling or any other operations.

When an operator wishes to drill a well, their first step is to negotiate access to with landowners. Permission must also be granted from the Coal Authority, if the well encroaches on coal seams. Then the operator needs to seek planning permission from the Local Planning Authority (LPA). The operator must consult with the Environment Agency (EA) in England and Wales, or the Scottish Environmental Protection Agency (SEPA) in Scotland, who are also statutory consultees to the LPA. The LPA will determine if an environmental impact assessment (EIA) is required, and an environmental permit from the appropriate environment agency may also be required.

Once the LPA has granted permission to drill, DECC will consider an application to drill and at least 21 days before drilling is planned, the HSE must be notified of the well design and operation plans ensure that major accident hazard risks to people from well and well related activities are properly controlled, subject to the same stringent regulation as any industrial activity. HSE regulations also require verification of the well design by an independent third party. Notification of an intention to drill has to be served to the environmental regulator under S199 of the Water resources act, 1991.

Once DECC checks the geotechnical information and that EA/SEPA and HSE are aware of the scope of the well operations, they may consent to drilling. If the well needs more than 96 hours of testing to evaluate its potential to produce hydrocarbons, the operator can apply to DECC for an extended well test of up to 60 days (once all other

consent and permissions have been granted) which limit the quantities of gas to be produced and saved or flared.

If the operator wished to drill an appraisal well or propose a development, they start again with the process described above; the landowner permissions and LPA planning consent, EA or SEPA consultation and HSE notification before DECC would consider approving the appraisal well or development. The LPA will also consider whether an EIA is required: for most developments, this is mandatory.

### **How are fracking operations regulated?**

From the outset, each application must go through the local planning authority process and before any drilling occurs, an application for authorisation for any discharge must be made to the Environment Agency (EA) or Scottish Environment Protection Agency (SEPA) in Scotland, which will only be granted if the agency is confident that there is no risk to the environment, and in particular to drinking water. As part of this process, operators are required to disclose the content of fracking fluids to the Environment Agency. The Health and Safety Executive scrutinises the well design for safety.

The HSE then monitors progress on the well to determine if the operator is conducting operations as planned. The HSE are also notified of any unplanned events. If it is deemed necessary, inspections may be undertaken by HSE to inspect specific well operations on site.

### **Should there be a moratorium on shale gas?**

In the light of the robust controls in place, outlined above, to protect the environment and ensure safe operation, DECC see no need for any moratorium on shale gas. This is also the view of the Energy and Climate Change Select Committee which held an inquiry into shale gas earlier this year and took evidence from Government, regulators, the British Geological Survey, the oil and gas industry and environmental groups. The committee also concluded that hydraulic fracturing itself does not pose a direct risk to water aquifers, provided that the well-casing is intact. Rather, that any risks that do arise are related to the integrity of the well, and are no different to issues encountered when exploring for hydrocarbons in conventional geological formations.

### **How much shale gas is there in the UK?**

Exploration for shale gas in the UK is still at a very early stage with only a modest level of exploration activity. None of the wells drilled has been production tested, so a reliable reserve estimate (the amount of gas that can be technically and economically produced) cannot yet be made. In 2010, a DECC-commissioned British Geological Survey (BGS) study, by analogy with the productivity of Barnett Shale gas basin production in the US, estimated that the shale gas potentially recoverable resources could be 150 billion cubic meters of gas (5.3 trillion cubic feet). To put this in context, this is almost 2 years of UK gas consumption (86 billion cubic meters in 2009).

## Links to more regulatory information:

The interaction between regulatory agencies is explained in a diagram on the [DECC oil and gas website\[External link\]](#) with a detailed description of the process and [table with all the Environmental legislation applicable to the onshore hydrocarbon industry\[External link\]](#).

The Borehole Sites and Operations Regulations 1995 (Regulation 6(1)) place a duty on operators of petroleum borehole sites to ensure that no drilling operations (included those associated with shale gas), abandonment operations or workover operations which would make a significant alteration to the well or involve a risk of accidental release of fluids from the well or reservoir are carried out at a site unless they have notified the HSE at least 21 days in advance. The notification must contain all of the information listed [in Part I of Schedule 1 of the Regulations\[External link\]](#), where a guidance booklet can be downloaded for free). Further information can be found on [the HSE website\[External link\]](#).

In Scotland, activities liable to have an adverse effect on the water environment fall within the scope of the [Water Environment \(Controlled Activities\)\[External link\]](#) (Scotland) Regulations 2011. Activities such as discharging water containing pollutants, drilling for the purpose of water abstraction and the abstraction of water require authorisation by Scottish Environmental Protection Agency(SEPA).

In England and Wales, the Environment Agency (EA) expects operators to notify the EA of their intention to carry out drilling, at which time the EA will advise on any requirement for control under the [Water Resources Act 1991\[External link\]](#) and [The Water Resources Act 1991 \(Amendment\) \(England and Wales\) Regulations 2009\[External link\]](#). Information on environmental controls on fracking can be found on [the EA website\[External link\]](#)

A permit under the [Environmental Permitting Regulations 2010 \(EPR\)\[External link\]](#) is required where fluids containing pollutants (substances liable to cause pollution) are injected into rock formations that contain groundwater (a “groundwater activity” under EPR). An environmental permit may also be needed if the activity poses a risk of mobilising natural substances that could then cause pollution. The permit, if granted, will specify limits on the activity and any requirements for monitoring. All Environment Agency environmental permits are placed on the public register.

If the EA decides that the activity poses an unacceptable risk to the environment, the EA will not issue a permit and if necessary may issue a notice under EPR to prohibit it. If the EA decides that the activity cannot affect groundwater, a permit may not be necessary. The Water Framework Directive and EPR defines groundwater as all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. Under statutory guidance it is for the EA to decide whether groundwater is present and whether a groundwater activity is taking or will take place. Each proposal will be assessed on a site by site basis.

Any activity which intersects, disturbs or enters coal seams requires Coal Authority prior written authorisation. For information, regarding licences, Agreements or a Permits, depending upon the activity to be carried out, see [the Coal Authority website.\[External link\]](#)

