Llywodraeth Cymru
Welsh Government

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Onshore petroleum licensing: guidance

Draft guidance for existing petroleum licensees seeking licence consents, approvals and administrative changes.

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Contents

1. Introduction to the Welsh Ministers' onshore petroleum licensing role

On 1 October 2018 the **Wales Act 2017** Section 23 transferred licensing functions under Part 1 of the **Petroleum Act 1998** from the **Oil and Gas Authority** (now the North Sea Transition Authority (NSTA)) to the Welsh Ministers in relation to the Welsh onshore area. Welsh Ministers are responsible for licensing the exploration and development of Wales' onshore petroleum resources.

Part 1 of the Petroleum Act 1998 defines petroleum (oil and gas hydrocarbons) and vests all rights to it in the Crown. The Act also empowers Welsh Ministers, as the licensing authority in Wales, to grant licences to "search and bore for and get petroleum" on behalf of the Crown, in return for consideration (referred to as a rental).

Welsh Ministers are the licensing authority for:

- Existing Welsh Petroleum Exploration and Development Licence (PEDL) and approvals associated with them. A PEDL grants exclusive rights to search and bore for, and get, petroleum within a specified area. Each PEDL covers the various stages of a development cycle from exploration to appraisal, production and eventually decommissioning of the wells. A PEDL does not provide any consent or authorisation for any development activity. Additional consents from Welsh Ministers, the landowner, the Local Planning Authority, **Natural Resources Wales (NRW)** and the **Health and Safety Executive (HSE)** are required.
- Decisions on whether to issue new PEDL rounds**.** PEDLs are usually only available through competitive licensing rounds. It is Welsh Government policy to not issue any new licences, unless they are required for safety or strictly research purposes.

- Decisions on whether to issue new Landward Petroleum Exploration Licences (XL) and Methane Drainage Licences (MDL). Landward Petroleum Exploration Licences are available for companies who want to explore but do not need exclusive rights to drill or produce petroleum. They are commonly used by seismic contractors who gather data to sell rather than exploiting the resources themselves. A MDL is required if the operator or owner of a coalmine must capture natural gas to make the mine safe.

The following guidance is intended for existing licensees and regulators. It covers the consenting and approvals processes undertaken by Welsh Government, including the relinquishment of licences. This guidance is not intended to cover in detail the consents and permitting regimes of other regulators such as Natural Resources Wales and the Health and Safety Executive.

This guidance should not be considered legal advice. Licensees remain entirely responsible for complying with the terms and condition of their licence. In all cases, licensees must also comply with all applicable regulatory regimes and requirements, and all relevant Welsh policy and legislation.

Applicants must apply to Welsh Ministers, via the Welsh Government, for any licence or licence consent or approval that affects acreage in relation to the Welsh onshore area.

In England, licensing functions continue to be carried out by the NSTA.

2. Welsh Government petroleum policy

Welsh Ministers have a statutory duty to manage the petroleum licences that were issued by the UK Government before 1 October 2018 in accordance with the model clauses incorporated into the licence, applicable legislation, and with

the general principles of public law.

The **Welsh Government's written statement on petroleum extraction** confirms our policy is to not undertake any new petroleum licensing rounds in Wales, or support applications for hydraulic fracturing petroleum licence consents, to help deliver on commitments to reduce the use of fossil fuels. The statement details how Wales' interests in sustainably managing our natural resources will not be served by exploring or developing any new sources of petroleum extraction.

3. Regulation of petroleum licence activities in Wales

Section 3 sets out, in broad terms, the nature of onshore petroleum activities and the consenting process.

3.1: Stages of an oil and gas development

The exploitation of petroleum reserves typically occurs in key stages:

- Pre-development is non-intrusive exploration and site characterisation, typically conducted through assessing existing geological data and information.
- Exploration is typically the use of seismic surveys to provide information about geological structures and exploratory drilling to verify the presence or absence of petroleum 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 covers 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 approved by the Welsh Ministers.
- Decommissioning and restoration refers to operations for the abandonment of wells, the removal of surface installations and site restoration. This stage could happen at any point during the life of a well should economic production cease to be possible.

3.2: Regulatory bodies

The various stages of an oil and gas development are regulated by a number of bodies in Wales, each with a specific role and remit (Table 1). It is the responsibility of the developer to be aware of all regulatory requirements, to ensure that all consents and permissions are acquired before commencing any regulated activity, and to comply with the conditions of all consents and permissions throughout the lifecycle of the development.

Bodies regulating petroleum exploitation in Wales

Welsh Ministers as the petroleum licensing authority

A developer should hold the relevant petroleum licence before any further permissions can be obtained. It is Welsh Government policy to not issue any new licences, unless they are required for safety or strictly research purposes.

Licence model clauses require licence holders seek consent from Welsh Ministers for specific activities, including:

- Consent to drill, suspend or abandon a well.

- Approval of petroleum field development plans.
- Consent to produce petroleum or flare or vent waste gas.
- Approval of the competency of the well installation operator.
- Approval of the sale of existing licences or change of beneficiaries.
- Approval of time extensions to the initial, second or production term of a petroleum licence.
- Determining the boundary of oil fields for taxation purposes (**Oil Taxation Act 1975** (SI 1975 c. 22)).

When considering whether to give consent/approval to specific well operations, such as drilling or producing petroleum, the position of the other regulators will be a material consideration. However, the decision remains solely with Welsh Ministers.

Local planning authority

Companies seeking to undertake exploratory, appraisal or production activities must apply for planning permission from the local planning authority. Planning authorities consider planning applications for all surface works associated with a petroleum development life-cycle (design, construction, operation, maintenance, decommissioning and abandonment). The local planning authority will consider issues such as noise, light, traffic, flood risk and air pollution.

The local planning authority, in making any decision, must take account of the current Planning Policy Wales, local planning policy positions, and Welsh Government energy and climate change policies.

Natural Resources Wales

Natural Resources Wales regulates activities which may cause pollution or pose other risks to the environment throughout the life cycle of a petroleum

development. Companies must apply for the necessary environmental permits associated with any activity captured by the relevant environmental legislation.

Health and Safety Executive

The Health and Safety Executive regulates to ensure the operator is managing the health and safety risks appropriately throughout the life cycle of a petroleum development. In particular, the Health and Safety Executive is responsible for ensuring the appropriate design and construction of a well casing.

The Coal Authority

The Coal Authority is responsible for granting consent for activity which cuts across, disturbs or enters coal seams.

North Sea Transition Authority

Collection of the rental on petroleum licences in Wales remains a reserved function of the North Sea Transition Authority.

Onshore petroleum regulatory route map

The indicative consenting process throughout the life-cycle of a petroleum development, covering licensing, planning, environmental permits and other necessary permissions. This guidance covers only Petroleum Act 1998 licensing requirements.

Welsh Government

- Licence administration, including change of licensee, appointment of operator, term extensions and changes to work programmes.
- Consent to drill, side-track, complete, suspend or abandon a well (Term 1: Exploration).
- Extend well test consent (Term 2: Appraisal).
- Field development plan and production consent (Term 3: Production).
- Consent to abandon any wells and surrender the licence (Decommissioning).

Local planning authority

- Planning permission for seismic studies, exploratory drilling and testing work. Including Environmental Impact Assessment (Term 1: Exploration).
- New planning application and Environmental Impact Assessment for production activities (Term 2: Appraisal; Term 3: Production).
- Post production surface restoration planning conditions discharged (Decommissioning).

Natural Resources Wales

- Environmental permits for extractive waste, water extraction, venting and combustive activities (Term 1: Exploration).
- New environmental permits required to allow for additional testing or production (Term 2: Appraisal; Term 3: Production).
- Post Production monitoring (Decommissioning).

British Geological Survey

- Notify intention to drill boreholes and construct wells (Term 1: Exploration).
- Report required information to British Geological Survey (Term 2: Appraisal; Term 3: Production; Decommissioning).

Health and Safety Executive

- Arrange independent examination of well designs. Notification of intention to drill. Report drilling information (Term 1: Exploration).
- Report drilling and production information (Term 2: Appraisal; Term 3: Production).

Coal Authority

- Acquire Coal Authority access licence if required (Term 1: Exploration).
- Reporting of information to Coal Authority (Term 2: Appraisal; Term 3: Production; Decommissioning).

North Sea Transition Authority

- Pay licence rental obligations and provide production records.

4. Overview of the petroleum licensing regime

Part 1 of the Petroleum Act 1998 establishes a licensing regime that applies to onshore oil and gas exploration and production in the UK (other than onshore in Northern Ireland).

4.1: The definition of petroleum

Petroleum is defined in Part 1 of the Petroleum Act 1998:

1. Includes any mineral oil or relative hydrocarbon and natural gas existing in its natural condition in strata; but
2. Does not include coal or bituminous shales or other stratified deposits from which oil can be extracted by destructive distillation.

4.2: The definition of the Welsh onshore area?

Petroleum includes naturally occurring hydrocarbons present within the rock strata but does not include oil or gas that can be derived from artificial processes such as distillation, pyrolysis or combustion of the strata. Petroleum therefore includes coal bed methane, shale oil and gas, and natural gas, but does not include underground coal gasification.

The Petroleum Act 1998 and the **Petroleum Licensing (Exploration and Production) (Landward Areas) Regulations 2014** define the onshore extent of the petroleum licencing regime (i.e. the geographical extent of the Welsh Minister's onshore licensing authority).

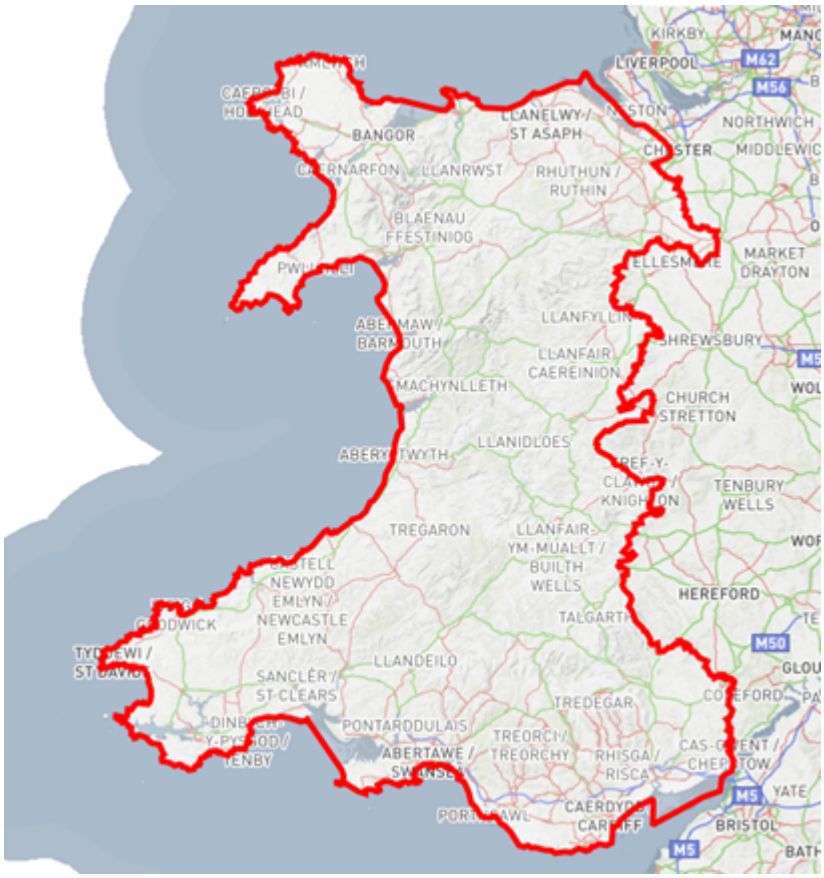

Figure 2: Petroleum licensing offshore area

4.3. Petroleum Exploration and Development Licence (PEDL) and model clauses

A PEDL, issued under the Petroleum Act 1998, gives companies exclusive rights to search, bore for and get petroleum. A PEDL is required for exploratory, appraisal, development, production and decommissioning activities. PEDLs are usually only available through competitive licensing rounds. It is Welsh Government policy to not issue any new licences, unless they are required for safety or research purposes.

The detailed terms and conditions of every licence awarded are prescribed in a

series of Model Clauses, which are set out in secondary legislation made under the Petroleum Act 1998. The Model Clauses applicable to a particular licence are those that are in force at the time the licence was granted, either:

- **Petroleum Licensing (Exploration and Production) (Landward Areas) Regulations 2014** (Schedule 2), ("2014 Model Clauses") or;
- **Petroleum (Production) (Landward Areas) Regulations 1995 (Schedule 3) ("1995 Model Clauses").**

Model Clauses attached to a licence are not affected by subsequent sets of model clauses, except where the change is agreed by both the licensee and the licensing authority.

Any breach or non-observance by the licensee of any of the terms and conditions of the licence, including a failure to obtain the necessary consent from the Welsh Ministers, may result in the termination of the licence.

4.3.1: PEDL lifecycle progression

PEDL typically run for three successive terms, Initial Term, Second Term and Production Term. These terms correspond to the exploration, appraisal and production phases of a petroleum development. Splitting the lifecycle of an oil and gas licence into these three Terms provides clear hurdles for the licensee's progress: finding the hydrocarbons, planning for their extraction and the extraction itself. It also allows Welsh Government to ensure licensees do not retain exclusivity of petroleum exploration and extraction without doing enough work for this to be justified.

The licensee must fulfil the requirements of the Model Clauses to progress from one Term to the next. However, there is inevitably a risk that even the most diligent of licensees will be prevented from meeting work programmes agreed for each Term by factors beyond their control (including the vagaries of geology

and drilling, oil price fluctuation and access to land). The potential for agreed variations of length and requirements of the Terms provides a reasonable balance between clear objective milestones and flexibility. Requests for variations should be made in writing to the Welsh Government, and if agreed, they will normally be executed by notice.

How a PEDL regulates a development through its complete life-cycle: Initial, Second and Production Terms.

Licence progress

Initial term exploration

- Obtain consents necessary to progress agreed work programme.
- Baseline monitoring prior to drilling.
- Complete seismic studies, and exploratory drilling and testing.
- Surrender 50% of acreage or apply for Retention Areas.
- Requests licence proceeds to Second Term.
- Or apply to vary licence work programme or term length.
- Or surrender licence.

Second term appraisal

- Complete appraisal work, including desk studies, planning for production, applying for production consents, drilling additional boreholes and Extended Well Testing.
- Submit Field Development Plan (FDP).
- Licence proceeds to Production Term.
- Or apply to vary licence work programme or term length.
- Or surrender licence.

Production term

- Obtain consents necessary to commence production of petroleum.
- Construct production facilities and production wells.
- Produce petroleum.
- Licence expires.

Decommissioning

- Decommissioning and restoration work completed.
- Licence surrendered.

4.3.2: Initial term

The Initial Term (exploratory phase) is initially set at 6 years within the licence model clauses, and carries a work programme of exploration activity that the licencing authority and the licensee will have agreed as part of the application process (or via subsequent variations). The licence will expire at the end of the Initial Term unless the licensee has completed the agreed work programme, or successfully sought an extension to the exploratory phase from Welsh Ministers.

The work programme may include a firm drilling commitment, or a two-part drill-or-drop commitment. In the case of the latter, the licensee has until the end of the drill-or-drop period (stipulated in the licence) to make a decision to commit to drilling a well in the Initial Term, or to relinquish the licence

At any time up to 1 month before the expiry of the Initial Term the licensee may request in writing to the Welsh Government that the licence continue in force to the Second Term. Licence terms require operators surrender at least 50% of

their licensed acreage at the end of the Initial Term, unless the area to be surrendered is designated a Retention Area.

While the Initial Term is associated with exploration work, the licensee has the option to start production during the Initial Term, subject to the consent of the Welsh Ministers and normal regulatory controls.

4.3.3: Second term

The Second Term, which initially lasts 5 years, is associated with appraisal and development (i.e. preparing for production). There is no agreed work programme, instead, the licence will expire at the end of its Second Term unless the Welsh Government have approved a Field Development Plan. As with the Initial Term, the duration of the Second Term may be varied by agreement in light of the circumstances.

4.3.4: Production term

The Production Term is intended for construction of any facilities and for petroleum production. The Production Term lasts a further 20 years.

4.4: Landward Petroleum Exploration licences (XL)

An Exploration Licence, also issued under the Petroleum Act 1998, grants non-exclusive rights to explore only, and does not grant any rights to drill boreholes or produce petroleum. Exploration Licences cover non-intrusive exploration, such as seismic surveys, carried out for hydrocarbon production, gas storage or carbon sequestration. Exploration Licenses can be applied for at any time but can only cover acreage that is not already covered by a PEDL. If the holder of an Exploration Licence wishes to explore acreage covered by a PEDL,

permission is required from the PEDL holder.

4.5: Methane Drainage Licences (MDL)

A Methane Drainage Licence is required if the operator of a coalmine needs to capture natural gas produced during mining operations in order to make the mine safe. Methane Drainage Licenses can be applied for at any time. Welsh Government will consult the Coal Authority about each application.

4.6: Underground coal gasification

Underground coal gasification is the process of creating synthetic gas (syngas) through the combustion of coal in-situ. The syngas is not petroleum as the gas does not exist naturally within the rocks. Underground coal gasification is regulated by the Coal Authority and does not require a Petroleum Act 1998 licence from Welsh Government. It is UK Government policy to not issue any licences for underground coal gasification.

5. Petroleum licence consenting functions

5.1: Activities that require the consent of Welsh Ministers

A PEDL alone does not provide any consent or authorisation to commence any activities necessary to search or bore for or get petroleum. The PEDL Model Clauses stipulate that the further written consent of the Welsh Ministers is required before:

- drilling wells, testing or conducting any preparatory activity inside the well.
- producing petroleum.

- decommissioning a well.
- making any changes to the administration of the licence.

Therefore, before commencing any of the activities listed below, the licensee must apply to Welsh Government for the necessary consent:

Licence administration, operatorship and taxation

- Change of licensee
- Change of the beneficiary of a petroleum field or subarea
- Appointment or change of the operator
- Extension of the initial, second or final term of a petroleum licence

Relinquishments

- Partial acreage or complete licence

Work programme

- Amendment of a work programme

Retention and development areas

- Consent to designate a Retention Area or a Development Area
- Amendment to a Retention Area

Field development plan

- Approval or amendment of an onshore or Field Development Plan

- Determination of an oil field - Schedule 1 to the Oil Taxation Act 1975

Well consents

- To drill a new well (exploration, appraisal or production)
- To drill a side-track well
- To complete or re-complete a well
- To suspend or re-suspend a well
- To re-enter a well subject to a well suspension
- To abandon a well

Production consents

- Production consent including variations
- Flare or vent petroleum including variations
- Extended Well Tests

5.2: Decision making framework

In exercising powers under Part 1 of the Petroleum Act 1998, the Welsh Ministers must manage existing licences in accordance with their model clauses, relevant Welsh legislation and policies, and with general principles of public law. Before applying for any consent, licensees are advised to consider fully the relevant policy publications, and the requirements of the Well-being of Future Generations (Wales) Act 2015, which stipulates that, in the exercise of all of its functions, the Welsh Ministers are obliged to carry out sustainable development (section 3(1) WFGA 2015).

For all consent decisions, the primary consideration of the Welsh Ministers will be whether the licensee has conformed fully with the licence Model Clauses and

any work commitments stipulated in the licence.

Where the licensee is requesting additional time to meet the requirements of the licence, a key consideration will be whether the licensee has worked diligently to meet the relevant licence deadlines or has been prevented from doing so by factors beyond their control.

Where the licensee is requesting a well consent, production consent, or approval of a Field Development Plan, the application must demonstrate that:

- Appropriate finances are in place to safely and effectively undertake the proposed activity. Two distinct types of financial criterion will be applied: financial viability and financial capacity. Financial viability refers to a company's ability to remain solvent during the life of the proposed operations. Financial capacity refers to a company's ability to meet known and specific costs. Further guidance on financial criteria will be supplied by the Welsh Government.
- Effective operational and environmental management systems are in place.
- All necessary permissions and consents have been acquired from the other regulatory bodies and the landowner.

Additional regulatory consents required for well and production activities

Local planning authority

- Secured planning permission from the Local Planning Authority.
- Discharged any relevant pre-operational conditions placed on the planning permission.

Landowner

- Secured a lease from the landowner.

Natural Resources Wales

- Obtained all necessary permits from Natural Resources Wales.
- Agreed a system for monitoring conditions and emissions.
- Notification of an intention to drill has to be served under Section 199 of the Water Resources Act 1991.

Health and Safety Executive

- Notified the Health and Safety Executive of intention to drill (minimum 21 days notice)
- Provided the Health and Safety Executive with details of the proposed well design, which has been checked by an independent and competent person (minimum 21 days notice). And satisfy all other consenting and data requirements.

Coal Authority

- Obtained an agreement from the Coal Authority if the well will encroach on coal seams.

British Geological Survey

- Informed the British Geological Survey of intention to drill.

Consultees

- Completed any necessary consultation processes with all statutory consultees.

North Sea Transition Authority

- All rental fees have been paid.

Consents will normally be granted for a specific activity and within certain parameters. Consents must be varied or replaced if the licensee wishes to undertake an activity not explicitly specified, for example, if the target depth of a borehole is modified, or to drill any additional wells.

5.3: Charging regime

Applications for consents may be subject to a charge, as outlined in the **Petroleum Licensing (Charges) (Wales) Regulations 2018**.

6. PEDL management and administration consents

6.1: PEDL licence rental and waivers

Each PEDL carries an annual charge, called a consideration or rental, set at the time of award and stipulated in the Model Clauses. Rentals are due each year on the licence anniversary. Rentals are charged at an escalating rate on each square kilometre the licence covers at that date. Rentals are designed to

encourage licensees to decide which acreage to retain, and to surrender acreage they do not want to exploit.

Setting of the rental rate is reserved to Westminster Treasury, and collection of the rental is reserved for the NSTA. The NSTA will therefore continue to invoice licence holders for the rental applicable to extant licenses in Wales.

Any request for a rental waiver must be made directly to the Welsh Government.

6.2: Licence assignments

A licensee can sell its licence interest, or a part of it, to another company. Any such transaction in which one or more companies enters a licence, or one or more companies withdraws from a licence, is referred to as a licence assignment.

Any assignment made without prior consent of the Welsh Ministers is considered a very serious breach of the licence and grounds for immediate revocation of the licence or reversal of the assignment using powers granted in the **Energy Act 2008**. This applies equally to assignments between unaffiliated companies, to assignments between sister companies within a single company group, and to the withdrawal of a company from a licence.

Licence assignment applications should be submitted in writing to the Welsh Government. If there are no reasons to withhold it, consent will be given for the assignment for execution by the applicant. Notification of execution is required (in the form of an Execution Deed) so that accurate records can be maintained. Assignments will not be considered effective until the validity of the documentation is determined by the Welsh Government.

6.3: Operatorship

Model Clauses stipulate the licensee shall ensure that no person shall exercise any function of organising or supervising any of the operations in pursuance of the licence, unless that person is first approved in writing by the Welsh Ministers. This is referred to as operatorship.

A request for operatorship can be submitted at any point in the lifetime of a licence. To obtain operatorship, it will be necessary to demonstrate:

- technical experience and capability to supervise, manage and undertake the proposed operations.
- risk-assessment procedures and hierarchy of decision-making are clear and embedded in operational management.
- plans for appropriate public engagement have been prepared.

The scope of the information required to apply for operatorship should be discussed with the Welsh Government prior to submitting an application. The amount of information required in an application will depend on the circumstances, including the complexity and scope of the planned activity. A relatively new or small company with little onshore experience should expect to provide more information than an established onshore operator. Table 4 highlights the minimum information requirements for an application for operatorship.

Information required to apply for operatorship

Company details

- UK registered name, address and company number.

- UK places of business and contact details.
- Website address and, during operations, a 24hr telephone response line for members of the public.
- Primary contact and accountable Board Member (email and telephone numbers).
- A letter from the board of the proposed operator confirming the scope of insurance or availability of necessary funds for any required remedial work.

Previous operating and technical experience

- Details of previous experience of supervising or carrying out drilling operations within the past two years, including location and description of the company's responsibilities.
- Details of production within the past five years, including location and description of the company's development responsibilities.
- Details of the proposed operator's emergency management experience.

Management structure and strategy

- Corporate governance structure, including names of the Board of Directors and Management Team and reporting roles.
- Organisational chart, noting roles and locations.
- Identify use of contractors.
- Summary of approach to risk-assessment and hierarchy of decision-making for well site and production operations.
- Monitoring and incident management plan.
- Community engagement plan.

Personnel details

- CVs of the key personnel involved in decision-making, including their previous experience and the basis on which they are employed (e.g. part-time or contracted).
- Key individuals responsible for key roles including geotechnical, health and safety, interaction with Local Planning Authorities, public engagement.
- Environmental and drilling expertise describing which skills exist in-house and those that are contracted.

Use of contractors

- List areas of technical assessment or operations to be outsourced to contractors.
- The names of contractors and contact information. Operators must always retain overall responsibility and cannot subcontract their licence responsibilities and obligations.
- Description of operator's relationship with the contractor, describing the decision-making process and what arrangements are in place to deal with any unexpected incidents.
- Track record of proposed sub-contractors.

6.4: Licence term extensions

Licensees can request an extension of the First or Second Term where they consider more time is required to comply with the licence work commitments, or to submit a Field Development Plan respectively. Only the 2014 Model Clauses contain an explicit clause enabling a licensee to apply for an extension of the First or Second Term. However, licences subject to the 1995 Model Clauses may have their Terms extended by way of a deed of variation.

At any time not later than one month before the expiry of the relevant Term, the Licensee may, subject to payment of the appropriate fee, request in writing that the Term be extended for a further period. The request should include a justification for the extension, in particular, why the licensee was not able to comply with agreed work programme (and thereby progress to the Second Term) or why the licensee was not able to submit a Field Development Plan (and thereby progress to the Production Term). It will also be necessary to detail what progress would be made should an extension be granted.

The critical factors in determining whether an extension will be granted are:

- Whether the licensee has worked diligently to meet the relevant deadline and/or has been prevented from doing so by factors beyond its control.
- Whether the proposed extension would satisfy the policy considerations outlined in section 2.

6.5: Continuation into the second term

Any extension of the First or Second Term will result in a shortening of the succeeding term to ensure continuity of the overall licence length.

The licensee may, subject to the appropriate fee, and conditional upon due performance by the licensee of the Work Programme before expiry of the Initial Term, request in writing that the licence continue in to the Second Term. The deadline for submitting the request is either 1 month, or 3 months before the end of the First Term, for licences subject to the 2014 Model Clauses or 1995 Model Clauses respectively.

Licensees are required to surrender at least 50% of the licence acreage if the licence continues into the Second Term, unless:

1. The remaining acreage would comprise less than 25 square kilometres.

2. For licences with the 2014 Model Clauses, the acreage has been designated either a Retention Area or Development Area.

6.6: First term work programme amendments

The licensee may, subject to the appropriate fee, request an amendment to the agreed First Term work programme. The request should include any justification for the amendment, in particular, why the licensee was not able to comply with the agreed work programme (and thereby progress to the Second Term), or any justification for the proposed change (for example, the acquisition of new information which has resulted in a change to exploration objectives). The critical factors in determining whether an amendment will be granted are:

- Whether or not the licensee has worked diligently to deliver the work programme obligations and/or has been prevented from doing so by factors beyond its control.
- Whether the amendment would satisfy the policy considerations outlined in section 2.
- Consistency with decisions in similar cases.

6.7: Licence relinquishments

A licensee may submit a licence relinquishment application at any time to surrender acreage or determine the entire licence. The notice period for relinquishment is 1 month or 6 months, for licences subject to the 2014 Model Clauses or 1995 Model Clauses respectively.

It will be necessary for the licensee to satisfy the Welsh Government that all wells within the licensed area have been appropriately plugged and abandoned. Welsh Government will consult all relevant regulators.

The surrender of acreage from a licence does not remove any company from a licence, even a company that is left with no beneficial interest under a Joint Operating Agreement. The withdrawal of such a company must be implemented separately by a licence assignment.

A Relinquishment Report will be required for any licence determination, or when a significant area of the licence is surrendered.

6.8: Geophysical surveys

Before conducting a geophysical survey (including seismic surveys), the licensee must provide at least 21 days notification to the relevant landowners, the Local Planning Authorities and Welsh Government. In an area known to contain coal, the operator must also notify the Coal Authority before commencing any survey.

The approval of the Welsh Government is required if the survey is to be conducted on the motorway or trunk road network or the relevant Local Planning Authority if the survey is to be conducted on a local road. There may be a need to contact potentially affected utility companies.

7. Retention areas

Licence Model Clauses require an amount of unused acreage to be surrendered as the licence progresses through the various stages of a development from exploration to production. For licences subject to the 2014 Model Clauses, the licensee can apply for part of the initial licenced area to be defined as a Retention Area. The requirement to surrender 50% of the licensed area at the end of the Initial Term does not apply to areas designated as Retention Areas. These areas may be retained into the Second Term of the licence even where

together they constitute more than 50% of the initial licensed area.

Applications to have an area designated as a Retention Area must be accompanied by a Retention Area Plan outlining the proposed exploration and appraisal activities and the relevant timescales for performance.

An application for a Retention Area must:

- Define the geographical location of the Retention Area, which may be expressed as a three dimensional space within the licenced area. The proposed Retention Area shall not include any area which is:
  1. within the geographical location of another Retention Area, unless replacing the original Retention Area, or
  2. within the geographical location of a Development Area.
- Propose a date for the expiry of the Retention Area.
- Include a Retention Area Plan describing the exploration and appraisal activities that the licensee intends to carry out in the Retention Area and the timescales over which those activities are to be carried out.

The Licensee may, at any time after the approval of a Retention Area, apply in writing to the Minister to amend:

- the geographical location of a Retention Area;
- the expiry date for a Retention Area; or
- Retention Area Plan.

The Welsh Government may direct, by notice in writing, that the Retention Area is terminated on the grounds that the Licensee has failed to carry out the activities described in the Retention Area Plan over the timescales described in that Plan.

8. Wells consents

Section 8 outlines the consents required for activities within the well, including drilling, testing, completion, suspension or abandonment activities. Licensees are advised to contact the Welsh Government to discuss potential applications at an early stage in the well planning process to clarify the application and information requirements.

8.1: Applications for consent to drill and/or side-track a well

Model clause stipulate the licensee must not commence the drilling of a well or side-track well, or recommence drilling of a previously abandoned well, without the consent in writing of the Welsh Ministers. The assessment of an application for consent to drill, side-track, or recommencing drilling a well, will include:

- reviewing the geotechnical data provided by the licensee.
- reviewing well site operational plans, including the possibility of well stimulation, flaring and capturing gas when testing for hydrocarbons.
- assessing the operator's financial capability.
- notifying NRW and the HSE of the planned activity. In determining whether to grant consent to relevant operations, the position of other relevant regulators will be taken into account.

Should a well consent will be granted, it will include consent to spud or re-spud, and where requested, side-track a well. The data capture requirements for drilling operations are described in Section 10.

8.1.1: Required supporting information for consent to drill and/or side-track a well

All applications for well consent to drill or side-track a well should include the following supporting information.

Board confirmations

- A letter from the licensee's company Board confirming that appropriate planning permission has been granted, relevant planning conditions have been discharged, and that there are no ongoing disputes or challenges to the permission.
- A Board letter confirming the scope of insurance, or the availability of necessary funds, for any required remedial work, unforeseen events and third party liability.

Technical

- Site location Ordnance Survey map showing the general area and proposed drilling location, proposed well-path(s) and relevant key information (including licence boundary and field boundaries).
- Two orthogonal seismic sections showing the proposed well path.
- Expected lithologic/stratigraphic column.
- Top reservoir target depth map (relative to the well path) with map border annotation and National Grid Easting/Northing using the Ordnance Survey National Grid (OSGB NG) Datum.
- A wellbore design schematic including a mud-weight plot, maximum pore pressure gradient and casing design.
- A description of the logging programme (both open and cased hole) for each casing depth, including any intermediate survey points.

- Proposals for Cement Bond Logs, wireline fluid samples, and leak-off or mini-fall off (Diagnostic Fracture Injection Testing - DFIT) tests.
- Conditional logging runs should be included and the conditions noted, e.g. where shallow gas or artesian flow (groundwater or oil flowing towards the surface under natural pressure) might be encountered.
- The proposed well data collection process. The minimum requirement is that the stratigraphy and presence of hydrocarbons must be identified along the well. However, it is expected that exploration wells will be cored or have sidewall cores cut in the reservoir section if there are hydrocarbon shows. A terminal core should also be cut if age dating is uncertain. It is anticipated that all appraisal wells will be cored in the reservoir section.
- A vertical seismic profile (VSP) or check-shot survey.

8.1.2: British Geological Survey notification

Under Section 23 of the **Mining Industry Act 1926**, landward licensees are required to give prior notification to the **Natural Environment Research Council** (through the **British Geological Survey** - **ngdc@bgs.ac.uk**) of their intention to undertake drilling so the council can decide if it wishes to attend the drill site to collect samples.

8.1.3: Coal Authority consent

If a licensee wishes to drill into a coal seam, whether to test for methane within the coalbed or to access a deeper structure, they should consult the Coal Authority at an early stage in the planning process. The **Coal Authority** may enter into an agreement with the licensee covering the conditions under which access to the coal seams will be permitted.

8.2: Applications for Well Tests

8.2.1: Standard Well Tests

An application for a Drill Stem Tests (DST), to be conducted following the completion of drilling activities, should normally accompany the application for consent to drill or complete the well. The application should include the objective of the DST, the planned operations, and what data will be recorded.

The licensee may also request authorisation for limited production testing for periods of up to 96 hours (or max 2,000 tonnes oil). When testing discrete sections of the well, each section can be produced for a maximum of 96 hours but the total quantity of oil produced from all sections should not exceed 2,000 tonnes. The periods between production, e.g. when the well is shut in to build up pressure, is not counted in the overall 96 hours. If there is any risk of exceeding the 96 hour or 2,000 tonnes limits operators are advised to make an application for an Extended Well Test to cover operational contingencies.

8.2.2: Extended Well Test (EWT)

The licensee may apply for consent to conduct an EWT within an exploration or appraisal well, if it can be demonstrated that the licensee will thereby gain necessary technical understanding or confidence in the performance of the hydrocarbon field. Consent for an EWT is required where the testing of the different sections in the well exceeds the 96 hour threshold per section, or where the total oil produced for all sections will exceed 2,000 tonnes.

An EWT must have realistic and definable appraisal objectives essential to the success of a development. EWTs are not an alternative to production under a Field Development Plan.

An application for consent to conduct an EWT should include:

- a description of the objective and rationale for the test programme.
- the Relevant Works which the licensee proposes to erect or utilise during the EWT period.
- the proposed location of the Relevant Works (e.g. pad area coordinates), a detailed plan of activity, and the requested duration.
- maximum quantities of oil and/or gas to be produced and saved, or flared/vented during the requested EWT (in tonnes and cubic metres).
- a board letter confirming the scope of insurance or the availability of necessary funds for any required remedial work.
- a board letter confirming the availability of planning permission and details of any on-going planning disputes or relevant planning conditions that have not been discharged.

8.3: Applications for completion work approval

NRW and the HSE will be consulted on the proposed EWT, and their views will be taken into account.

There are no strict criteria governing the maximum volume to be produced during an EWT, or the duration of an EWT, but consent will usually only be granted for a maximum 90 days (to allow for operational delays). Throughout the test the operator must keep Welsh Government informed of on-site activity, and must report monthly oil, gas and water production figures. Within 30 days of completion of the EWT, the operator must submit an EWT report fully detailing the test results.

If a licensee wishes to get petroleum from a well it will need to undertake appropriate Completion Work. The licensee must not initiate any such Completion Work except in accordance with an approved programme of Completion Work.

Applications for consent for Completion Work should therefore include a proposed programme of Completion Work, with details of the proposed completion processes, the materials that will be utilised, and start and end dates.

8.4: Applications for suspension consent or to re-enter a Well

Licensees must not suspend work on the drilling of a Development Well, or re-enter a well previously suspended, without written consent, and only in accordance with the conditions attached to the consent. If well suspension is a likely outcome after drilling, then an application to suspend the well should be applied for in parallel with the application for a well drilling consent.

A request to suspend a well must include:

- A detailed justification for the suspension and future plans for the well.
- The required duration of the suspension.
- The proposed suspension method, and how this method might be reversed.
- How abandonment would be achieved if the well is not intended for further appraisal or production.

8.5: Applications for abandonment consent

Once the well is drilled, if suspension is desired, the operator must submit a report of what was encountered in the well before a decision on well abandonment can be made by Welsh Government. A well engineering diagram must also be submitted at this time.

Licensees must not abandon a well without written consent, and only in accordance with the conditions attached to the consent. An application for

abandonment must demonstrate that the abandoned well is appropriately plugged and will pose no immediate or long term risk of the unplanned escape of gas or fluid.

When abandoning a petroleum well it will therefore be necessary to demonstrate compliance with:

- Borehole Sites and Operations Regulations 1995 and Well aspect requirements of the Offshore Installations and Wells (Design and Construction) Regulations 1996. The Health and Safety Executive are responsible for considering compliance.
- Petroleum Exploration and Development Licence model clauses.
- Relevant planning permissions.

Licensees must also comply with the **Guidelines for Decommissioning of Wells** produced by the well decommissioning working group of the Oil and Gas UK wells forum. These guidelines include the requirements to:

- seal any permeable layers within the well
- fill the remainder of the well with cement between 2 cement plugs. The lower plug must be located at a level that will prevent material from the well moving into the surrounding strata
- remove the wellhead and cut and seal the casings below ground level

8.6: Cessation of production

The closed well will also need to be reviewed by an independent well examiner and the HSE before the site can be reinstated back to its pre-operative state.

After well abandonment consent is given the operator must notify Welsh Government upon completion of the work and a well engineering diagram must be submitted at this time.

If the proposed abandonment is the last well in a previously producing field see Cessation of Production (COP) guidance.

A Cessation of Production report is required when the licensee plans to cease production from a field. The report, which may accompany an application for abandonment, should include:

- The definition of economic limit (the production rate beyond which the net operating cash flows are negative) and a determination of cut-off rates and timing.
- Possible options for extending field life.
- The costs and any revenues associated with cessation of production itself (capital and operating expenditures and any residual value of field assets).
- Details of any remaining licence obligations.
- Reservoir maps indicating the estimated location and distribution of remaining technically recoverable oil/gas that will be un-drained at the time of cessation of production.
- Confirmation that all abandonment requirements in the relevant planning consents will be met and details of what is involved.

9. Development and production

Section 9 outlines the consents, applications and information necessary to progress a licence from appraisal (Second Term) to Production (Third Term). Any application for production will be subject to compliance with the licence model clauses, relevant legislative requirements, and Welsh policy considerations.

9.1: Field development plan

Licensees must not carry out any Relevant Works, or get petroleum from the licence area, except in accordance with an approved programme of work, referred to as a Field Development Plan (FDP).

The FDP should provide a summary of:

- the operator's understanding of the field.
- a description and estimate of the hydrocarbon reservoirs.
- the proposed development strategy including any well-stimulation processes, facilities and pipelines.

Licensees are jointly and severally responsible for the FDP, and it must represent a single view of all licensees. The licence operator is usually responsible for producing the FDP and ensuring that all necessary consents and authorisations are obtained.

The FDP must be accompanied by a Board letter confirming:

- the scope of insurance or the availability of necessary funds for any required remedial work.
- planning permission has been granted for the proposed development, and that any planning disputes have been resolved.
- each licensee supports the development plan and has the necessary funds available.

The FDP must demonstrate how the proposed development methods comply with good oilfield practice when compared to similar, successful developments. A suggested structure for the document is set out at Appendix A of this guidance. Operators are encouraged to engage early with Welsh Government to discuss the FDP content and development options before

submitting a FDP.

FDPs will be published six years after they have been approved, unless the licensee can evidence that the FDP contains commercially sensitive information.

9.1.1: Field development plan approval and production approval

Petroleum production development may be authorised if Welsh Government are satisfied that the FDP meets the requirements of the Model Clauses, relevant legislation and policy considerations. Approval will be given in the form of a production consent.

The production consent will cover the production of hydrocarbons from the field, plus construction of the production facilities and required infrastructure. Consent will usually be given for production over a period that can be reasonably forecast with appropriate tolerances. Conditions may be imposed to give Welsh Government powers to require a review if performance falls outside these tolerances or if the field is found to differ from the initial perception to a significant extent.

If production consent is issued for a duration that is less than the anticipated life of the field it is the responsibility of the operator to apply for renewed approval to allow production to continue, and an updated Field Development Plan Addendum (FDPA) may be required.

9.1.2: Field development plan addendum

If a development has been authorised, the licensee must provide evidence that the Field Development Plan is being followed or modified appropriately as the understanding of the field develops. If an operator wishes to deviate from the approved FDP, they are required to submit a Field Development Plan

Addendum (FDPA) outlining the proposed changes. The process for agreeing a FDPA is similar to that for an FDP. A suggested structure for the FDPA is set out at Annex B of this guidance.

9.2: Further information relating to FDPs and FDPAs

9.2.1: Field determination

So that the licensees understand what constitutes a field for both development and tax purposes, Welsh Government will issue a proposed Field Determination at an early stage in the FDP authorisation process, utilising the geological information that is available at that time.

For Abandoned Mine Methane fields this will normally be a 1km square around the vent or mines gas well, rather than the workings expected to be drained by the development because of the uncertainty and complexity of many abandoned workings.

For Coalbed Methane fields the area will usually be defined by the areal limits of the coal seams to be accessed by the proposed development. In the case of a phased project, this might mean that the field will need to be redefined as further blocks of coal are drilled.

9.2.2: Unit development

Where a Field Development Plan is proposed for a field that extends into the area covered by a neighbouring licence, which is operated by a different licensee, unnecessary competitive drilling is to be avoided. The most efficient way to satisfy this requirement is for licensees to discuss options with the neighbouring licensees at an early stage and propose a jointly agreed FDP. In

cases where the licensees have not reached an agreement, Welsh Ministers have powers to require unitisation between licensees.

9.2.3: Field returns

Monthly petroleum production returns are required from a producing field. Licensees are requested to contact Welsh Government promptly if production does not fall within the consented range, or the geotechnical understanding or economic recoverable resource potential changes significantly.

9.2.4: Flaring and venting of gas

During the appraisal, commissioning and production phases of a development, the flaring and/or venting of some gas may be unavoidable for practical or safety reasons. However, this flaring or venting must be kept to the minimum that is technically and economically justified.

Licensees are required to apply for consent to flare or vent gas emitted by their fields. The main purpose of this requirement is to ensure that gas is conserved where possible. Natural Resources Wales considers the environmental impact of emissions, and an environmental permit may be required to vent or flare waste.

9.3: Development areas

At the same time the licensee submits a Field Development Plan for approval, the licensee is also required to designate one or more Development Areas. Development Areas must be approved before erecting permanent structures for petroleum production (Relevant Works).

The Development Area application must:

- Define one or more geographical locations, within which the Relevant Works are to take place.
- Include a Development Area Plan in respect of each Development Area, setting out the activities that the licensee intends to carry out in order to get petroleum and the timescales over which those activities are to be carried out (including the latest date by which the licensee will get petroleum within each Development Area).

Development Areas can be revoked if the operator fails to achieve production by the set date.

10. Reports and data

Licence model clauses require the licensee collect, retain, and make available to the Welsh Government certain samples, data and information regarding their activities and the geological features they encounter. The data requirements apply to all onshore geophysical surveys and all onshore exploration, appraisal, and development wells. Such information is vitally important to various industrial sectors and must therefore be preserved.

Welsh Government is committed to making information publicly available as soon as is reasonable. Under current regulations, the data specified in Section 10 is usually available for public release once a period of confidentiality has passed (3 to 5 years depending on the licence model clauses applicable to the licence).

10.1: Geophysical surveys and seismic data

A seismic survey is a low impact, non-invasive method of investigating the location and characteristics of geological structures beneath the Earth’s

surface. This information is used to produce geological structure maps identifying areas where petroleum deposits may be found.

Where geological surveys are undertaken the following survey data should be sent to the Welsh Government:

Location data

- Location of seismic wave sources.
- Geophone locations.

Digital field data

- Original field format tapes together with one demultiplexed version of the field data in SEG-Y format (SEG-Y is the file format standard developed by the Society of Exploration Geophysicists (SEG) for storing geophysical data.).
- Original sample rate and record length to be retained and demultiplexed data to be unfiltered and not edited.
- Test records to be retained.

Paper acquisition data

- All paper or digital operational data for each line should be stored together, and an index provided e.g. observer’s reports, statics, low-velocity layers, line intersections etc.

Stack data

- Digital versions in SEG-Y for all final stacks and migrations.

Reprocessed data

- Digital versions in SEG-Y for all reprocessed stacks and migrations.

Magnetic, gravity and other geophysical survey data

- This data should be supplied only if requested and then within 30 days of the request. The required format/media will be specified with the request.

Seismic data submitted to Welsh Government will be kept confidential until the data is released at the end of the confidentiality period. For the purpose of data release, the start of the confidentiality period is deemed to be the end of the calendar year when data acquisition was completed. The confidentiality periods are:

- For onshore licences subject to the 1995 model clauses the confidentiality period is 5 years.
- For onshore licences subject to the 2014 model clauses the confidentiality period is 4 years.
- For Exploration Licences (XL) the confidentiality period is 3 years.

During the confidentiality period only the map location of the data acquired will be made public.

10.2: Well data (data required on completion of a well)

The following data is required from all wells drilled under a petroleum licence, including shallow boreholes drilled as part of an operator’s exploration and development activities, such as those drilled to test coal seam thickness and gas content, mine water flooding levels etc.

10.2.1: Petrophysical logs

Petrophysical logs, including Cement Bond Logs and Image Logs, should be supplied to Welsh Government within 4 weeks of completion of the well. The data must be supplied digitally in an industry standard format and should be accompanied by a digital image file of the log. Any reprocessed logs such as dip-meters (magnitude of the inclination of a plane from horizontal) and true vertical depth logs should be sent as soon as they become available.

10.2.2: Geological composite log

Within 6 months of the completion of any well, including abandonment, or suspension after reaching the first potential producing horizon, the following information must be included on a digital composite log (1:500 scale), ad submitted to Welsh Government:

- A geological columnar section with selected petrophysical logs i.e. a lithology indicating log, a porosity log and a resistivity log.
- The log should indicate all logging and coring intervals, testing intervals and casing/liner seats, and it should carry abbreviated information concerning the geology and testing or shows.

10.2.3: Completion report (End of well report)

Within 6 months of the completion of any well, including abandoned and suspended wells, injection or production wells, or observation wells, a completion report must be submitted containing the following information:

All wells

Licence and Well Details

- Well Registration Number, well name and the target reference for the well. Where the operator has its own numbering system on fields the alternative number should also be included.
- Licence number and operator.
- Status of well - i.e. abandoned, suspended, production, injection or observation.
- Well history, including dates for rig on location, drilling commenced (spud), drilling completed and other operations completed.
- National Grid coordinates and relevant latitude and longitude for top-hole location.

Measurements

- Height of drilling reference point (e.g. Kelly Bushing Height or Rotary Table or Rig Floor) above Ordinance Datum.
- Total Depth. If there is significant deviation provide the True Vertical Depth (TVD), together with bottom hole National Grid coordinates (including bearing and distance from top hole location).
- Table of geological formations encountered giving depths (measured depth (MD) and true vertical depth sub sea (TVDSS)) and thicknesses (apparent and true vertical thickness).
- A brief geological description, with significant age determinations and structural information (dips and faults).
- A listing or log of hydrocarbon indications recorded whilst drilling.
- A record of all cores and side wall cores, together with stratigraphical core log, conventional poroperm results (porosity and permeability) and any

special core analyses including those to determine petrophysical rock parameters.
- A record of all logs taken with determinations of porosity and water saturations in reservoirs and potential reservoirs.
- The depths (MD and TVDSS) and results of all formation, drill stem and production tests performed in the well. Including details of:
- sample intervals,
- chokes,
- rates and volumes of hydrocarbons and water obtained and their gravities, pressure, and temperatures measured with extrapolated reservoir pressure and reference depth.
- Perforation details, including type, size, density of shots and when applicable, details of stimulation such as type, volume, rate, and pressures.

Drilling details

- Drilling unit description.
- Drilling history of the well including mud record, chronological report and copies of all drilling reports. Intermediate dates and depths should be included where operations were suspended prematurely.
- Details of the well's casings/liners, including:
- Setting/seat depths.
- Cement volumes, location of cement tops (depth below a reference level) outside the casings, and details of any testing methods applied.
- Company/contractor cementing reports and records.
- Details of all formation integrity tests. Information should be supplied as total pressure versus depth indicating either that leak-off has been achieved or that it was a simple limit test.
- The kick-off point (intentional deviation) of a side-tracked or deviated hole.
- If the well is abandoned or suspended, details of packers, plugs, casing retrieval and site clean-up. A diagram showing all components, cement, perforations and obstructions left in the hole is required.

- If the well is completed, details of packers, subsurface chokes, nipples and safety valves, tubing size, tubing grade and pipe thread, and the well head Christmas tree.
- A completion diagram showing components of the completion, casing strings, cement tops, perforations and obstructions left in the hole.

Testing

- The results of chemical and physical analyses of fluids produced by testing in the well, plus the results of core studies of permeability, desorption, adsorption and gas content.

Development Wells

The following further information concerning the reservoir should be included in the completion report:

- Reservoir unit tops as depths (MD and TVDSS) and thickness.
- Fluid contacts or limits i.e. gas/oil, or oil/water, or gas/water or lowest known occurrences of hydrocarbon fluids as depths (MD and TVDSS).
- Subsea National Grid co-ordinates of reservoir unit tops and fluid contacts.
- Net pay-thickness (portion of a reservoir that contains economically producible hydrocarbons).
- Reservoir average porosities and water saturations.

In addition to the completion report, the following data is also required, within one year, for development or EWT wells, digitally (in a TIFF, CGM or PDS format):

- Results of any significant chemical and physical analysis of petroleum, including PVT analyses (pressure-volume-temperature), water or minerals found in the well, or fluid injected into the formation subsequent to well the completion report.
- Results of any significant physical analysis carried out on rock samples or fluid from the well subsequent to submission of the well completion report.
- Results of any significant tests on production, injection and observation wells, including downhole formation pressure and temperature surveys.
- Any measurements relating to well-head to down-hole pressures (static or flowing).
- Details of any changes in perforations or completion hardware or any further operations to stimulate or inject fluids. The TVD or drilled depth of flowing perforation intervals should be reported.
- Details of any other significant changes to the well.

Well velocity information

- The results of any velocity surveys and vertical seismic profiling including velocity logs, vertical seismic profiles and synthetic seismograms, must be supplied within two months of the survey being completed.

10.3: Samples requirements

The following physical samples are required to be collected from the well.

Cuttings samples

- Representative washed and dried samples, depth labelled, collected whilst drilling the well at selected intervals. Wherever possible each sample should be at least 100g weight.

Slabbed cores

- Slabbed cores are required from all cores taken as a continuous vertical section comprising at least a width of the core, which will allow standard poroperm plugs to be taken. Any operator wishing to dispose of any other core material after the expiry of five years should inform Welsh Government giving six months' notice in order that their preservation may be arranged if required.

Oil samples

- A representative sample of stock tank oil should be retained for 5 years. A basic sample analysis will be required before any sample is disposed of.

Samples from the sea bed (some onshore licences include sea or estuary areas that include the sea bed)

- Portions of sea bed samples and/or cores from boreholes penetrating below the sea bed.

10.4: Licence relinquishment reports

Upon relinquishing or partially relinquishing a licence, the licence operator is required to submit a Relinquishment Report. The report must be submitted within three months of the licence being relinquished. The reports will be published by Welsh Government.

This report should contain a full summary of the work carried out under the licence, including descriptions of any newly acquired seismic and reprocessed data, any studies and results, and an account of the remaining prospectivity for the relinquished area. Copies of reprocessed seismic data should be made available to Welsh Government.

If production has ceased on a field, the operator should document within the relinquishment report the basis of their decision to cease production and provide an estimate of the remaining recoverable resources.

10.4.1: Relinquishment report guidelines

The relinquishment report should include the following information:

Licence information

- Licence Number
- Licence Round
- Block Number(s)

Work programme summary

- If the Licence was in the Initial Term, specify the exact Work Programme agreed for the Licence, and what progress was made.
- If the Work Programme included reprocessing of seismic data, give clear seismic examples of pre and post processing as figures, and describe where there were any noticeable uplifts in the seismic data.
- Similarly, for new seismic data acquired and interpreted, give clear seismic comparison examples of older and newly acquired seismic data as figures. Specify whether the data was of sufficient quality to address the geology of the block(s).
- Where there were new wells drilled on the licence, give brief details of the results.

Map

- The report should include a map of the seismic and well database utilised in the evaluation of prospectivity and/or discoveries.

Prospectivity update

- Provide a brief review of prospectivity presented in the original licence application and a more detailed review of prospectivity following any reprocessing/new seismic data and other new information acquired.
- Include structure maps and examples of the seismic interpretation.
- If any drilling has taken place show examples of the revised or new interpretation/mapping incorporating the well results.

Further technical work undertaken

- Summarise any further detailed technical analysis or studies undertaken to de-risk the prospectivity on the licence.

Resource and risk summary

- Include a summary table of recoverable resources associated with the remaining undrilled prospects and leads.

Conclusions

- Comment on any remaining potential prospectivity on the licence and the reason for relinquishment.

Maps and figures

- As a minimum provide a Location Plat, a Structure Map at an appropriate scale (which must cover sufficient National Grid co-ordinates to enable geo-referencing of the prospects within the Licence) on appropriate horizon(s), illustrative seismic sections and illustrative geoseismic cross-section(s).

Clearance

- It is important that the submitting operator confirms within the report that Welsh Government are free to publish the report and that all third party ownership rights (on any contained data and/or interpretations) have been considered and appropriately cleared for publication purposes.
- Welsh Government will only consider withholding publication of the report

following a clear request in the covering email from the operator.

10.5: Data summary table

Welsh Government require all onshore well data to be submitted in digital copy:

Notification of seismic surveys

- Send data to Welsh Ministers, 28 days prior to survey, and upon completion of survey.

Seismic data

- Send data to Welsh Ministers, as soon as possible once data has been acquired.

Magnetic gravity and other geophysical data

- Send data to Welsh Ministers, as soon as possible once data has been acquired.

Application for consent to drill

- Send data to Welsh Ministers, minimum 21 days prior to drilling.

Notification of spud

- Send data to Welsh Ministers, earliest opportunity (within 2 hours where

possible).

Well summary

- Send data to Welsh Ministers, prior to Completion, Suspension, or Abandonment of a well.

Petrophysical logs

- Send data to Welsh Ministers and BGS, within 4 weeks of completion.

Completion report

- Send data to Welsh Ministers and BGS, within 6 months of completion.

Composite log (digital copy)

- Send data to Welsh Ministers and BGS, within 6 months of completion.

Well velocity information

- Send data to Welsh Ministers and BGS, within 2 months of completion.

Reservoir information (development wells)

- Send data to Welsh Ministers and BGS, within 2 months of completion.

EWT or development well test report

- Send data to Welsh Ministers and BGS, within 3 months.

Licence relinquishment report

- Send data to Welsh Ministers, within 3 months.

10.6: The data release process

Copies of all required data should be sent to Welsh Government, and where appropriate, the BGS. The data will be stored for the confidentiality period specified under the terms of the licence under which the data was acquired.

If the data is deemed to be complete, the operator will be notified of its release from obligations under the terms of the licence to retain the data.

Section 23 of the Mining Industry Act 1926 requires onshore well data to be sent to the BGS who will maintain the data and observe the confidentiality period specified by Welsh Ministers. Well records and data supplied under this provision are Public Records and the Science and Technology Act 1965 places a duty on BGS to disseminate (subject to confidentiality restrictions) its knowledge in the earth sciences.

Appendix A

11: Field Development Plan (FDP) Content

The following are suggested section headings and topics to include in a Field Development Plan. The actual content of the document should be agreed with Welsh Government prior to the submission of the Plan.

11.1: Executive summary

The Executive Summary should state the essential features of the development including:

- A brief description of the hydrocarbon reservoirs estimated reserves, and the proposed development strategy and infrastructure.
- An outline map showing the field limits, Field Determination boundary, contours of fluid contacts, existing and proposed wells, with Unitary Authority and licence boundaries.
- A project schedule, total capital cost and a statement of licence interests.
- A central estimate of ultimate recovery, and the minimum, central and maximum hydrocarbon production profiles of:
  - gas, in thousands of metric tonnes and billion cubic feet per year,
  - oil, in thousands of metric tonnes and in millions of US barrels per year.
- A statement of intent towards any parts of the field area that are not addressed by the Plan, including any commitment to the later development of that area, or to the later stages of a phased development. Any provision for the development of other hydrocarbons in the area should also be identified.
- A map with the Field Determination boundary and location of any nearby protected area: National Parks, Areas of Outstanding Natural Beauty, World Heritage Sites, Groundwater Source Protection zones and any European

Sites of Scientific Interest.
- The essential elements of the Field Management Plan and key decision points.

11.2: Field description

- A brief history of the field, referencing the discovery well and significant appraisal wells.
- Maps, sections and tables necessary to define the field adequately.

11.2.1: Seismic interpretation and structural configuration

- A summary of the extent, vintage and quality of the seismic data with key mapping horizons noted.
- The structural configuration of the field using appropriate figures and maps (e.g. dip and strike seismic lines, depth structure map of target horizon and schematic cross section).

11.2.2: Geological interpretation and reservoir description

- Stratigraphy of the reservoirs, facies variations, the geological correlation within the reservoir and any other relevant geological factors that may affect the reservoir parameters and thereby influence reservoir continuity within the field should be summarised.
- The geological data provided should reflect the basis of reservoir subdivision and should include the relevant reservoir maps on which the development is based.

11.2.3: Petrophysics and reservoir fluids

- Summary of the key petrophysical parameters, including log, core and well test data.

11.2.4: Hydrocarbons in place

- Volumetric and material balance estimates of hydrocarbons in place, for each reservoir unit, together with a description of the cause and degree of uncertainty in these estimates.

11.2.5: Well performance

- Assumptions used in the Field Development Plan for the productivity of development wells.
- Findings from Drill Stem or Extended Well Tests.
- The potential for scaling, waxing, corrosion, sand production or other production problems should be noted and suitable provision made in the Field Management Plan.
- The potential for well stimulation.

11.2.6: Reservoir units and modelling approach

- Brief description of the reservoir engineering. Where the reservoir has been subdivided for reservoir analysis into flow units and compartments, the basis for division should be stated.
- A description of the extent of any aquifer(s) should be given.

11.2.7: Improved recovery techniques

- A summary of the alternative recovery techniques considered and the reasons for the final choice is required.

11.2.8: Reservoir development and production technology

- The chosen recovery process should be described and the optimisation method summarised, including references to the potential for artificial lift and stimulation.
- Any limitations on recovery imposed by production technology or by the choice of production facility or location should be indicated.
- Remaining uncertainties in the physical description of the field that may have material impact on the recovery process should be described and a programme to resolve these should be included in the Field Management Plan.

11.3: Development and management plan

11.3.1: Preferred development plan, reserves and production profiles

- Describe the proposed reservoir development and indicate the drilling programme and well locations.
- An estimate of the range of reserves for each reservoir should be given (excluding fuel and flare) with a brief explanation of how the uncertainty was determined and explicit statements of probability, where appropriate.
- The assumed economic cut-off should be stated.
- Expected production profiles per well, for total liquids, oil, gas, gas usage and flare, associated gas liquids and produced water for the life of the field.

- Where fluids are to be re-injected, annual and cumulative injection profiles should be provided.

11.3.2: Drilling and production facilities

- Description of the drilling programme, well workover capability, and the proposed well completion process.

11.3.3: Process facilities

- A brief description of the operating parameters and limitations of the process plant.
- The use and disposal of separator gas should be described.
- A summary of the main and standby capacities of major utility and service systems, together with the limitation and restrictions on operation.
- A summary of the method of metering hydrocarbons produced and utilised.
- A brief description of systems for collecting and treating oil, water and other discharges.
- A brief description of any fluid treatment and injection facilities.
- A brief description of the main control systems and their interconnections with other facilities.
- A statement regarding the planning consent and environmental permissions.
- A description of the petroleum export route.

11.3.4: Field management plan

- Clearly set out the principles and objectives that the licensees will adhere to when making field management decisions and conducting field operations.
- The rationale and plan for data gathering and analysis proposed to resolve the existing uncertainties and to understand dynamic performance of the

field during both the development drilling and production phases outlined.
- The potential for workover, re-completion, re-perforation and further drilling should be considered and described.
- Where options remain for improvement to the development, or for further phases of appraisal or development, the criteria and timetable for implementing these should be given and described in phases.

11.3.5: Other attachments

- Coal Authority access agreement and authorisation to intersect coal seams for the purpose of producing methane.
- A letter from each licensee, confirming that they support the development plan and have the necessary funds available to meet their obligations.
- Confirmation that residence requirements have been met.
- An Ordnance Survey plot of surface location of planned and existing infrastructure.

Appendix B

12: Field Development Plan Addendum (FDPA) content

The following are suggested section headings and topics to include in a Field Development Plan.

12.1: Introduction

- A brief review of the field operations and export route with any divergence from the Development Plan.
- Any changes in licence equity, or of the operator.

- A map showing the field extent and licence boundaries.

12.2: Field description

12.2.1: Hydrocarbons initially in place and recoverable reserves

- Changes to estimates of hydrocarbons initially in place and changes to reserves should be identified by reference to the original Development Plan.

12.2.2: Well status and operations

- A table summarising changes in well status (e.g. producer/injector, suspended/abandoned, perforated intervals, reservoir identifier, lift provision).
- Well operations carried out during the reporting period (e.g. drilling, workovers, data gathering, perforating or stimulation).
- Any significant gap in field production explained.
- A chart of individual well historic production rates (and water cut percentage, if relevant).
- A cumulative production chart for each well.

12.2.3: Geology and geophysics

- A brief summary of the reservoir geology and hydrocarbon type.
- Detailed depth structure map for key productive horizons with annotations of the maximum extent and well paths from the surface to top horizon.
- Interpreted seismic line across the flied and, if available, a schematic cross-section.
- A summary of the results where drilling, seismic re-processing, or other work

has had significant impact on the reservoir model.

12.2.4: Field facilities and infrastructure

- An Ordnance Survey plot which shows the location of all field facilities.
- A brief report on the performance of the field production facilities, highlighting features that have impeded operations.
- Any changes to export routes.

12.3: Development and management plan

12.3.1: Field management

- Changes in development strategy.
- Important reservoir monitoring results, reservoir monitoring limitations and specific production difficulties.
- Plots of reservoir pressure and voidage replacement.
- Plans for reservoir monitoring.

12.3.2: Studies

- Results of any relevant geoscience, reservoir or facilities/pipeline engineering studies completed during the reporting period.
- Plans and timescales for ongoing and future studies.

12.2.3: Forecasting

- A table of the forecasted production, vent and flare volumes, and injection

profiles.
- Estimate of the Cessation-of-Production date.
- A summary of the initial estimate stock-tank oil initially in place, gas initially in place, cumulative production and recovery factor, remaining reserves, and field Estimated Ultimate Recovery (EUR).

12.3.4: Proposed changes to the development plan

- Proposed changes to commitments or conditions in the development consent should be set out clearly, as should plans to extend the development beyond the Development Area.
- A summary of exploration targets or longer-term development opportunities.

12.3.5: Other regulatory issues

- A summary of the status of other regulatory consents and permissions.

Glossary

Abandonment

Preparing a well to be closed permanently, usually after either logs determine there is insufficient hydrocarbon potential to complete the well, or after production operations have drained the reservoir. Assets on the surface and downhole must be permanently retired in a manner which protects health, safety and the environment.

Appraisal

The process of finding out how much oil or gas may be present and establishing if it has the potential to be developed commercially.

Borehole imaging logs

Logging and data-processing methods used to produce two-dimensional, centimetre-scale images of a borehole wall and the adjacent rocks. These tools are limited to the open-hole environment.

Casing

Large-diameter pipe lowered into an open-hole and cemented in place. The well designer must design casing to withstand a variety of forces, such as collapse, burst, and tensile failure, as well as chemically aggressive brines. Casing is usually manufactured from plain carbon steel that is heat-treated to varying strengths but may be specially fabricated of stainless steel, aluminium, titanium, fiberglass, and other materials.

Cement bond logs

A representation of the integrity of the cement job, especially whether the cement is adhering solidly to the outside of the casing. The log is typically obtained from one of a variety of sonic-type tools.

Christmas tree

The set of valves, spools, and fittings connected to the top of a well to direct and control the flow of formation fluids from the well.

Checkshot

A type of borehole seismic data designed to measure the seismic travel-time from the surface to a known depth.

Choke

A device incorporating an orifice that is used to control fluid flow rate or downstream system pressure.

Completion work

Work, by way of the installation of a casing or down-hole equipment, after the Well has been drilled, for the purpose of bringing the well into use as a Development Well.

Composite log

A single log created by splicing together two logs of the same type, but run at different times in the well; or by splicing two different types of log run at the same time. It is common practice to splice all the basic logs run over different depth intervals in a well to obtain a single composite record.

Condensate

A mixture of lighter short chain hydrocarbons that are present as gaseous components in raw natural gas, and which condense out at lower temperatures (below hydrocarbon dew point of the raw gas). The raw natural gas can be associated with crude oil (separate from oil but present in same formation, or dissolved in the crude) or not.

Development

The process of building production facilities and drilling first exploration and production wells.

Development well

A well which the Licensee uses or intends to use in connection with the getting of Petroleum in the Licensed Area.

Diagnostic fracture injection testing

Leak-off test: a test to determine the strength or fracture pressure of the open formation.
Fall-off test: the measurement and analysis of pressure data taken after an injection well is shut in.

Discharge

Direct or indirect introduction or input to surface waters or groundwater.

Disposal

Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy.

Drill and core

The act of drilling a wellbore and recovering a core sample. A specific drill bit is used that allows a solid core to be extracted instead of crushed rock (cuttings). The core provides much greater geological data to be obtained than is possible from drill cuttings alone.

Drill cuttings

Small pieces of rock that break away due to the action of the bit teeth. Cuttings are screened out of the liquid mud system at the shakers and are monitored for composition, size, shape, colour, texture, hydrocarbon content and other properties by the mud engineer, the mud logger and other on-site personnel.

Drill stem test

A procedure to determine the productive capacity, pressure, permeability or extent (or a combination of these) of a hydrocarbon reservoir. Usually conducted with the drill-string (a combination of the drill-pipe, the bottom-hole assembly and any other tools used to make the drill bit turn at the bottom of the wellbore) still in the hole.

Drilling (muds) fluids (oil based or water based)

Any of a number of liquid and gaseous fluids and mixtures of fluids and solids (as solid suspensions, mixtures and emulsions of liquids, gases and solids) used in operations to drill boreholes into the earth. Classifications of drilling [muds] fluids can be based on the component that clearly defines the function and performance of the fluid: (1) water-base, (2) non-water-base and (3) gaseous (pneumatic).

Exploration

The search for mineral deposits of economic value, including sampling, bulk sampling, drilling and trenching, but excluding any works required for the development of such deposits, and any activities directly associated with an existing extractive operation.

Facies

The overall characteristics of a rock unit that reflect its origin and differentiate the unit from others around it. Mineralogy and sedimentary source, fossil content, sedimentary structures and texture distinguish one facies from another.

Field

An accumulation, pool, or group of pools of hydrocarbons or other mineral resources in the subsurface. A hydrocarbon field consists of a reservoir in a shape that will trap hydrocarbons and that is covered by an impermeable, sealing rock. Typically, the term implies an economic size.

Flare

The burning of unwanted gas through a pipe (also called a flare). Flaring is a means of disposal used when there is no way to transport the gas to market and the operator cannot use the gas for another purpose. Flaring generally is not allowed because of the high value of gas and environmental concerns.

Formation

Any geological formation being referred to, such as the formation hosting the hydrocarbons or resource formation.

Gas

Any substance that is gaseous at room temperature (20°C) and atmospheric pressure (1.013 barg).

Groundwater

All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

Joint operating agreement

The JOA is a contract where two or more parties agree to undertake a common task to explore and exploit an area for hydrocarbons.

Location plat

A detailed map of the surface hole location and pertinent surface features.

Natural gas

A mixture of hydrocarbon compounds and some non-hydrocarbons, which exist either in gaseous state or in a solution, often associated with oil and coal. Methane is the main component, typically 90% of the gas, followed by ethane.

Packer

A device that can be run into a wellbore with a smaller initial outside diameter that then expands externally to seal the wellbore.

Perforation

The communication tunnel created from the casing or liner into the reservoir formation, through which oil or gas is produced. The most common method uses jet perforating guns equipped with shaped explosive charges. However, other perforating methods include bullet perforating, abrasive jetting or high-pressure fluid jetting.

Petrophysical well logging

Also known as borehole logging, is a process where specialised instrumentation is inserted into a borehole to determine the properties of the geological formations surrounding the bore.

Permit

An environmental permit granted under the Environmental Permitting (England and Wales) Regulations 2010 by the Environment Agency which allows the operation of a regulated facility subject to certain conditions.

Produced waters

A term used to describe those waters resulting from the exploration and extraction of hydrocarbons that are produced from a well alongside oil and gas (with the exception of flowback fluid).

Production

Commercial production of oil and/or natural gas from production wells.

Plug

Cement plugs in the wellbore to isolate the reservoir and other fluid-bearing formations.

Relevant works

Any structure and any other works which are intended by the licensee to be permanent and are neither designed to be moved from place to place without major dismantling nor intended by the licensee to be used only for searching for petroleum.

Reservoir

A subsurface body of rock having sufficient porosity and permeability to store and transmit fluids. Sedimentary rocks are the most common reservoir rocks because they have more porosity than most igneous and metamorphic rocks and form under temperature conditions at which hydrocarbons can be preserved.

Resource formation

The geological formation that contains the oil and gas resources.

Seat

The part of a valve against which the closure element (gate, ball) affects a tight shutoff.

Separator

A cylindrical or spherical vessel used to separate oil, gas and water from the total fluid stream produced by a well.

Show

A surface observation of hydrocarbons, usually observed as florescent liquid on cuttings when viewed with an ultraviolet or black light (oil show) or increased gas readings from the mud logger's gas-detection equipment (gas show).

Sidetrack

A side-tracking well is a secondary wellbore drilled away from an original wellbore. A side-track might be required to bypass an unusable section of the original wellbore, which may be inaccessible due to irretrievable equipment or debris in the hole, or a collapsed wellbore. A side-track may also be used to explore a nearby geologic feature. It is possible to have multiple side-tracks, each of which might be drilled for a different reason.

Site surface water

Rainwater and/or surface run off accumulating within the site.

Spud/re-spud

To start the well drilling process by removing rock, dirt and other sedimentary material with the drill bit.

Stratigraphy

The study of the history, composition, relative ages and distribution of strata, and the interpretation of strata to elucidate Earth history. The comparison, or correlation, of separated strata can include study of their lithology, fossil content, and relative or absolute age, or lithostratigraphy, biostratigraphy, and chronostratigraphy.

Stack

A processed seismic record that contains traces that have been added together from different records to reduce noise and improve overall data quality.

Suspension

A well suspension is the operation of isolating fluids in the wellbore while providing a means to easily restore the well in the future. A well suspension is reversible, whereas a well abandonment is the permanent closure of the well. A licensees may choose to suspend, instead of abandon the well, while other prospects or abandonment are considered.

Tops

The depths in a well, measured below a reference elevation, at which formations are found in the subsurface.

Tubing grade

A system of classifying the material specifications for steel alloys used in the manufacture of tubing.

Velocity survey

Measurements used to determine average velocity versus depth, such as from an acoustic log or check-shot survey. Acquiring a velocity survey is also known as "shooting a well."

Vertical seismic profile (VSP)

A class of borehole seismic measurements used for correlation with surface seismic data, for obtaining images of higher resolution than surface seismic images and for looking ahead of the drill bit.

Voidage

The volume that the produced fluid occupies at reservoir conditions.

Waste

Any substance or object which the holder discards or intends or is required to discard.

Waste gas

A gas which the holder discards or intends or is required to discard.

Well decommissioning

Typically includes plugging of wells; removal of well equipment, production tanks and associated installations; and surface remediation.

Well stimulation

A treatment performed to restore or enhance the productivity of a well.

Stimulation treatments fall into two main groups, hydraulic fracturing treatments and matrix treatments. Fracturing treatments are performed above the fracture pressure of the reservoir formation and create a highly conductive flow path between the reservoir and the wellbore. Matrix treatments are performed below the reservoir fracture pressure and generally are designed to restore the natural permeability of the reservoir following damage to the near-wellbore area.

Well stimulation fluids

Refers to any fluids used in treatments to restore or enhance the productivity of a well. The two main groups are hydraulic fracturing fluids and matrix treatment fluids. Hydraulic fracturing fluids are designed to increase the flow of hydrocarbons to the well bore and will contain proppant and friction reducers along with the water. Matrix treatment fluids are typically acid-based and are designed to remove scale and other pore-clogging material from the immediate vicinity of the well bore; unlike hydraulic fracturing fluids they do not penetrate more than a few centimetres into the formation.

Workover

The repair or stimulation of an existing production well for the purpose of restoring, prolonging or enhancing the production of hydrocarbons.

Wireline fluid samples

Logging that employs an electrical cable to lower tools into the borehole and to transmit data