



Department
of Energy &
Climate Change

Onshore oil and gas exploration in the UK: regulation and best practice

England

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This document is also available from our website at www.gov.uk/decc.

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Introduction

This roadmap document is intended as a first point of reference for anyone seeking to understand the permitting and permissions process for exploratory work in oil and gas development, onshore in the UK. The content is primarily for unconventional oil and gas operations, (specifically shale gas and coal bed methane developments) but many of the processes described will apply equally to conventional operations.

It is intended to offer an introduction to and guidance on planning and permitting. Its content should not be considered as definitive policy statement.

The roadmap is intended as a general guide only and will be revised as legislation develops, new regulations are introduced; or when best practice evolves.

Development of the roadmap has been coordinated by the Office of Unconventional Gas and Oil (OUGO), a new UK Government office that aims to promote the safe, responsible and environmentally sound recovery of the UK's unconventional reserves of gas and oil.

The roadmap has been developed through collaboration with other Government departments, Devolved Administrations and other interested parties in order to provide UK-wide guidance on onshore gas and oil development.

The roadmap does not define timescales for the planning and permitting process or individual steps within it. Operators are advised to contact the relevant regulatory authorities to establish indicative timelines. Information will also be available on regulators' websites.

How to use this roadmap

This interactive roadmap explains the permitting and permissions process for onshore oil and gas exploration, including shale gas and coal bed methane operations.

The roadmap provides a basic, indicative overview of the process, highlighting key pieces of legislation and regulation, and identifying required actions and best practices at various stages. Relevant regulatory websites should be referenced for detailed advice.

There is a separate roadmap document for each of the countries within the United Kingdom reflecting the different legislative frameworks that apply and various regulatory bodies that have responsibility for operations in each geographical area. This particular document deals with England; there are separate documents for Wales, Scotland and Northern Ireland.

An overview diagram is presented for each country. On this diagram users can click individual boxes to access more detail. At the end of each section, users can click on a text hyperlink to take them back to the roadmap itself.

Depending on the user's version of Microsoft Word/Adobe Acrobat, all links may simply be clicked or may need the Control (Ctrl) key to be held down at the same time.

Frequently asked questions

What are the differences between conventional and unconventional oil and gas?

The oil and gas industry is well established in the UK, having focused on exploiting conventional oil and gas fields, both onshore and offshore. The industry is now in a phase of exploration for unconventional oil and gas as a result of recent technological developments. These include use of hydraulic fracturing (or fracking) for the exploration of oil and gas shales as well as coal bed methane (CBM) extraction.

Conventional oil and gas accumulations (such as in the North Sea) are contained in permeable rocks, such as sandstone.

In **unconventional hydrocarbon accumulations** the same rock layer acts as both source and reservoir rock.

Shale gas is essentially the same as North Sea gas (i.e. mostly methane) but is trapped in impermeable shale rock. Enlarging or creating fractures in the rock by hydraulic fracturing (or 'fracking') enables shale gas to flow. The fracking technique has been used in the UK for many years with conventional deposits. Improvements in horizontal drilling and hydraulic technology over the past few decades have made the exploitation of shale gas reservoirs more economical.

Exploration for shale gas presents a series of new challenges; not least the collection of data across previously little understood and poorly studied parts of hydrocarbon provinces.

Coal bed methane (CBM) wells produce gas from coal seams that act as source and reservoir to the produced gas. These wells often produce water in the initial production phase, as well as natural gas. Economic CBM reservoirs are normally shallow, as the coal tends to have insufficient strength to maintain porosity at depth.

What is the process for drilling an onshore oil or gas well?

The process of obtaining consent to drill a well is the same whether the well is targeted at conventional or unconventional gas. The Oil and Gas Authority (OGA) (DETI in Northern Ireland) issues a licence that grants exclusivity to operators in the licence area to explore for and produce petroleum.

Operators wishing to drill a well must negotiate access with landowners. Permission must also be granted by the Coal Authority if the well encroaches on coal seams.

The operator then needs to seek planning permission from the local minerals planning authority (MPA), the local planning authority (LPA) if in Scotland or DOE Planning if in Northern Ireland. The operator must consult with the environmental regulator: the Environment Agency (EA) in England, Natural Resources Wales (NRW) in Wales, the Scottish Environment Protection Agency (SEPA) in Scotland or the Northern Ireland Environment Agency (NIEA) in Northern Ireland, who are also statutory consultees to the MPA/LPA/DOE. The MPA/LPA/DOE will determine if an environmental impact assessment (EIA) is required. Environmental permit(s) from the appropriate environmental agency will also be necessary.

OGA/DETI will give consent to drill only when

- The MPA/LPA/DOE has granted permission to drill and the relevant planning conditions have been discharged
- All the necessary permits from the relevant environmental agency are in place
- The Health and Safety Executive (HSE) or Health and Safety Executive Northern Ireland (HSENI) has had notice of and is satisfied with the well design.

- The operator must arrange an examination of the well design by an independent, competent well examiner.
- The British Geological Survey (BGS) or Geological Survey of Northern Ireland (GSNI) has been notified of the intent to drill.

If the well needs more than 96 hours of testing to evaluate its potential to produce hydrocarbons, the operator must apply to OGA/DETI for an extended well test (once all other consents and permissions have been granted). Permission for the extended well test will limit the quantities of gas to be produced and saved or flared.

If an operator wishes to start production from a development site, they start again with the process described above: the landowner permissions and MPA/LPA/DOE planning consent; EA, NRW, SEPA or NIEA consultation; and appropriate environmental permit and HSE/HSENI notification before OGA/DETI will consider approving the development.

How are hydraulic fracturing operations regulated?

Each application must go through the planning authority process and operators must consult with the relevant environmental agency (the Environment Agency (EA) in England; Scottish Environment Protection Agency (SEPA) in Scotland; Natural Resources Wales (NRW) in Wales; or the Northern Ireland Environment Agency (NIEA) in Northern Ireland) in order to establish the requirements for any environmental permits/authorisations that will be needed. Applications will only be granted if the relevant agency is confident that there is no unacceptable impact to the environment and, in particular, to principal aquifers that provide potable water supply. As part of this process, operators are required to disclose the content of hydraulic fracturing fluids to the relevant environment agency.

The Health and Safety Executive (HSE) or Health and Safety Executive Northern Ireland (HSENI) will scrutinise the well design for safety.

An environmental permit will be required from the relevant environment agency for any borehole drilling as well as hydraulic fracturing activities.

The HSE/HSENI then monitors progress on the well. The HSE/HSENI is also notified of any unplanned events. If it is deemed necessary, inspections may be undertaken by HSE/HSENI to inspect specific well operations on-site.

What is the UK's approach to regulation?

The UK has a goal-setting approach to regulation that requires operators to ensure and demonstrate to regulators that the risks of an incident relating to oil and gas operations are reduced to 'as low as reasonably practicable'. This encourages operators to move beyond minimum standards in a continuous effort for improvement.

In February 2013, the United Kingdom Onshore Operators Group (UKOOG), the representative body for UK onshore oil and gas companies, published [industry guidelines covering best practice for shale gas well operations in the UK](#). HSE and EA helped develop these guidelines.

Best practice guidance is set out in [Shale gas extraction in the UK: a review of hydraulic fracturing](#), Royal Society and Royal Academy of Engineering report, June 2012. The Government Q&A and response to the recommendations and issues can be found on the [DECC website](#).

Which phases of an oil and gas development does this roadmap cover?

The exploitation of oil and gas resources typically occurs in four key phases:

- Exploration
- Appraisal
- Development and production
- Decommissioning, restoration and aftercare.

This roadmap covers only the exploration and appraisal phases.

Exploration is the use of seismic surveys to provide information about geological structures and exploratory drilling to verify the presence or absence of oil or gas reserves.

Appraisal is the assessment of exploration prospects using extended well tests and additional drilling to determine if reservoir development is economically feasible.

Development and production cover the development of field infrastructure and the production of hydrocarbons from the reservoir until economically feasible reserves are depleted. Development and production can only be initiated by the operator once a field development plan has been submitted to and approved by OGA/DETI, as technically shale gas does not involve conventional fields.

Decommissioning, restoration and aftercare refer to operations for the abandonment of wells, the removal of surface installations and the restoration of the site.

What is the history of hydraulic fracturing and unconventional gas development in the UK?

The UK has experience of hydraulic fracturing and directional drilling for non-shale gas applications.

The first UK well to encounter shale gas (accidentally) was drilled in West Sussex in 1875 (Netherfield) and in 1895 the nearby Heathfield well produced enough gas to light the local railway station until well into the 20th century.

Advances in directional drilling (involving record-breaking offsets up to 11km) have enabled the development of the Wytch Farm field onshore and offshore Dorset. Discovered by British Gas in the 1970s and now operated by Perenco, the field is responsible for the majority of UK onshore oil production and is a giant oil field, with over 200 wells drilled and reserves of 500 million barrels of oil. Drilling vertically onshore then horizontally out to sea has proved more cost-effective and environmentally sensitive than building offshore platforms. Horizontal drilling has also allowed the operator to choose drilling locations away from environmentally sensitive areas.

The first hydraulic fracturing of onshore conventional UK wells was done in the late 1950s, and it has been a common field operation to increase flow rates since then.

Offshore, tight (low permeability) sandstone wells are also now commonly hydraulically fractured. In the 1990s, several wells were also fractured in the UK to improve coal bed methane flow rates, but this is not always necessary for CBM.

In the mid-1980s research began into the potential for gas production from UK shales.

An [overview of all areas currently under licences](#) as well as [an interactive version of the map](#) are available on the Government website.

What opportunities are there for public consultation?

Public consultation is part of every oil and gas application for planning permission, which is required for each stage of exploration, appraisal and production.

The Environment Agency will carry out public consultation for the issue of environmental permits. The length of time for these consultations varies from 4 to 12 weeks, depending on the complexity of the application. They would be advertised in the most appropriate way, depending on the circumstances. Often this will be done through local media and the Environment Agency's website, alongside targeted e-mails to interested parties.

Minerals planning authorities (MPAs) will also advertise and consult on individual planning applications.

The MPA gives notice that it has validated and accepted a planning application by writing to residents and businesses near the application site, putting up a site notice or placing an advertisement in a local newspaper. Information about the application must also be available on the relevant local authority website.

As a matter of best practice, UKOOG's charter also sets out that communities must be engaged from the very start of the planning application process, where shale gas is being developed. For a more specific indication of when, where and how consultation will take place, please check the relevant MPA's website or contact them directly. In addition, the Government encourages pre-application consultation for all kinds of developments, including shale gas.

Pre-drilling approvals checklist

Before commencing drilling operations for onshore oil and gas development the operator must have

- Obtained a petroleum exploration and development licence (PEDL) from OGA or petroleum licence (PL) from DETI
- Secured a lease from the landowner
- Submitted relevant PON notifications to OGA/DETI (<https://www.gov.uk/oil-and-gas-petroleum-operations-notices>)
- Satisfied DECC/DETI that effective operational and environmental management systems are in place
- Secured planning permission from the MPA/LPA/DOE
- Discharged any relevant conditions placed on the planning permission by the MPA/LPA/DOE
- Obtained a permit from the Coal Authority if the well will encroach on coal seams (excluding NI)
- Informed the BGS/GSNI of the intention to drill
- Completed the necessary consultation processes with all the statutory/relevant consultees
- Obtained all the necessary permits from the relevant environmental agency (EA/NRW/SEPA/NIEA)
- Notified the HSE/HSENI of the intention to drill (minimum 21 days' notice)
- Provided HSE/HSENI with details of the proposed well design that have been examined by an independent and competent well examiner (minimum 21 days' notice)
- Agreed data-reporting methods with OGA/DETI
- Agreed a method for monitoring induced seismicity and fracture growth height with OGA/DETI, where hydraulic fracturing is planned
- Received approval for an outline hydraulic fracturing programme from OGA/DETI, where hydraulic fracturing is planned.

Bibliography

[**UK onshore shale gas well guidelines**](#)

Exploration and appraisal phase, UKOOG, Issue 1 February 2013

[**Shale gas extraction in the UK: a review of hydraulic fracturing**](#)

Royal Society and Royal Academy of Engineering report, June 2012

[**Bowland Shale Gas Study – Main Report**](#)

The Carboniferous Bowland Shale gas study: geology and resource estimation. DECC

[**Background note on induced seismicity in the UK and its relevance to hydraulic stimulation for exploration for shale gas**](#)

Professor Peter Styles (Keele University) and Dr Brian Baptie (British Geological Survey), April 2012

[**Regulatory guidance: Coal bed methane and shale gas**](#)

Scottish Environment Protection Agency

[**Parliamentary briefing paper on unconventional gas**](#)

Postnote, Number 374, April 2011

[**Extended well tests**](#)

DECC

[**Guidance note: Regulation of exploratory shale gas operations**](#)

Environment Agency

[**Government response to Royal Academy of Engineering and Royal Society report on “Shale gas extraction in the UK: a review of hydraulic fracturing”**](#)

Version: Final A04- 10 December 2012

[**What is shale gas?**](#)

DECC

[**Shale gas background note**](#)

Prepared for DECC by Dr C. Green of G Frac Technologies Ltd

[**Planning practice guidance for onshore oil and gas**](#)

Department for Communities and Local Government, July 2013

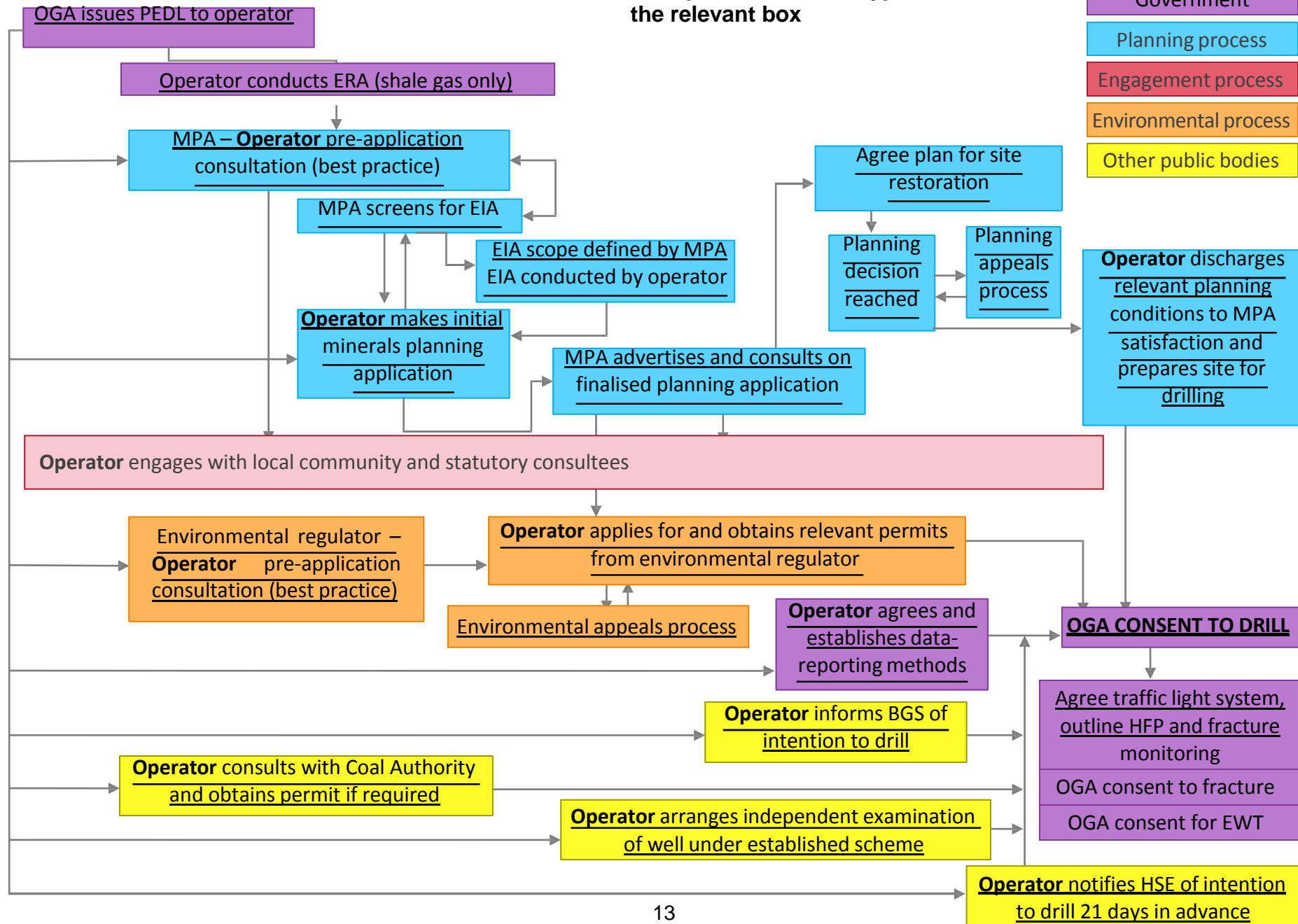
Glossary

ALARP	as low as reasonably practicable
BGS	British Geological Survey
BSOR	borehole sites and operations regulations
DCLG	Department for Communities and Local Government
DECC	Department of Energy and Climate Change
DETI	Department of Enterprise, Trade and Investment (NI)
DOE	Department of the Environment (NI)
EA	Environment Agency
EIA	environmental impact assessment
ERA	environmental risk assessment
ES	environmental statement
EWT	extended well test
GSNI	Geological Survey of Northern Ireland
HFP	hydraulic fracturing plan
HPA	Health Protection Agency
HSE	Health and Safety Executive
HSENI	Health and Safety Executive Northern Ireland
ISO	International Organization for Standardization
LPA	local planning authority
MPA	mineral planning authority
NIEA	Northern Ireland Environment Agency
NRW	Natural Resources Wales (formed by merger of the Countryside Council for Wales, Environment Agency Wales and the Forestry Commission Wales)
OGA	The Oil and Gas Authority
PAD	pre-application discussions (NI)
PEDL	petroleum exploration and development licence
PL	petroleum licence (NI)
PPC	pollution prevention and control
SEPA	Scottish Environment Protection Agency
UKOOG	United Kingdom Onshore Operators Group

Roadmap

For more information, please click the hyperlink in the relevant box

- Government
- Planning process
- Engagement process
- Environmental process
- Other public bodies



OGA issues PEDL to operator

Lead agency	OGA
Actions	<ul style="list-style-type: none"> • Petroleum exploration and development licence (PEDL) granted through licensing rounds • Under licensing agreement, operator agrees to follow good oilfield practice • As part of the licensing process, OGA will assess operator competency, safety management systems, well examination scheme and financial capability • Operators must have clearly defined operational and environmental management systems • Operator submits relevant PON notification(s)
Key legislation and guidance	Town and Country Planning Act 1990 Planning and Compensation Act 1991 Environment Act 1995 Petroleum Act 1998 Energy Act 1976 Petroleum (Production) (Landward Areas) Regulations 1995
Operator input	Proof of relevant management systems
Engage stakeholder	No
Statutory consultees	–
Decision/output	PEDL

PEDL framework

The Secretary of State issues landward production licences (petroleum exploration and development licences) under powers granted by the Petroleum Act 1998.

Licence holders are obliged to seek permission from OGA before they start well operations.

Exploration may begin with seismic investigations to identify prospective structures. Most MPAs regard such work as an activity that does not require planning permission or as permitted development. Licence holders must notify landowners, planning authorities and OGA of plans to conduct seismic surveys in the licence area. Operator must notify the Highways Agency if the survey is undertaken on highways. The UK government requires that a petroleum operation notice (PON) form (14b: Notification of intention to carry out onshore (landward) geophysical surveys) be submitted and that proposals are discussed with the MPA and the relevant statutory agencies.

There may be a need to contact the utilities. This could be done through National Joint Utilities Group (NJUG) meetings, which are run by the highways authority (New Roads and Streetworks Act, NRSWA).

Management systems

Effective risk-based, systematic management of well integrity, the integrity of the surface equipment used in fracturing/flowback operations and of other associated operations is critical to ensuring the safety of the well operations and environmental protection.

Operators' management systems should be developed and applied to all operations, including any pre-drilling operations such as seismic acquisition work.

Operators should also operate in accordance with a suitable environmental management system that conforms to the principles in ISO 14001.

Useful links

Current fields and licences

www.gov.uk/government/uploads/system/uploads/attachment_data/file/15095/landfields-lics.pdf

UKOOG onshore shale gas well guidelines

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/185935/UKOOG_ShaleGasWellGuidelines.pdf

Oil and gas: operatorship

www.gov.uk/oil-and-gas-operatorship

PON notification

<https://www.gov.uk/oil-and-gas-petroleum-operations-notices>

[Return to the roadmap flowchart](#)

Operator conducts ERA

Lead agency	OGA
Actions	<ul style="list-style-type: none"> • The environmental risk assessment (ERA) is a first-stage risk assessment to be conducted for proposed shale gas operations where hydraulic fracturing is planned • OGA requires compilation of an ERA as a matter of good practice • The ERA is recommended as a starting point for early engagement with the MPA, other regulators and local communities • OGA is consulting other regulators to develop agreed guidance for operators on the preparation of suitable ERAs
Key legislation and guidance	–
Operator input	Completed ERA
Engage stakeholder	Yes
Statutory consultees	–
Decision/output	ERA report

Environmental risk assessment

Licensees will be required to carry out an overview assessment of environmental risks, including risks to human health, covering the full cycle of the proposed operations, including well abandonment, with the participation of stakeholders, including local communities. This should be done as early as practicable in the development of their proposals.

Detail

An environmental risk assessment (ERA) is required for all shale gas operations involving hydraulic fracturing, as a matter of good practice. It should involve the participation of stakeholders including local communities at the earliest possible opportunity. The ERA should be undertaken as early as practicable and in any case before application for planning consent.

The ERA should assess risks across the entire life cycle of the planned shale gas activities, including the disposal of wastes and well abandonment, and risks of induced seismicity.

The ERA can subsequently inform other assessments, such as the environmental impact assessment (EIA), where this is required following screening by the relevant planning authority.

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MPA–operator pre-application consultation

Lead agency	Minerals planning authority (MPA)
Actions	Pre-application consultations with the local MPA is considered best practice for operators
Key legislation and guidance	Town and Country Planning Act 1990 Town and Country Planning (Environmental Impact Assessment) Regulations 2011 National Planning Policy Framework Planning Practice Guidance for Onshore Oil and Gas (DCLG)
Operator input	Engage with statutory consultees
Engage stakeholder	Yes
Statutory consultees	Canal & River Trust; Civil Aviation Authority; Coal Authority; Crown Estate Commissioners; Department for Culture, Media and Sport; DECC; Department for Environment, Food and Rural Affairs; Department for Transport; Environment Agency; English Heritage; Forestry Commission; Garden History Society; Highways Agency; Ministry of Defence; Natural England; National Air Traffic Control Services and operators of officially safeguarded civil aerodromes; rail network operators; Sport England; Theatres Trust; toll road concessionaries; local planning authorities, and local highway authorities
Decision/output	–

Pre-application consultation

Operators are encouraged to undertake a pre-application consultation with the MPA and other key consultees. This consultation will be expected to address issues such as noise, ecology, archaeology, site access and visual impact. It will define arrangements for permits from and contact with appropriate regulatory agencies. It will detail consultative checks made with local water and power suppliers.

Screening opinion

Under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, applicants can make a formal request to the MPA for an EIA screening opinion at any time. A decision on whether an EIA is required could be made well in advance of any planning application.

Local community engagement

As part of the pre-application consultation, operators are expected to engage with the local community, in accordance with the MPA's community involvement requirement for mineral developers.

Industry charter for local community engagement

UKOOG has defined standards for community engagement. Operators will

- Engage with local communities, residents and other stakeholders at each stage of operations – exploration, appraisal or production, beginning in advance of any operations and in advance of any application for planning permission
- Ensure there is a continued point of contact for local communities and that they provide sufficient opportunity for comment and feedback on initial plans, listen to concerns and respond appropriately and promptly
- Have a strategy or plan for engagement that is developed early and links to all statutory processes.

Useful links

UK planning portal

www.planningportal.gov.uk/

UKOOG Community Engagement Charter

<http://www.ukoog.org.uk/elements/pdfs/communityengagementcharterversion6.pdf>

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MPA screens for EIA

Lead agency	Minerals planning authority (MPA)
Actions	<ul style="list-style-type: none"> • MPA review formal application to determine if there is a need for a full EIA • Applicants may apply to the MPA for a screening opinion as to whether the development is to be subject to an EIA • A planning permission for a proposal that should be subject to EIA which has not been screened or is not accompanied by an environmental statement could be challenged.
Key legislation and guidance	Town and Country Planning Act 1990 Town and Country Planning (Environmental Impact Assessment) Regulations 2011
Operator input	Operator may need to undertake scoping study
Engage stakeholder	Yes
Statutory consultees	–
Decision/output	Decide if EIA is required

Screening and scoping

The MPA should carry out a screening exercise to determine whether any proposal for onshore oil and gas extraction requires an EIA.

Applications for the exploratory and appraisal phases will fall under Schedule 2 to the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 if they exceed the applicable threshold or any part of the development is to be carried out in a sensitive area. An EIA is only required if the project is likely to have significant environmental effects.

While all applications must be assessed on a case-by-case basis, it is unlikely that an EIA will be required for exploratory drilling operations which do not involve hydraulic fracturing unless the well pad is located in a site that is unusually sensitive to limited disturbance occurring over the short period involved.

Applications for the production phase are also likely to fall under paragraph 2 of Schedule 2 to the 2011 Regulations, in which cases they should be screened for likely significant effects. Applications where more than 500 tonnes of oil or 500,000 cubic metres of gas will be extracted per day may fall under Schedule 1, in which case an EIA is mandatory.

Operators can request a screening opinion from the MPA at any time

A screening request should include a location plan identifying the land, a brief description of the nature and purpose of the proposed development and the possible effects on the environment, and any other additional information or representation.

Once a screening opinion has been made, the MPA will send written confirmation stating whether it requires an EIA.

Should the MPA not provide a screening opinion in the required time or determine that the proposed development would require an EIA, the applicant can appeal/dispute the decision with the Secretary of State by requesting a screening direction.

Where an EIA is required, developers are encouraged to ask the MPA for an opinion as to the scope and level of detail that should be covered before submitting any application for planning permission. In such cases and to ensure that all the relevant environmental issues are identified and addressed, the MPA will consult other relevant bodies before an opinion is given.

Useful links

DCLG, Planning practice guidance for onshore oil and gas

<https://www.gov.uk/government/publications/planning-practice-guidance-for-onshore-oil-and-gas>

[**Return to the roadmap flowchart**](#)

EIA scope defined by MPA; EIA conducted by operator

Lead agency	Minerals planning authority (MPA)
Actions	<ul style="list-style-type: none"> • MPA defines the required scope of EIA • Operator commissions a full EIA that has regard for any environmental risk assessments previously undertaken
Key legislation and guidance	Town and Country Planning Act 1990 Town and Country Planning (Environmental Impact Assessment) Regulations 2011
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	Environment Agency, English Heritage, Natural England
Decision/output	Environmental statement (from EIA)

EIA scope

An EIA should draw together, in a systematic way, an assessment of the likely significant environmental effects of the proposed development.

Where a proposed scheme is determined to be “EIA development”, the developer can ask the planning authority for advice on the scope of the information to be gathered. Operators are expected to draw upon the content of the ERA when completing an EIA.

An EIA must cover the geographical area where the impacts occur, both above and below ground. This is likely to be a broader area than the application area.

Environmental statement

Once the EIA has been carried out the information should be systematically presented in the environmental statement (ES). The ES must contain

- i. A description of the development comprising information on the site and the design and size of the development
- ii. A description of the measures envisaged to avoid, reduce and, if possible, remedy significant adverse effects
- iii. The data required to identify and assess the main effects that the development is likely to have on the environment
- iv. An outline of the main alternatives studied by the applicant or appellant, and an indication of the main reasons for the choice made, taking into account the environmental effects
- v. A non-technical summary of the information provided under paragraphs 1–4 of this part.

In addition, it must contain any relevant information from Part I of Schedule 4 (see www.gov.uk/government/publications/environmental-impact-assessment-circular-02-1999).

Traffic light monitoring system for induced seismicity

Where hydraulic fracturing operations are planned the EIA should include a brief description of the proposed traffic light system for monitoring induced seismicity. A more detailed description will be required at a later stage. This may be required during the groundwater consent application, because fracture development should be restricted to within the target formation. The level of information required will be judged on a case-by-case basis.

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Operator makes initial minerals planning application

Lead agency	Minerals planning authority (MPA)
Actions	<p>MPA receives planning application from operator under the Town and Country Planning Act 1990.</p> <p>Key issues may include</p> <ul style="list-style-type: none"> • Site location • water (e.g. run-off from site) • Traffic volumes • On-site storage facilities • Noise • Groundwater • Induced seismicity • Waste. <p>These are issues that might be raised but MPAs are not expected to duplicate work carried out by regulators such as the Environment Agency.</p>
Key legislation and guidance	<p>Town and Country Planning Act 1990</p> <p>Town and Country Planning (Environmental Impact Assessment) Regulations 2011</p>
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	Environment Agency, English Heritage, Natural England
Decision/output	Planning application documents

Planning application

Companies seeking to undertake exploratory investigations and to subsequently test for and possibly extract onshore oil or gas, including shale gas and coal bed methane, must apply for planning permission from the MPA that has strategic planning authority for mineral and waste developments.

This involves managing the planning process according to rules set out by the government to assess applications for mineral developments, including mineral exploration.

When an application for development is received by the MPA, it will be assessed on its merits against the policies of the development plan and in light of advice from statutory consultees and representations received.

Guidance to operators

It is considered best practice for the operator to submit any necessary environmental statement (ES) when making the formal planning application. Where an ES is not required operators may

have to support a planning application with technical reports including ecology, noise and archaeology.

The MPA encourages operators to define the minimum and maximum expected extent of operations (e.g. number of wells and duration) during the exploration phase and to apply on this basis. This will make for a clearer consultation process and help to establish the limits of any planning permission that is granted.

The decision process

The MPA determines applications in accordance with planning law. Before the MPA takes a decision, it will consider the advice provided by other agencies, such as the Environment Agency, on important matters such as the protection of the environment and public.

The focus of the planning system is on whether the development is an acceptable use of the land, and the impacts of those uses, rather than any control processes, health and safety issues or emissions, where these are subject to approval under other regimes. MPAs should assume that these non-planning regimes will operate effectively.

The MPA advertises planning applications that it receives and there is an opportunity to make representations on individual proposals.

If planning permission is granted, the MPA will monitor and inspect operations to ensure that they comply with any conditions imposed.

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MPA advertises and consults on finalised planning application and environmental statement

Lead agency	Minerals planning authority (MPA)
Actions	<ul style="list-style-type: none"> • MPA advertises the planning application package in local media and consults statutory consultees • Local engagement with communities is formally undertaken
Key legislation and guidance	Town and Country Planning Act 1990 Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	Canal & River Trust; Civil Aviation Authority; Coal Authority; Crown Estate Commissioners; Department for Culture, Media and Sport; DECC; Department for Environment, Food and Rural Affairs; Department for Transport; Environment Agency; English Heritage; Forestry Commission; Garden History Society; Highways Agency; Ministry of Defence; Natural England; National Air Traffic Control Services and operators of officially safeguarded civil aerodromes; rail network operators; Sport England; Theatres Trust; toll road concessionaries; local planning authorities; and local highway authorities
Decision/output	Consultation responses from statutory and non-statutory consultees, including the local community

Planning statement

It is necessary to provide the MPA with sufficient information to be able to determine the application. This may include the submission of a planning statement, which may include information detailing the operations proposed, phasing, equipment, timescales and the need for the development.

Content of the planning application package

The planning application package will typically contain

- The planning application, with appropriate form, certificate fee and schedule of plans and drawings
- The environmental statement (ES).

Non-technical summary

This is a summary of the contents and conclusions of the EIA. It is the part of the ES, which may be published separately for circulation on a non-statutory basis to local residents or interested parties.

Environmental statement

This sets out the information about the development in more detail than the non-technical summary. The ES draws together the threads that have been explored through the technical reports. It is necessary to define the “baseline” that has been adopted in order to demonstrate the effects, if any, of the development on each key issue that has been identified by scoping. Where an issue has not been investigated in detail, this should be explained to avoid third parties questioning the adequacy of the EIA.

Mitigation measures should be described either in relation to each item or collated in a separate section of the ES, which may also constitute the suggested environmental management and monitoring scheme to be followed during and after the development has been completed and is operational.

The ES should outline the main alternatives studied by the applicant.

Technical reports

The individual technical reports prepared for the various effects on the environment together with the data supporting the conclusions should be included in Part III. This enables the local planning authority to verify the contents of the ES by reference to the source material and to be satisfied that the EIA has been sufficiently rigorous and in accordance with the methodology agreed as part of the scoping exercise.

Public access to information

Operators will be required to make the information about their plans and proposals available to the public. This may include through their company website (best practice) and through local libraries.

The planning application and supporting documents will also be available on the MPA website for consultation.

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Environmental regulator – operator pre-application consultation (best practice)

Lead agency	Environment Agency
Actions	<ul style="list-style-type: none"> Operators are strongly advised to discuss the requirements of all the relevant permissions with staff in the local EA office at the pre-application stage and to twin-track planning and environmental permission applications Operators should also contact the EA's national oil and gas permit team
Key legislation and guidance	Environmental Permitting Regulations 2010 Water Resources Act 1991
Operator input	Engage with Environment Agency
Engage stakeholder	Yes
Statutory consultees	<ul style="list-style-type: none"> Environment Agency MPA (consultation considered best practice)
Decision/output	EA response to enquiry

Pre-application consultation

Before submitting a pre-application enquiry to the EA, it is strongly recommended that operators should contact the relevant MPA to determine the likelihood of the proposed development receiving planning permission.

Pre-application enquiry form

Operators can use the EA pre-application enquiry form to make sure the EA has all the information necessary to provide a timely and useful response.

The enquiry form is designed to bring together all the information the EA requires, which enables it to provide a timely and meaningful response.

Technical guidance

The Environment Agency has published technical guidance for onshore oil and gas exploratory operations, both conventional and unconventional. Written for operators and other regulators, the guidance has been the subject of a detailed consultation process.

Useful links

Local EA offices

www.environment-agency.gov.uk/contactus/36324.aspx

EA pre-application enquiry form

www.environment-agency.gov.uk/research/planning/33580.aspx

EA technical guidance consultation

<https://consult.environment-agency.gov.uk/portal>

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Operator applies for permits from environmental regulator

Lead agency	Environment Agency
Actions	<ul style="list-style-type: none">• Operators are strongly advised to discuss the requirements of all the relevant permissions with staff in the local EA office at the pre-application stage and to twin-track planning and environmental permission applications• In July 2013 the Environment Agency published technical guidance for conventional and unconventional onshore oil and gas exploratory operations
Key legislation and guidance	Environmental Permitting Regulations 2010 Water Resources Act 1991
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	–
Decision/output	Application documents, EA permits There are appeal provisions in the event of permit applications being rejected

Application process

Operators must serve a notice on the EA under Section 199 of the Water Resources Act 1991 to “construct...a boring for the purposes of searching for or extracting minerals”. Operators may require environmental permits for

- Groundwater activity (unless the EA is satisfied that there is no risk of inputs to groundwater)
- Mining waste activity (likely to apply in all circumstances)
- Industrial emissions activity (when the operator intends to flare more than 10 tonnes of gas per day)
- Radioactive substances activity (likely to apply in all circumstances)
- Water discharge activity (if surface water runoff becomes polluted).
- Groundwater investigation consent (to cover drilling and test pumping where there is the potential to abstract more than 20 m³/day in the production process)
- Water abstraction licence (if the operator plans to abstract more than 20 m³/day for own use rather than purchasing water from a public water supply utility company)
- Flood risk consent (if the proposed site is near a watercourse or main river).

The EA technical guidance on onshore oil and gas exploratory operations provides a useful starting point, and current and prospective operators should refer to this guidance before

starting the permitting process. See <https://consult.environment-agency.gov.uk/file/2582905> – please note that this technical guidance is in draft form and subject to revision post-consultation.

Role of the MPA

Environmental impacts are also of relevance to MPAs. The MPA will use appropriate planning conditions, having regard to the issues for which they have responsibility, to mitigate against any adverse environmental impact.

Useful links

Local EA offices

www.environment-agency.gov.uk/contactus/36324.aspx

EA technical guidance consultation (subject to revision post-consultation)

<https://consult.environment-agency.gov.uk/portal>

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Environmental appeals process

Lead agency	Environment Agency
Actions	Operators can appeal against rejection of environmental permit applications
Key legislation and guidance	Environmental Permitting Regulations 2010
Operator input	Yes
Engage stakeholder	No
Statutory consultees	–
Decision/output	Resolution of appeal

Appeals process

Appeals are made to the Secretary of State for permits in England. They can be resolved by negotiations with the appellant outside the formal process, otherwise the Secretary of State will normally refer the appeal to a planning inspector, who can resolve it through written representations, a hearing or an inquiry.

Useful links

Appeals process

[http://www.environment-agency.gov.uk/static/documents/Business/RGN_7_Appeals_\(v3.0\)_30_March_2010.pdf](http://www.environment-agency.gov.uk/static/documents/Business/RGN_7_Appeals_(v3.0)_30_March_2010.pdf)

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Agree plan for site restoration

Lead agency	Minerals planning authority (MPA)
Actions	Operator presents plans for restoring the development site after abandonment
Key legislation and guidance	Town and Country Planning (Environmental Impact Assessment) Regulations 2011 Central government proposals (in development)
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	–
Decision/output	Methods statement describing plans for post-abandonment site restoration

Planning for site abandonment

Operators need to present their plan for restoration of the planned development site to the MPA. This will outline actions that the operator proposes to take once operations have reached a conclusion.

Well suspension/decommissioning/abandonment

On completion of drilling operations, a well may be suspended to allow for future testing. If it is concluded that there is no petroleum present or not in commercial quantities then the well will be abandoned, in accordance with the latest Oil and Gas UK standard.

Once a well has been abandoned, the site will be restored and a period of aftercare conducted to ensure the land returns to a state that is the same or better than it was prior to operations commencing.

Restoration will involve the removal of all equipment that was not originally at the site and which had been brought in to conduct the operations.

Health and safety legislation requires a well to be designed and constructed such that, so far as reasonably practicable, there is no unplanned escape of fluids from it. The MPA is responsible for ensuring the wells are abandoned and the site is restored.

There is a requirement to notify the HSE when wells are abandoned and to show that the process complies with Oil and Gas UK guidelines.

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Planning decision reached

Lead agency	Minerals planning authority (MPA)
Actions	<ul style="list-style-type: none">• MPA reaches planning decision following consultation. This will include any agreed monitoring requirements and implementation of planning conditions• Any grant of planning permission would be subject to several pre-commencement planning conditions, which would need to be formally discharged (under the Town and Country Planning Act 1990) before drilling could commence
Key legislation and guidance	Town and Country Planning Act 1990
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	–
Decision/output	Planning approved or rejected There are provisions for planning appeals

Exploration decision

In the first instance, the MPA can only grant planning permission for the exploration of hydrocarbons. Should adequate reserves be found and it is viable to exploit them, a separate planning permission would be required to extract the oil or gas.

Community liaison committees

Where permission for minerals development has been granted, operators are encouraged to develop links with the local community by establishing community liaison committees.

UKOOG has defined standards for community engagement. Operators will ensure there is a continued point of contact for local communities and that they provide sufficient opportunity for comment and feedback on initial plans, listen to concerns and respond appropriately and promptly.

Post planning-approval requirements

If the MPA grants planning permission, DECC will consider an application to drill. DECC requires operators to establish arrangements for controlling induced seismicity, venting and flaring where required.

Period of notice for HSE

At least 21 days before drilling is planned, the HSE must be notified of the well design and operation plans to ensure that major accident hazard risks to people from the well and well-related activities are properly controlled.

The operator has to notify the HSE of their well abandonment programme, which has to be examined and has to comply with Oil and Gas UK guidelines.

HSE regulations require that the well programme be examined by an independent and competent well examiner.

Environment Agency

Notification of an intention to drill has to be served to the environmental regulator under Section 199 of the Water Resources Act 1991.

British Geological Survey

The operator must also inform the BGS of an intention to drill a borehole.

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Planning appeals process

Lead agency	Minerals planning authority (MPA)
Actions	If the MPA rejects a planning application, the operator has a right of appeal
Key legislation and guidance	Town and Country Planning Act 1990
Operator input	Yes
Engage stakeholder	No
Statutory consultees	–
Decision/output	Appeal decision

Appeals process

Where an MPA refuses permission for the proposed development or to grant it subject to conditions, operators can appeal through the Planning Inspectorate to the First Secretary of State under Section 78 of the Town and Country Planning Act 1990.

The DCLG Secretary of State can call in applications at any stage (before or after determination of appeal).

Appeals must be made within six months of the date of the decision notice.

The Secretary of State can allow a longer period for giving notice of an appeal, but will not normally be prepared to use this power unless there are special circumstances that excuse the delay in giving notice of appeal.

The Secretary of State need not consider an appeal if he/she judges that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions it imposed, having regard to the statutory requirements, to the provisions of the development order and to any directions given under the order.

When the MPA receives and registers a planning application, the applicant will receive a letter stating the date by which it should be determined. If the operator has not had a decision by that date or has not agreed to an extension of time with the case officer, then the operator may appeal against non-determination.

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Operator discharges planning conditions and prepares site for drilling

Lead agency	Minerals planning authority (MPA)
Actions	Operator completes required work to meet the terms of planning conditions
Key legislation and guidance	Town and Country Planning Act 1990
Operator input	Yes
Engage stakeholder	–
Statutory consultees	–
Decision/output	MPA confirmation that all the necessary conditions have been met

Discharging relevant planning conditions

Before operations can begin at the site, the operator must satisfy the MPA that it has discharged all relevant planning conditions (i.e. those conditions that apply before operations commence).

Some planning conditions may apply once operations have started or after they have finished.

Typically, planning conditions may be imposed to control any impact on local amenity (such as noise). The operation of the site's equipment should not be of concern to MPAs as these are controlled by the Environment Agency and the Health and Safety Executive

The MPA has enforcement powers under the Town and Country Planning Act 1990 to ensure that all required conditions are met.

MPA monitoring

Extraction of minerals is a continuous process of development. There is, therefore, a requirement for routine monitoring and, if necessary, enforcement by the MPA to secure compliance with conditions that are necessary to mitigate impacts of mineral working operations.

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Operator consults with Coal Authority and obtains permit if required

Lead agency	Coal Authority
Actions	Operator will require permit to drill from the Coal Authority if the planned well is to encroach on coal seams
Key legislation and guidance	Mining Industry Act 1926 Coal Industry Act 1994
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	Coal Authority
Decision/output	Record of notification Coal Authority permit (if required)

The Coal Authority

Under the Coal Industry Act 1994, any well likely to enter or pass through a coal seam, for any purpose, will require the agreement of the Coal Authority.

Such agreements lay down stringent requirements for the entering of coal seams and the subsequent provision for the supply of information. This includes accurate plans and sections of all wells drilled relative to Ordnance Survey datum and full well logs, including the method of drilling and method of treatment and sealing of wells and a record of equipment left in the well. Operators drilling through coal measures should be aware of the *Guidance on Managing the Risk of Hazardous Gases when Drilling or Piling Near Coal*, issued by the Coal Authority.

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Operator informs BGS of intention to drill

Lead agency	British Geological Survey (BGS)
Actions	Operator is required to inform the BGS of an intention to drill
Key legislation and guidance	Mining Industry Act 1926 Science and Technology Act 1965
Operator input	Yes
Engage stakeholder	Yes
Statutory consultees	–
Decision/output	Record of notification

British Geological Survey (BGS)

The Mining Industry Act 1926 makes provision for the “notification of intent to sink boreholes and shafts and subsequent provision of information”. Such powers have now been transferred to the Natural Environment Research Council by the Science and Technology Act 1965. The BGS requires information on any borehole that is intended to penetrate to a depth greater than 30m or the deepening of an existing well.

Operators carrying out such operations are required to keep a record of the operations in the form of logs and cores or fragments. For oil and gas wells, a section of each core and half of agreed interval cutting samples must be sent to the BGS to archive, along with all digital logs, the end of well report and test results, as described in the PON 9b.

BGS has compiled orientation and relative magnitudes of the contemporary in situ stress regime in the UK into a BGS stress GIS and database. BGS and operators will contribute to this national stress database and the World Stress Map (http://dc-app3-14.gfz-potsdam.de/pub/introduction/introduction_frame.html).

Useful links

[PON 9b: Record and sample requirements for onshore geophysical surveys and wells](#)

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Operator arranges independent examination of well design under established scheme

Lead agency	HSE
Actions	<ul style="list-style-type: none">• The HSE requires the operator to have a well examiner scheme in place• The HSE must be satisfied by the proposed design of the well
Key legislation and guidance	Health and Safety at Work etc. Act 1974 Offshore Installations and Wells (Design and Construction) Regulations 1996 (particularly Reg. 18)
Operator input	Yes
Engage stakeholder	–
Statutory consultees	HSE
Decision/output	Well plan that confirms full life cycle up to and including abandonment Assessment of well programme by independent and competent person

Role of the HSE in onshore oil and gas developments

The HSE monitors onshore oil and gas operations from a well integrity and site safety perspective. The HSE oversees the adoption of safe working practices by onshore operators as required under the Health and Safety at Work etc. Act 1974 and regulations made under the Act.

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. These regulations are primarily concerned with well integrity.

HSE works closely with the EA, and the OGA 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.

Requirements on operators

HSE regulations require that the well design is examined by an independent and competent well examiner.

The well examiner should also review daily activities.

The well should be designed with abandonment in mind. Well abandonment proposals have to comply with Oil and Gas UK guidelines.

The HSE will review pre-drilling activity via the wells notification process.

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Operator notifies HSE of intention to drill 21 days in advance

Lead agency	HSE
Actions	<ul style="list-style-type: none"> The HSE requires the operator to give advance notice (at least 21 days) of intention to drill The HSE must be satisfied by the proposed design of the well
Key legislation and guidance	Health and Safety at Work etc. Act 1974 Borehole Sites and Operations Regulations 1995 (particularly Reg. 6)
Operator input	Yes
Engage stakeholder	–
Statutory consultees	HSE
Decision/output	Record of notification to HSE

Notification to HSE

The Borehole Sites and Operations Regulations 1995 (BSOR) apply to conventional and unconventional oil and gas operations, including shale gas and coal bed methane developments. These regulations are primarily concerned with the health and safety management of the site.

Requirements on operators

At least 21 days before drilling is planned, the HSE must be notified of the well design and operation plans to ensure that major accident hazard risks to people from the well and well-related activities are properly controlled. It should be noted that a well operation does not in itself constitute a requirement for Control of Major Accident Hazards (COMAH).

The operator is required to establish a site safety document.

The HSE will review pre-drilling activity via the wells notification process.

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Operator agrees and establishes data-reporting methods

Lead agency	OGA
Actions	Operator supplies agreed information to key consultees, including OGA, EA, HSE and BGS
Key legislation and guidance	UKOOG onshore shale gas well guidelines (best practice)
Operator input	Yes
Engage stakeholder	–
Statutory consultees	–
Decision/output	Data-reporting agreement and ongoing provision of operational information by operator

Data reporting

Operators of oil and gas wells are required to share certain information about the operation with key regulatory bodies, including OGA, EA, HSE and BGS.

Data exchange standards

There are standard formats for data exchange within the oil and gas industry. The wellsite information transfer standard markup language (WITSML), for example, provides a standard for transmitting technical data between organisations such as energy companies, service companies, drilling contractors, application vendors and regulatory agencies.

Operators will also be expected to communicate with OGA using the established system of oil and gas petroleum operations notices (PON).

Fracturing information

In addition to statutory reporting, operators of shale gas wells that will be conducting hydraulic fracturing operations should keep records of the following information for regulatory inspection purposes:

- Geological information, including the proposed depth(s) of the top and the bottom of the formation into which well fracturing fluids are to be injected
- Information concerning water supply, usage, recycling and reuse
- A detailed description of the well fracturing design and operations
- A detailed post-fracture job report.

Useful links

Oil and gas: onshore exploration and production

www.gov.uk/oil-and-gas-onshore-exploration-and-production#resumption-of-shale-gas-exploration

UKOOG guidance for onshore shale gas wells

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/185935/UKOOG_ShaleGasWellGuidelines.pdf

PON notifications

<https://www.gov.uk/oil-and-gas-petroleum-operations-notices>

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OGA consent to drill

Lead agency	OGA
Actions	<ul style="list-style-type: none">• OGA will assess operator competency and financial stability.• OGA grants consent to drill only once all permits are in place and all relevant consultees have been notified.
Key legislation and guidance	Terms of licences issued under the Petroleum Act 1998 UKOOG guidance for onshore shale gas wells
Operator input	Yes
Engage stakeholder	–
Statutory consultees	–
Decision/output	Drilling consent

Pre-drilling checklist

OGA may provide consent to drill once the operator has

- Satisfied OGA that effective operational and environmental management systems are in place
- Secured planning permission from the MPA/LPA
- Discharged any relevant conditions placed on the planning permission by the MPA/LPA
- Obtained a permit from the Coal Authority if well will encroach on coal seams
- Informed the BGS of intention to drill
- Completed the consultation processes with all statutory consultees.
- Obtained all necessary permits from the relevant environmental agency
- Agreed a system for monitoring conditions and emissions with the relevant environmental agency
- Notified the HSE of intention to drill (minimum 21 days' notice)
- Provided the HSE with details of proposed well design checked by an independent and competent person (minimum 21 days' notice)
- Agreed data-reporting methods with OGA
- Agreed method for monitoring induced seismicity with OGA (where hydraulic fracturing is planned) if hydraulic fracturing is planned from outset of drilling operation
- Received approval for outline hydraulic fracturing programme from OGA (where hydraulic fracturing is planned).

Bundling of consents

If operators plan to conduct hydraulic fracturing operations on a specific well they have the option to bundle their requests for drilling consent and fracturing consent. Whether consent for fracturing is sought before or after drilling of the well, operators must receive OGA approval before fracturing commences.

Useful links

UKOOG guidance for onshore shale gas wells

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/185935/UKOOG_ShaleGasWellGuidelines.pdf

EA

www.environment-agency.gov.uk/business/topics/133885.aspx

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OGA approval for outline hydraulic fracturing plan and agreed method for monitoring induced seismicity

Lead agency	OGA
Actions	<ul style="list-style-type: none"> • Operators must establish arrangements to control seismicity and provide a detailed plan for monitoring hydraulic fracturing operations • Before granting consent for shale gas operations that include hydraulic fracturing, OGA will require that a fracturing plan be submitted for consideration. OGA will expect operators to demonstrate a full understanding of the risks of hydraulic fracturing • Operators will need to evaluate the historical and background seismicity and the in situ stress regime, and delineate faults in the area of the proposed well to identify the risk of activating any fault by hydraulic fracturing • The fracturing plan should also include appropriate plans to monitor seismicity before, during and after the well operations
Key legislation and guidance	Terms of licences issued under the Petroleum Act 1998 UKOOG guidance for onshore shale gas wells
Operator input	Yes
Engage stakeholder	–
Statutory consultees	–
Decision/output	Monitoring agreed as part of fracture plan

Traffic light monitoring systems for induced seismicity

Traffic light monitoring systems will be required to enable operations to mitigate induced seismicity.

The remedial action level for the traffic light system (that is, the “red light”) will be set at magnitude 0.5 (far below a perceptible surface event, but larger than the expected level generated by the fracturing of the rock). This will apply to the first set of hydraulic fractures and will be subject to review.

Traffic light monitoring systems are affected by natural delays within geological systems such as the slow movement of fluids through faults, so it is important that the trigger levels are low enough to detect the smaller induced seismic events that may be an indication of or precursor to a larger induced seismic event later.

By using sophisticated seismic monitoring algorithms, it is possible to discriminate these very small events from background surface-induced vibrations. In addition, the fracture plan should also include provision to monitor fracture growth height.

Useful links

UKOOG guidance for onshore shale gas wells

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/185935/UKOOG_ShaleGasWellGuidelines.pdf

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OGA consent to fracture

Lead agency	OGA
Actions	<ul style="list-style-type: none">• As part of the PEDL licence process, an outline hydraulic fracture plan (HFP) is reviewed and approved by OGA• The operator is granted the right to start hydraulic fracturing operations in line with outline HFP and agreed monitoring arrangements
Key legislation and guidance	Terms of licences issued under the Petroleum Act 1998 UKOOG guidance for onshore shale gas wells
Operator input	Yes
Engage stakeholder	–
Statutory consultees	–
Decision/output	Outline fracture plan agreed

Hydraulic fracture plan

Operators should develop an outline HFP based on the risk assessment, which describes the control and mitigation measures for fracture containment and for any potential induced seismicity.

The proposed design of the fracture geometry should be included in the HFP, including (fracturing) target zones, sealing mechanism(s) and aquifers (fresh and saline), so as not to allow fracturing fluids to migrate from the designed fracture zone(s).

Disclosure of chemical additives

Operators will disclose the chemical additives of fracturing fluids on a well-by-well basis.

A public disclosure of fracture fluid form is downloadable from www.ukoog.org.uk

Useful links

UKOOG guidance

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/185935/UKOOG_ShaleGasWellGuidelines.pdf

UK Government guidance on shale gas extraction

www.gov.uk/government/uploads/system/uploads/attachment_data/file/49541/7269-government-response-sg-report-.pdf

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OGA consent for extended well test (EWT)

Lead agency	OGA
Actions	<ul style="list-style-type: none"> • Operator applies for permission to conduct EWT to assess productivity • OGA requires operators to establish arrangements for controlling venting and flaring activities during the EWT
Key legislation and guidance	Terms of licences issued under the Petroleum Act 1998 UKOOG guidance for onshore shale gas wells
Operator input	Yes
Engage stakeholder	–
Statutory consultees	–
Decision/output	Consent for EWT

Extended well test

If the well needs more than 96 hours of testing to evaluate its potential to produce hydrocarbons, the operator can apply to OGA for an extended well test (EWT) once all other consent and permissions have been granted that limits the quantities of gas to be produced and saved or flared.

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