Welsh Government Oil and Gas Evidence Programme:

Decommissioning, Site Restoration and Aftercare

November 2017

Table of Contents

1. Executive Summary

Natural Resources Wales is the principle environmental advisor to the Welsh Government, and within this capacity, NRW is leading on the delivery of the Welsh Government oil and gas evidence programme. AECOM authored the Scottish Government commissioned report: Unconventional Oil and Gas: Decommissioning, Site Restoration and Aftercare - Obligations and Treatment of Financial Liabilities (the 'Scottish Government Report')and NRW has commissioned AECOM to review whether the conclusions and recommendations presented within that report are applicable to a Wales' specific legislative, political and environmental landscape.

The review has identified that the conclusions of the Scottish Government Report apply to Wales (including the regulation of coal bed methane activities). The principal uncertainty is whether the Welsh Government will implement the recommendations of the report in relation to oil and gas licensing under newly devolved powers under the Wales Act 2017

2. Introduction

2.1 Aims

This report presents a review of the findings of the AECOM authored report for the Scottish Government: 'Unconventional Oil and Gas: Decommissioning, Site Restoration and Aftercare - Obligations and Treatment of Financial Liabilities' (the 'Scottish Government Report'), to provide a quantification and qualification of existing conclusions, evidence gaps, risks and opportunities in the study with regards to their applicability in Wales.

AECOM's brief from the Welsh Government is to provide:

- AECOM's view on whether the Scottish Government Report provides an up to date evidence base for Wales, particularly with reference to coal bed methane (CBM) as the primary petroleum hydrocarbon of interest in Wales; and
- AECOM's view on whether the evidence presented in the Scottish Government Report is applicable or not in Wales (i.e. is the evidence location specific, based on legislation not available to Wales, or not appropriate for the regulation of CBM activities).

For the purposes of this review unconventional oil and gas (UOG) includes developments which exploit shale oil, shale gas and coalbed methane. The report highlights whether or not the conclusions are equally applicable to coal bed methane as they are to shale gas.

2.2 Background

Natural Resources Wales (NRW) is the principle environmental advisor to the Welsh Government, and within this capacity, NRW is leading on the delivery of the Welsh Government oil and gas evidence programme. The Welsh Government evidence programme is entitled: Study of the potential impact of petroleum production within the Welsh onshore area, as defined within the Petroleum Act 1998, with regards to environmental, social and economic factors.

2.3 Scope

An assessment has been undertaken of each individual conclusion, recommendation or evidence gap presented in the Scottish Government Report and its applicability to Wales. This has been measured using a simple confidence matrix provide by NRW together with appropriate commentary on why individual conclusions are of high, medium or low relevance to Wales.

This report also identifies:

- any significant new and relevant published evidence that was not considered within the Scottish Government Report - together with commentary on why any additional evidence should be considered and the identification of any changes to the conclusions of the Scottish Government report in the context of their applicability to Wales.
- evidence gaps which are specific to Wales and which are not addressed by the existing Scottish Government Report – together with an assessment of the potential impact of these evidence gaps for the regulation of decommissioning, restoration and aftercare of unconventional hydrocarbons in Wales.

Recommendations have also been made for the generation of new evidence if necessary together with a commentary on any assumptions, policy development or time/spatial considerations that would be required to ensure the recommendations achieved a confidence factor acceptable to the Welsh Government.

In order to do this the following Welsh legislation, regulation, guidance documents and other relevant sources were reviewed:

- The Environmental Permitting (England and Wales) Regulations 2010;
- Petroleum Act 1998;

- The Petroleum Licensing (Exploration and Production) (Landward Areas) Regulations 2014;
- Oil And Gas Authority UK, 2015a. Guidelines for the Abandonment of Wells;
- Oil And Gas Authority UK, 2015b – Petroleum Licensing: Financial Guidance;
- Oil and gas guidance - Oil and gas: operatorship;
- Planning Act (Wales) 2015;
- Town and Country Planning Act 1990;
- Well-being of Future Generations (Wales) Act 2015;
- Environment (Wales) Act 2016;
- Coal Industry Act 1994;
- Wales Act 2017;
- Planning Policy Wales (Edition 9, November 2016);
- Vale of Glamorgan Local Development Plan Adopted June 2017, Policy MG25 Mineral Working (including Oil and Gas Extraction);
- Environmental Permitting Regulations - Guidance for applicants H5, Site condition report – guidance and templates;
- Minerals Technical Advice Note (MTAN) Wales 1: Aggregates (March 2004);
- Minerals Technical Advice Note (MTAN) Wales 2: Coal (January 2009);
- Natural Resources Wales FAQs for Onshore Oil and Gas (including the FAQ for Onshore Exploratory Development at Pontrhydyfen;
- Natural Resources Wales website – Regulation in Wales;
- Natural Resources Wales website – Control of Major Accident Hazards (COMAH); and
- Natural Resources Wales website – The Infrastructure Act 2015 and Hydraulic Fracturing Safeguards.

The results of the review are discussed in general in Section 3 with a detailed confidence matrix presented as Appendix A.

3. Review of Key Findings of Scottish Government Report

3.1 Introduction

This section summaries the review of the key findings of the Scottish Government Report as summarised in that report's Executive Summary and provides a commentary of the applicability of each of those findings to Wales. A more detailed review of the findings of the Scottish Government Report and the evidence base for the conclusions of this report are set out in a confidence matrix in Appendix A.

3.2 Environmental Issues

3.2.1 Sub-Surface Development

Decommissioned oil and gas wells are unlikely to leak gases (including methane) or other fluids from the sub-surface to groundwater or to the atmosphere if constructed and abandoned to comply with international standards and industry best practice. Minimisation of emissions is required to protect human health, ecosystems, groundwater, and surface water quality. Methane is also a greenhouse gas and contributes to man-made climate change. Poorly constructed wells may also allow sub-surface leakage between groundwater bodies such as aquifers, which can affect water quality.

This conclusion applies equally to Wales. Although the principal unconventional hydrocarbon resource in Wales is in the form of CBM, methods of well construction are essentially the same as for other unconventional hydrocarbons. Risks will therefore be similar.

The key to preventing leaks from the sub-surface is ensuring well integrity in both the short and long-term. Experience in the United States, Canada and the UK suggests that long-term well integrity can be achieved by implementing best practice during well construction and abandonment operations under a strong regulatory regime.

This conclusion applies equally to Wales. CBM wells do not differ from those for other unconventional hydrocarbons in that they must be constructed and abandoned using best practice under a strong regulatory regime.

However, there is a risk that a small proportion of wells may fail – mainly due to cement shrinkage and that in most cases failure will occur a few years after decommissioning. However, for leakage to occur from a failing well a source of hydrocarbons is required together with a driving force for the gas or oil to migrate. The oil or gas in shales or the gas in coals that are targeted by UOG wells are not under abnormal pressure and there is therefore generally no driving force for leakage. The risk of leakage from abandoned UOG wells is therefore likely to be very low. However, in those UOG wells where there are permeable rocks overlying the target shales or coals that contain hydrocarbons under pressure, there remains a residual risk of leakage if there is a failure of well integrity

Methane in coal seams is adsorbed onto natural fractures (or cleats) in the coal seams. Coal bed methane is extracted by dewatering the coal seam to allow methane to desorb and be pumped to surface. As such CBM wells are not under abnormal pressure and there is no greater driving force for leakage than in other UOG wells. The residual risks from methane contained within permeable rocks (e.g. sandstones) are the same as for other UOG developments.

It is appropriate to monitor for leakage from decommissioned UOG wells for as long as the regulator, the Scottish Environment Protection Agency (SEPA) consider necessary. Where leaks are identified, the need for remedial action by the UOG Operator should be based on a risk assessment with remedial action undertaken in accordance with the steps that SEPA consider necessary (page 2).

NRW has the power to require monitoring for leakage from decommissioned CBM wells as long as it considers necessary. NRW will not allow surrender of a sites environmental permit until they are satisfied that there is no unacceptable risk to the environment. NRW can require operators to undertake remedial actions to prevent leakage prior to permit surrender should this be required.

3.2.2 Surface Development

Decommissioning and restoration of surface UOG development may also require the management of leaks from surface installations e.g. tanks and pipework, that could potentially contaminate the ground and potentially affect the quality of groundwater and surface water. The key to preventing surface spillages and leakage is a combination of good design in accordance with pollution control legislation and implementation of an accredited environmental management system. In the event that surface spillages or leakages occur there is appropriate legislation already in place in Scotland to ensure remediation if required following decommissioning and prior to restoration.

There is already appropriate legislation already in place in Wales to ensure remediation of surface contamination if required following decommissioning and prior to restoration.

3.3 Current Regulatory Framework

We consider that Scotland, in common with the rest of the UK, has a framework for the regulation and control of decommissioning and aftercare of UOG development comparable with good regulatory systems in other countries.

We consider that Wales, in common with the rest of the UK, has a framework for the regulation and control of decommissioning and aftercare of UOG development comparable with good regulatory systems in other countries.

The oil and gas licensing system, which is currently operated by the Oil and Gas Authority (OGA), grants petroleum exploration and development licences (PEDLs) for the exploration or production of hydrocarbons to operators. The OGA's petroleum licensing powers in Scotland are to be devolved to the Scottish Government in accordance with the Scotland Act 2016.

The OGA's petroleum licensing powers are to be devolved to the Welsh Government in accordance with the Wales Act 2017.

The OGA also issues consents to drill. These should only be granted to a licence holder if there is a valid planning permission for UOG development, all the necessary environmental authorisations are in place, there is a system for monitoring conditions and emissions and if the Health and Safety Executive (HSE) is satisfied with the well design as assessed by an independent, competent well examiner.

The existing powers of the OGA to issue consents to drill will be devolved to the Welsh Government in accordance with the Wales Act 2017. The well examination scheme operated by the HSE will continue to operate as currently.

SEPA regulates aspects of UOG development through granting of environmental authorisations including risks to the water environment, risk of major accidents, environmental liability and some operational activities. SEPA also regulates the management and disposal of non-extractive waste arising from decommissioning (including naturally occurring radioactive materials).

NRW regulates aspects of UOG development through granting of environmental permits including risks to the water environment, risk of major accidents, environmental liability and some operational activities. NRW regulates the management and disposal of extractive waste arising from decommissioning (including naturally occurring radioactive materials).

Well abandonment can only be undertaken if the well abandonment plan is approved by the HSE. Following well abandonment and decommissioning, environmental authorisations can only be surrendered with the agreement of SEPA. Before accepting the surrender of any authorisation, SEPA must be confident that there would be no significant adverse impact on the water environment. This ensures that there will also be no unacceptable impact from surface pollution or from well leakage. Post-operation monitoring by the operator required by SEPA should be of sufficient duration to demonstrate this.

The well abandonment plan approval system operated by the HSE will continue to operate as it currently does. NRW controls impacts on the water environment under the environmental permitting system. A site's environmental permit cannot be surrendered until NRW is confident that there would be no significant adverse impact on the water environment based on post-operational monitoring if required.

Planning authorities control the restoration and aftercare of surface development at UOG sites through conditions attached to planning permissions. These conditions can include a requirement to remediate any land contamination arising from oil and gas activities. Planning Agreements between the Planning Authority and the operator may also be used to secure financial contributions covering surface restoration and aftercare liabilities.

Planning Authorities in Wales also control the restoration and aftercare of surface development at UOG sites through conditions attached to planning permissions. These conditions can include a requirement to remediate any land contamination arising from oil and gas activities. Planning Agreements between the Planning Authority and the operator may also be used to secure financial contributions covering surface restoration and aftercare liabilities.

3.4 Lessons on Robust Decommissioning, Restoration and Aftercare

3.4.1 Regulation of UOG in Other Countries

A review of the monitoring and regulatory frameworks for UOG development in other countries in Europe, North America and also Australia has shown that there is a generally similar approach to regulation in the countries or jurisdictions examined. All require licensing of hydrocarbon exploration and production (including UOG development) and provision of some kind of financial guarantee from operators to manage the environmental liabilities from decommissioning. There is generally either guidance or regulations relating to the design of wells and well abandonment with the objective of minimising risk of well failure and leakage. Ideally, there should be mandatory monitoring throughout the life cycle of a well. In Scotland, baseline monitoring before drilling commences is considered good practice and is likely to be required by SEPA. Operational and post-decommissioning monitoring is required by SEPA.

The review has identified no significant change in the evidence base to modify this conclusion as it applies to Wales.

The robustness of the regulatory regimes in the countries studied varies. The level of financial guarantees required can vary significantly; well construction and abandonment plans do not always require detailed review and approval before being implemented and baseline, operational and post-decommissioning monitoring are not always mandatory. Only a few of the jurisdictions studied have funds for the management of orphaned wells - for which no one has legal responsibility.

The review as identified no significant change in the evidence base to modify this conclusion as it applies to Wales.

3.4.2 Regulation of other Industries in Scotland

The study has also reviewed the regulatory systems relating to landfill sites and opencast coal mining in Scotland to see if there are lessons to be learnt and applied to the betterment of UOG regulation. For both industries, restoration responsibilities are regulated by planning authorities whilst environmental compliance is regulated by SEPA. Where the two industries differ is in the treatment of financial guarantees. In the case of landfill development, SEPA requires that the operator must have made adequate financial provisions to meet its obligations (including aftercare). In the case of opencast coal mining, planning authorities can control the performance, restoration and aftercare of opencast coal sites through financial guarantees attached to legal agreements between the planning authority and the operator.

In Wales, restoration responsibilities for landfills and opencast coal sites are also regulated by planning authorities whilst environmental compliance is regulated by NRW.

The treatment of financial guarantees in Wales for the restoration of landfills and opencast coal sites by planning authorities and NRW is essentially the same as in Scotland.

3.4.3 Restoration Benefits

Restoration can deliver positive benefits for former UOG sites and the wider community. Planning permissions for UOG development normally set out restoration requirements for sites, typically requiring restoration to a site's original land use or to another beneficial use. The proposed community benefits package put forward by UOG operators could also be used to provide wider community benefits. Using the landfill tax credit regime as an example, this could be through land reclamation and restoration, funding of community based projects or groups, maintenance of public parks or other amenity, nature conservation, and the preservation of buildings or archaeological sites.

Restoration of CBM sites in Wales can deliver the same restoration benefits as identified for Scotland.

3.4.4 Lessons for Scotland

Because of the long-history of oil and gas regulation in the UK, both onshore and offshore, Scotland has a mature regulatory system for the decommissioning and aftercare of UOG developments, which is equal to best practice examined in other countries or to regulation of other comparable industries in Scotland. This includes requirements for decommissioning and abandonment of wells, which, with appropriate regulatory oversight and monitoring, are sufficient to manage risks of well leakage consistent with the aim of providing suitable protection for communities and the environment. The devolvement of the OGA's petroleum licensing powers to the Scottish Government provides an opportunity to fine-tune the licensing system to the particular requirements of Scotland. For example, it may be possible to strengthen the powers relating to the provision of financial guarantees by operators that already exist under the petroleum licensing system.

Because of the long-history of oil and gas regulation in the UK, both onshore and offshore, Wales has a mature regulatory system for the decommissioning and aftercare of UOG developments, which is equal to best practice examined in other countries or to regulation of other comparable industries in Wales. This includes requirements for decommissioning and abandonment of wells, which, with appropriate regulatory oversight and monitoring, are sufficient to manage risks of well leakage consistent with the aim of providing suitable protection for communities and the environment.

The devolvement of the OGA's petroleum licensing powers to the Welsh Government provides an opportunity to fine-tune the licensing system to the particular requirements of Wales. For example, it may be possible to strengthen the powers relating to the provision of financial guarantees by operators that already exist under the petroleum licensing system.

3.5 Decommissioning, restoration, and aftercare costs and the treatment of financial liabilities

3.5.1 Whilst operators are licensed

It is essential that UOG operators have sufficient funds available to cover liabilities associated with the abandonment and decommissioning of wells. As the licensing authority, the OGA (and the Scottish Government in future under devolved powers) can currently test the financial robustness of operators during licence applications, if a licence changes hands or before a well consent is issued. The licensing authority also has powers to compel the supply of further financial information once operations commence, and to require a company to "take action" if the OGA (or Scottish Government) is not confident that there are sufficient funds to cover its liabilities.

The devolution of the OGA's powers to the Welsh Government offers the same opportunities for the Welsh Government as the Scottish Government to test the financial robustness of operators both during licensing and during licence transfers.

The devolved powers will also allow the Welsh Government to compel operators to supply further information and take action if there are insufficient funds held by an operator to cover its liabilities.

There is potential for improvement in these existing provisions. There is currently no power to require specific arrangements for on-shore well decommissioning and aftercare if a company proves to be failing the financial tests after a well consent is awarded by either the OGA or the future Scottish licensing authority. A relatively simple solution could be for the licensing authority to re-apply the existing financial strength tests regularly for operators and to ensure that the well costs used in the tests include sufficient allowance for the operator's sub-surface decommissioning and restoration liabilities.

The potential for improvement in licensing powers identified for Scotland is also available in Wales should the Welsh Government wish.

There is a low risk of post-decommissioning well failure, but should it occur it is most likely to happen within a few years of well abandonment and decommissioning. It could therefore be expected that the licensing authority should only accept surrender of the PEDL when all environmental authorisations and restoration obligations have been satisfied. During this period, the licensing authority could continue to apply the financial tests and require specific financial action should significant liabilities be identified by the regulators.

If it wishes, the Welsh Government may decide to extend its devolved licensing powers to include declining the acceptance of PEDL surrender until all environmental authorisations and restoration obligations have been satisfied.

3.6 After Licence Surrender

The likelihood of long-term failure of decommissioned UOG wells, which are well constructed and abandoned, is considered to be low. In the event that a failure does occur after licence surrender, long-term insurance products could cover such risks. Alternatively, a mutual fund could be established to cover the costs of repairing leaking orphaned wells in the future. As an example, an annual levy on consented wells raised through the licence fee on each PEDL could be used for this purpose.

If it wishes, the Welsh Government may decide to require the UOG industry in Wales to provide financial provision for orphaned wells through insurance or a mutual fund.

As in Scotland, the OGA is currently responsible for the management of financial liabilities associated with oil and gas wells under the petroleum licensing system. Again as in Scotland, the OGA has no responsibility for onshore environmental legislation in Wales.

The primary conclusion of this review is that the same gaps exist in Wales as they do in the Scotland with regards to the management of financial liabilities.

The Scottish Government Report sets out a number of possible remedies (Sections 6.8 and 6.9) that could correct these gaps, and these are considered to be equally applicable to Wales. These are principally:

- additional powers to OGA or a future Welsh (petroleum) licensing authority, including powers to compel licensees and parent companies to:
  - re-take the financial tests at least annually; and
  - provide specific additional or alternative financial arrangements;
- new or revised definitions of
  - “decommissioning liabilities” ;
  - “repair liabilities”;
  - “Well Costs”;
  - “Works Programme”; and
  - “licence commitments”
- restrictions on the type of assets that may be used in the financial tests; and
- consideration of a mutual fund.

The differences between applicable Welsh and Scottish legislation and regulations were reviewed to assess whether or not a different system for the management of financial instruments could be appropriate in Wales.

In this regard, Schedule 9 of the Town and Country Planning Act (TCPA) as amended, and the Planning Act (Wales) 2015 is relevant. In particular the powers of Planning Authorities (and Welsh Ministers) to make orders (under paragraph 1 of the TCPA 1990) imposing restoration and aftercare conditions and planning obligations.

The powers under the TCPA are considerable and could, with an accompanying statutory instrument setting out how financial tests should be applied and liabilities managed, enable Planning Authorities to regulate the financial liabilities aspect of UOG decommissioning, site restoration and aftercare in Wales.

However, on the basis of the reasonable assumption that the Welsh Government in its future role as the successor to the OGA continues to manage the overarching financial liabilities through the PEDL system, this would fragment regulation and could result in an overlap in the responsibilities of the Welsh Government (as the petroleum licensing body) and Planning Authorities. This would make it harder to gather the information necessary to accurately assess decommissioning and repair liabilities in the longer term. It would also make it harder to create a proportionate mutual fund.

Following a review of the Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015, it is considered that, at this point, this legislation would have no direct effect on the management of financial liabilities and that any ensuing regulations would be unlikely to address this issue specifically where other legislation and regulation already provides direction.

4. Legislation for sustainable development to secure the long term well-being of Wales

4.1 Introduction

The following section provides an overview of three key pieces of Welsh legislation; the Environment (Wales) Act 2016, the Well-being of Future Generations (Wales) Act 2015 and the Planning (Wales) Act 2015, and considers the potential implications on decommissioning, site restoration and aftercare of any future UOG sites in Wales.

4.2 Environment (Wales) Act 2016

The aims of the Environment (Wales) Act are to enable Wales' resources to be managed in a more proactive, sustainable and joined-up manner and to establish the legislative framework necessary to tackle climate change.[1] The Act recognises that the resilience of ecosystems and the benefits they provide are essential to the well-being of Wales, thereby complementing the legislative framework within the Well-being of Future generations (Wales) Act 2015.

The Act introduced an enhanced biodiversity and resilience of ecosystems duty that applies to public authorities. The new reporting duty enables public authorities to report on actions taken to improve biodiversity and to promote the resilience of ecosystems and also what actions have been taken to incorporate biodiversity measures into other areas of policy, strategies or initiatives[2].

In terms of decommissioning, site restoration and aftercare, it is likely that the Welsh UOG regulator will be required to provide information to NRW and the Welsh Ministers on oil and gas production from UOG wells, fugitive emissions and the prevention of fugitive emissions for the development of interim emissions targets, the compilation of carbon budgets and the calculation of the net Welsh emissions account.

4.3 Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations Act (Wales) 2015 requires public bodies in Wales to consider the long-term impact of their decisions, to work better with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change[3]

The Well-being of Future Generations (Wales) Act 2015 establishes Public Service Boards (PSB) for each Local Authority Area in Wales. Each PSB must improve the economic, social, environmental and cultural well-being of its area by working to achieve its well-being goals.

The seven well-being goals are:

- a prosperous Wales;
- a resilient Wales;
- a healthier Wales;
- a more equal Wales;
- a Wales cohesive of communities;
- a Wales of vibrant culture and thriving welsh language;
- a globally responsible Wales.

[1] Environment (Wales) Act 2016 – Explanatory Memorandum http://gov.wales/docs/desh/publications/160429-explanatory-memorandum-en.pdf
[2] Natural Resources Policy Statement – Welsh Government http://gov.wales/docs/desh/publications/150914-natural-resources-policy-statement-en.pdf
[3] https://futuregenerations.wales/about-us/future-generations-act/

The members of each PSB must include the Local Authority, the Local Health Board, the Welsh Fire and Rescue Authority and NRW. The PSB can invite groups representing others (industry or campaign groups etc.) to attend meetings to make representations and express views. The PSB must undertake a local Well-being Assessment for its area from which it must prepare and publish a Local Well-being Plan and report annually on progress made on the objectives included in the plan.

An example assessment is the Vale of Glamorgan PSB Well-being Assessment which identifies threats including climate changes and deterioration of air quality. Local Well-being Plans are currently being drafted at this time and are expected to be published by May 2018.

Local Planning Authorities will be under a duty to have regard to the Local Well-being Plan published by the PSB[4], there may therefore be increased emphasis and focus on fugitive emissions and the prevention of fugitive emissions from decommissioned UOG sites at the decision making stage (i.e. planning and permitting) over and above that already embedded in the current system.

4.4 Planning (Wales) Act 2015

The Planning (Wales) Act 2015 sets out a series of legislative changes to deliver reform of the planning system in Wales, to ensure that it is fair, resilient and enables development[5].

Part 2 of the Act makes provision about sustainable development, in accordance with the Well-being of Future Generations (Wales) Act 2015, in the exercise of functions relating to development planning and applications for planning permission.

Part 3 of the Act is about developing a National Development Framework for Wales. The National Development Framework will sit alongside Planning Policy Wales, which sets out the Welsh Government's planning policies and will continue to provide the context for land use planning.

Part 5 of the Act is about the making of certain applications to Welsh Ministers. It makes provision for applications for planning permission for development of national significance in Wales to be made by Welsh Minister instead of a local planning authority and for certain other applications to be made to either the Welsh Ministers or a local planning authority.

4.5 Conclusions

It is not considered that the three pieces of legislation reviewed will have any direct implications on the current requirements for the provision of decommissioning, site restoration and aftercare over and above those already embedded in the current regulatory system. It is however considered that there will be increased focus on how development proposals, and in this instance UOG development proposals, address decommissioning, site restoration and aftercare in the context of sustainability and the ecosystem approach.

In terms of the role of the UOG regulator in Wales, the regulator will be required to:

- comply with the sustainable development principles;
- cooperate with the Future Generations Commissioner and Public Services Boards;
- cooperate with the Natural Resources Body (NRW) and provide input to area statements and reports; and
- provide information to NRW and the Welsh Ministers on oil and gas production from UOG wells, fugitive emissions and the prevention of fugitive emissions for the development of interim emissions targets, the compilation of carbon budgets and the calculation of the net Welsh emissions account.

[4] The link between the Well-being of Future Generations (Wales) Act, the Planning (Wales) Act and the Environment (Wales Act)
[5] Welsh Government – Planning (Wales) Act 2015 http://gov.wales/topics/planning/legislation/planning-wales-act-2015/?lang=en

Appendix A Confidence Matrix

Confidence Matrix Methodology

To assign confidence to the information being used, the following guidance set by the Intergovernmental Panel on Climate Change (IPCC) is used to assign confidence levels (Low, Medium, and High). This ensures a consistent, tried and tested method is used. It is dependent on expert judgement to determine what is an appropriate amount of evidence and level of agreement specific to each subject.

The confidence matrix included in this report details the key findings of the Scottish Government Report and sets out the level of 'agreement' with the current situation in Wales. The evidence for the level of agreement is provided or reference and an overall confidence rating is given for each finding as set out below.

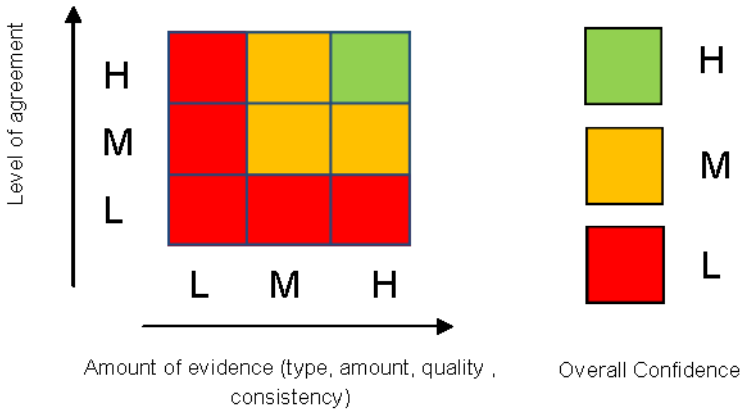

Figure 1. Confidence Matrix Methodology

Scottish Government Report Review - Confidence Matrix

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap				Level of Agreement				Amount of Evidence	Overall Confidence		
Original Text and Reference	Summary	H	M	L	Commentary	H	M	L	Commentary	H	M	L
Decommissioned oil and gas wells are unlikely to leak gases (including methane) or other fluids from the sub-surface to groundwater or to the atmosphere if constructed and abandoned to comply with international standards and industry best practice. Minimisation of emissions is required to protect human health, ecosystems, groundwater, and surface water quality. Methane is also a greenhouse gas and contributes to man-made climate change. Poorly constructed wells may also allow sub-surface leakage between groundwater bodies such as aquifers, which can affect water quality. (page 2)	Construction and abandonment to international standards and best practises can prevent leakage. Poor construction may result in pollution.		H		This conclusion applies equally to Wales. Although the principal unconventional hydrocarbon resource in Wales is in the form of CBM, methods of well construction are essentially the same as for other unconventional hydrocarbons. Risks will therefore be similar.		H		Coalbed Methane: Principles and Practices, Haliburton, June 2007, Chapter 5 – Well Construction.			
The key to preventing leaks from the sub-surface is ensuring well integrity in both the short and long-term. Experience in the United States, Canada and the UK suggests that long-term well integrity can be achieved by implementing best practice during well construction and abandonment operations under a strong regulatory regime. (page 2)	Long-term well integrity can be achieved by implementing best practice during well construction and abandonment operations under a strong regulatory regime.		H		This conclusion applies equally to Wales. CBM wells do not differ from those for other unconventional hydrocarbons in that they must be constructed and abandoned using best practice under a strong regulatory regime.		H				H	
However, there is a risk that a small proportion of wells may fail – mainly due to cement shrinkage and that in most cases failure will occur a few years after decommissioning. However, for leakage to occur from a failing well a source of hydrocarbons is required together with a driving force for the gas or oil to migrate. The oil or gas in shales or the gas in coals that are targeted by UOG wells are not under abnormal pressure and there is therefore generally no driving force for leakage. The risk of leakage from abandoned UOG wells is therefore likely to be very low. However, in those UOG wells where there are permeable rocks overlying the target shales or coals that contain hydrocarbons under pressure, there remains a residual risk of leakage if there is a failure of well integrity. (page 2)	Causes of well failure.		H		Methane in coal seams is adsorbed into natural fractures (or cleats) in the coal seams. CBM is extracted by dewatering the coal seam to allow methane to desorb and be pumped to surface. As such CBM wells are not under abnormal pressure and there is no greater driving force for leakage than in other UOG wells. The residual risks from methane contained within permeable rocks (e.g. sandstones) are the same as for other UOG developments.		H					

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement			Amount of Evidence			Overall Confidence		
Original Text and Reference	Summary	H	M	L	Commentary	H	M	L	Commentary	H	M	L
For this reason, it is appropriate to monitor for leakage from decommissioned UOG wells for as long as the regulator, the Scottish Environment Protection Agency (SEPA) consider necessary. Where leaks are identified, the need for remedial action by the UOG Operator should be based on a risk assessment with remedial action undertaken in accordance with the steps that SEPA consider necessary. (page 2)	Monitoring of decommissioned wells.			H	NRW has the power to require monitoring for leakage from decommissioned CBM wells as long as it considers necessary. NRW will not allow surrender of a site's environmental permit until it is satisfied that there is no unacceptable risk to the environment. NRW can require operators to undertake remedial actions prevent leakage prior to permit surrender should this be required.			H	Natural Resources Wales FAQ: Onshore Oil and Gas *Monitoring after a site has been abandoned will depend on the risks posed by the site, which will be assessed on a site-by-site basis. If wells are abandoned in line with Health and Safety Executive (HSE) regulations and we are satisfied that they do not pose a risk to the environment we would see no reason for continued monitoring. Natural Resources Wales will not allow the operator to surrender their permit until we are satisfied that either no pollution has occurred at a site, or if it has, that the site has been returned to its original condition.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf			H
It is essential that UOG operators have sufficient funds available to cover liabilities associated with the abandonment and decommissioning of wells. As the licensing authority, the OGA (and the Scottish Government in future under devolved powers) can currently test the financial robustness of operators during licence applications, if a licence changes hands or before a well consent is issued. The licensing authority also has powers to compel the supply of further financial information once operations commence, and to require a company to "take action" if the OGA (or Scottish Government) is not confident that there are sufficient funds to cover its liabilities. (page 6)	Funding for liabilities associated with the abandonment and decommissioning of wells.			H	The Wales Act 2017 devolves to Welsh Ministers the administration of existing and future petroleum exploration and development licensing It would be reasonable to assume that the same licensing procedure will be adopted by the Welsh Government until such time as it makes any decision on the need for reform. The devolvement of the licensing procedure to the Welsh Government provides an opportunity for improvement/strengthening of the existing financial provisions.		M		Whilst it is considered that there is a high level of agreement between the anticipated role of the Scottish Government following the devolvement and the role of the Welsh Government in the same capacity - no evidence has been identified that supports the assumption that the same licensing procedure will be adopted by the Welsh Government.		M	
Once the operator has surrendered the relevant authorisations and met the Health and Safety Executive's well abandonment requirements and, later, when the post-production requirements in the Petroleum Exploration and Development Licence have ceased, there are no statutorily required long-term monitoring and control requirements to ensure that well integrity is retained and pollution does not occur. (page 12)	No long-term monitoring required following conclusion of procedural requirements / permissions / licences.			H	This conclusion applies equally to Wales. There is no long-term monitoring requirement following conclusion of procedural requirements / permissions / licences.			H	Natural Resources Wales FAQ: Onshore Oil and Gas *Monitoring after a site has been abandoned will depend on the risks posed by the site, which will be assessed on a site-by-site basis. If wells are abandoned in line with Health and Safety Executive (HSE) regulations and we are satisfied that they do not pose a risk to the environment we would see no reason for continued monitoring. Natural Resources Wales will not allow the operator to surrender their permit until we are satisfied that either no pollution has occurred at a site, or if it has, that the site has been returned to its original condition.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf			H

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement				Amount of Evidence		Overall Confidence		
Original Text and Reference	Summary	H	M	L	Commentary	H	M L	Commentary	H	M L
Conventional hydrocarbons in permeable rocks such as sandstones or limestones which can overlie UOG resources in some wells do represent a potential source of leaks if a driving force such as high formation pressures exists (Darrah, et al., 2014). In Scotland, permeable rocks that could contain hydrocarbons overlie the shales and coals that contain UOG resources (Read, et al., 2003) and represent a source for potential leakages. (page 22)	Location of permeable rocks that could contain hydrocarbons overlying the shales and coals that contain UOG resources represent a source for potential leakages.				This observation applies equally to Wales			P J Brenchley Geology of England and Wales (2nd Edition), 2006		
All operators in the UK holding a PEDL are required by OGA to be members of UKOOG the onshore operator group. The Scottish Government will have the ability to maintain this requirement after the OGA's petroleum licensing powers are devolved in accordance with the Scotland Act 2016. UKOOG requires all operators to comply with their duties under relevant regulations. UKOOG requires its members to follow best practice in well construction as set out in the guidelines for well construction produced by Oil and Gas UK (OGUK). (Page 25)	Membership of UKOOG required by OGA which in turn requires operators to follow best practise for well construction (amongst other things).		H		The Wales Act 2017 devolves to Welsh Ministers the administration of existing and future Petroleum Exploration and Development licensing It would be reasonable to assume that the same licensing procedure will be adopted by the Welsh Government until such time as it makes any decision on the need for reform.		M	Whilst it is considered that there is a high level of agreement between the anticipated role of the Scottish Government following the devolvement and the role of the Welsh Government in the same capacity - no evidence has been identified that supports the assumption that the same licensing procedure will be adopted by the Welsh Government.		M

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Original Text and Reference	Summary	Commentary		Commentary		
		H M L		H M L		H M L
Well abandonment plans must be approved by the HSE before sites are decommissioned. (page 27) HSE works closely with SEPA and the OGA to share relevant information on such activities and to ensure that there are no material gaps between safety, environmental protection and planning authorisation considerations, and that all material concerns are addressed. (page 34) HSE also work alongside SEPA in the implementation of the Control of Major Accident Hazards Regulations 1999 (as amended) with the main aim of preventing and mitigating the effects of those major accidents involving dangerous substances. (page 35)	The role of the HSE.	H	The role of the HSE is the same across the UK. The HSE is responsible for ensuring safe practices in well design, integrity and construction work, and for safety with regard to drilling work.	H	Natural Resources Wales – Regulation in Wales *The HSE is responsible for ensuring safe practices in well design, integrity and construction work, and for safety with regard to drilling work.* http://naturalresourceswales.gov.uk/guidance-and-advice/environmental-topics/energy/onshore-oil-and-gas/regulating-onshore-oil-and-gas/?lang=en Natural Resources Wales FAQ: Onshore Oil and Gas *Under the proposed Natural Resources Wales/HSE 'working together' agreement, we will be jointly inspecting wells and sharing information on sites where hydraulic fracturing is taking place.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf Natural Resources Wales – Control of Major Accident Hazards (COMAH) *The Regulations are enforced through the joint Competent Authority in the UK. The Competent Authority comprises five organisations:* • *Health and Safety Executive (HSE);* • *Office for Nuclear Regulation (ONR)* • *Natural Resources Wales (NRW)* • *Environment Agency (EA) (for England); and* • *Scottish Environmental Protection Agency (SEPA).* https://naturalresources.wales/about-us/what-we-do/how-we-regulate-you/control-of-major-accident-hazards-comah/?lang=en	H	H

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement				Amount of Evidence		Overall Confidence		
Original Text and Reference	Summary	H	M	L	Commentary	H	M	L	Commentary	H	M	L
Monitoring of baseline conditions before drilling or well construction commences is not currently a legal requirement in Scotland but is regarded as best practice by UKOOG and is likely to be required by SEPA before a licence to drill a deep borehole can be awarded. (page 28)	Requirement for monitoring of baseline conditions.			H	This observation applies equally to Wales – monitoring of baseline conditions before drilling or well construction commences is not currently a legal requirement in Wales. It is however regarded as best practice by UKOOG (membership of UKOOG currently required by OGA) and may be required by NRW as part of its consideration of any environmental permit applications.			H	Natural Resources Wales FAQ: Onshore Oil and Gas *As required by the Infrastructure Act 2015, environmental permits issued by NRW will contain a condition that requires monitoring of the level of methane in groundwater in the period of 12 months before any hydraulic fracturing begins.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf Natural Resources Wales – The Infrastructure Act 2015 and Hydraulic Fracturing Safeguards *The Infrastructure Act 2015 contains specific provisions relating to energy exploitation, including a number of safeguards that must be completed before the Oil and Gas Authority will issue operators with consent to undertake hydraulic fracturing. Operators must meet twelve safeguard conditions to obtain the consent. Many of the safeguard conditions relate to environmental protection, for example twelve month's groundwater methane monitoring, fugitive emissions monitoring, and assessment and disclosure of chemicals.* *These safeguard are only applicable where an operator is seeking consent to undertake hydraulic fracturing (as defined within the Act), and do not apply to the drilling of exploratory boreholes or coal bed methane activities. The safeguards are also additional to the requirement to obtain the relevant planning and environmental permitting consents.* http://naturalresourceswales.gov.uk/guidance-and-advice/environmental-topics/energy/onshore-oil-and-gas/regulating-onshore-oil-and-gas/?lang=en Natural Resources Wales FAQ: Onshore Gas Exploratory Development at Pontrhydyfen *As part of its consideration of any environmental permit applications, Natural Resources Wales will assess what, if any, baseline monitoring is required. The nature and scope of any baseline data is assessed on a site-by-site basis and will depend on the specific activity proposed by the developer, local environmental conditions and the site condition report. The type and period of baseline monitoring will depend on the risks from particular activities at particular sites.* https://naturalresources.wales/media/679443/eng-nrw-qanda-march-_pontrhydyfen_final.pdf			H

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement			Amount of Evidence			Overall Confidence		
Original Text and Reference	**Summary**	H	M	L	**Commentary**	H	M	L	**Commentary**	H	M	L
Where leaks are identified, the need for remedial action by the UOG Operator should be based on a risk assessment with remedial action undertaken in accordance with the steps that SEPA consider necessary. (page 28)	Remediation actions to be undertaken based on a risk assessment and in accordance with the requirements of the environmental regulator (prior to surrender of environmental authorisations).			H	This observation is equally applicable to Wales – if leaks are identified, prior to the surrender of a permit, the operator will be required by NRW to return the site to its original condition.			H	Natural Resources Wales FAQ: Onshore Oil and Gas [Monitoring after a site is abandoned]…*will depend on the risks posed by the site, which will be assessed on a site-by-site basis. If wells are abandoned in line with Health and Safety Executive (HSE) regulations and we are satisfied that they do not pose a risk to the environment we would see no reason for continued monitoring. Natural Resources Wales will not allow the operator to surrender their permit until we are satisfied that either no pollution has occurred at a site, or if it has, that the site has been returned to its original condition.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf Environmental Permitting Regulations - Guidance for applicants H5, Site condition report – guidance and templates. *The surrender part of the SCR describes the condition of the land and groundwater at the point at which you apply to surrender your environmental permit. It must provide the evidence necessary to convince us that your site does not pose a pollution risk and is in a satisfactory state.* *You may be able to say that the land and groundwater have not deteriorated, and are therefore in a satisfactory state, if your evidence shows that:* • measures to protect land and groundwater have worked; • you investigated and remedied pollution incidents that may have affected land; • you monitored soil, gas or water and you investigated and remedied any deterioration found; • you investigated and remedied any risk of pollution caused by decommissioning. *If the land has deteriorated because of the permitted activities, you need to take steps to restore it to a satisfactory state.* https://naturalresources.wales/media/1215/environmental-permitting-regulations-guidance-for-applicants-h5-site-condition-report-guidance-and-template.pdf	H			H
It is assumed that the same licensing procedure will be adopted by the Scottish government until such time as it makes any decision on the need for reform. (page 32)	Devolvement of licensing procedure.			H	The Wales Act 2017 - devolves to Welsh Ministers the administration of existing and future Petroleum Exploration and Development licensing It would be reasonable to assume that the same licensing procedure will be adopted by the Welsh Government until such time as it makes any decision on the need for reform.		M		Whilst it is considered that there is a high level of agreement between the anticipated role of the Scottish Government following the devolvement and the role of the Welsh Government in the same capacity - no evidence has been identified that supports the assumption that the same licensing procedure will be adopted by the Welsh Government.		M	

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement			Amount of Evidence			Overall Confidence		
Original Text and Reference	**Summary**	H	M	**L**	**Commentary**	H	M	**L**	**Commentary**	H	M	**L**
The locations of all wells including abandoned wells are held by the OGA are publically available. It is anticipated that those parts of the database relating to Scotland will be maintained and updated once the OGA's powers are devolved to the Scottish Government. (page 33)	Devolvement of licensing procedure. Role of OGA – record of all wells.		H		The Wales Act 2017 - devolves to Welsh Ministers the administration of existing and future Petroleum Exploration and Development licensing It would be reasonable to assume that those parts of the database relating to Wales will be maintained and updated by the relevant regulator once the OGA's powers are devolved to the Welsh Government.		M		Whilst it is considered that there is a high level of agreement between the anticipated role of the Scottish Government following the devolvement and the role of the Welsh Government in the same capacity - no evidence has been identified that supports the assumption that the database detailing the locations of any wells will be maintained by the Welsh Government.		M	
The Planning Authority (i.e. the planning department of the Scottish local authority area in which a UOG development is located) is responsible for granting planning permission for development related to exploration and production of UOG. Planning permissions are granted under the Town and Country Planning (Scotland) Act 1997 (as amended). Any application for planning permission to carry out UOG development involving hydraulic fracturing is likely to be accompanied by an Environmental Impact Assessment (EIA). (page 36)	Planning applications and EIA.		H		This observation applies equally to Wales as the planning system is similar. The Local Planning Authority (i.e. the planning department of the Welsh local authority area in which a UOG development is location), is responsible for granting planning permission for development related to exploration and production of UOG. Any application for planning permission to carry out UOG development involving hydraulic fracturing is likely to be accompanied by an Environmental Impact Assessment (EIA). At present, the Welsh Government has adopted a precautionary approach to UOG development whereby a Local Authority proposing to approve a planning application for a UOG development which would involve using hydraulic fracturing technology (or other unconventional extraction techniques) must refer the planning application to Welsh Ministers.		H		Natural Resources Wales FAQ: Onshore Oil and Gas *The Welsh Government has adopted a precautionary approach to the development of unconventional oil and gas resources in Wales. In support of this approach, the Minister for Natural resources has issued a Notification Direction to all Welsh Local Authorities. From the 16th February 2015, local authorities in wales are subject to The Town and Country Planning (Notification)(Unconventional Oil and Gas)(Wales) Direction 2015.* *The Direction requires that where a Local Authority proposes to approve a planning application for an unconventional oil and gas development, which would involve the using hydraulically fracturing technology (or other unconventional extraction techniques), then the local panning authority must refer the planning application to Welsh Ministers.* *This Direction is only applicable to developments involving the onshore explorations, appraisal or production of coal bed methane or shale oil using unconventional extraction techniques, including hydraulic fracturing. The Direction does not apply to the making of exploratory boreholes which do not involve the carrying out of such unconventional techniques.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf			H

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement				Amount of Evidence				Overall Confidence			
Original Text and Reference	Summary	H	M	L	Commentary	H	M	L	Commentary	H	M	L	
All planning applications in Scotland are required to be determined against the Town and Country Planning (Scotland) Act 1997, which states (at Section 25) that all applications are to be determined in 'accordance with the [development] plan unless material considerations indicate otherwise. The various development plans tend not to refer to onshore gas, due to their age, but all have general mineral works and environmental policies that would inform restoration and aftercare requirements and the financial contributions that would be applicable to an UOG planning application. (page 36) Development plans are influenced by, amongst other things, the Scottish Government's national policy […] Specific policies relating to mineral extraction developments that should be reflected at local policy level are outlined within Scottish Planning Policy and should be referred to in relation to the principles underlying potential UOG development. (page 37)	Planning applications, planning policy and material considerations. General mineral and environmental policies that would inform restoration and aftercare requirements and the financial contributions that would be applicable to an UOG planning application. Inclusion of specific mineral extraction policies at local level.			H	The Planning Act (Wales) 2015 requires Local Authorities to prepare a Local Development Plan. Due to the recent nature of this legislation the Local Development Plans (particularly covering areas where there are existing PEDLs) do refer specifically to onshore oil and gas as well as more generally to provisions for restoration and after-care following mineral extraction.			H	Planning Policy Wales (Edition 9, November 2016) includes specific policies relating to mineral extraction developments as follows: *14.5 Restoration and Aftercare* *14.5.5 Financial Guarantees* *14.7.13 Energy Minerals* *14.8.6 Oil and Gas – Onshore* http://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf Example: Vale of Glamorgan Local Development Plan Adopted June 2017. Policy MG25 Mineral Working (including Oil and Gas Extraction) *Proposals for the extraction of new primary minerals will only be permitted where there is a proven national, regional or local need for the mineral and where:[…]* *7. There is provision for the land to be progressively and finally restored to a high standard and to a beneficial and sustainable after-use including long term post-closure management* http://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP/LDP-Adoption/Final-Composite-Version-of-LDP-Written-Statement-accepting-all-changes.pdf	H		

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement		Amount of Evidence		Overall Confidence
Original Text and Reference	Summary	H M L	Commentary	H M L	Commentary	H M L
Planning Advice Note (PAN) 64: Reclamation of Surface Mineral Workings (Scottish Executive, 2000b, provides guidance on the use of planning agreements in minerals applications, alongside aftercare/restoration considerations, and statutory timescales involved. Within the context of the decommissioning phase of UOG development, the Planning Authority is primarily concerned with the effective aftercare management of the site as a land use (for an initial period of 5 years at least, which is determined by Schedule 3, Part 2, Paragraph (7) of the 1997 Act) and ensuring sufficient financial guarantees and reporting procedures are in place to manage that process. (page 37)	Planning advice on the use of planning agreements in minerals applications, alongside aftercare/restoration considerations, and statutory timescales involved.	H	Wales has two Minerals Technical Advice Notes (MTANs): Minerals Technical Advice Note (MTAN) Wales 1: Aggregates (March 2004); and Minerals Technical Advice Note (MTAN) Wales 2: Coal (January 2009) Whilst the content of the Advice Notes is specifically focused on Aggregates and Coal, it is considered that the general principles regarding restoration and aftercare would be applicable to UOG development.	H	Minerals Technical Advice Note (MTAN) Wales 1: Aggregates (March 2004), Part D 103 […] It is equally important that the applicant should thoroughly understand, and make financial provisions for, the responsibilities he will be taking on under the reclamation conditions likely to be imposed on the planning permission. 113. The aftercare period is five years starting with compliance with the restoration condition or such other maximum period after that compliance as may be prescribed by further regulations; and may relate to any part or phase of the site development. http://gov.wales/docs/desh/policy/040331aggregatesmtanen.pdf Minerals Technical Advice Note (MTAN) Wales 2: Coal (January 2009) 60. […] The applicant should thoroughly understand, and make financial provision for, responsibilities under the reclamation Conditions and agreements. MPPW states wherever it is reasonable to do so, authorities may require financial guarantees. Operators are encouraged, as a reasonable alternative, to participate in established mutual funding or guarantee schemes which safeguard against possible financial failure. http://gov.wales/docs/desh/policy/090120coalmtanen.pdf	H	H
The Planning Authority would control the restoration and aftercare phases through conditions attached to any approved consent and via Section 75 Agreements. (page 37)	Control of restoration and aftercare through planning conditions and planning obligations.	H	This is equally applicable in Wales – the Planning Authority would control the restoration and aftercare phases through conditions attached to any approved consent and via Section 106 Agreements.	H	Planning Policy Wales – Edition 9 November 2016 *14.5 Restoration and Aftercare* *14.5.5 Financial Guarantees* *Properly worded and relevant planning conditions should be able to secure the restoration, aftercare and after-use of mineral sites. Operators and landowners should ensure that sufficient finance is set aside to enable them to meet restoration and aftercare obligations. The full cost of restoration does not need to be put on deposit at the outset, but it should build up commensurate with the programme of activity or extraction. For larger sites, progressive restoration should be achieved using a stream of funding required at various stages throughout the operation. Operators are encouraged, as a reasonable alternative, to participate in established mutual funding or guarantee schemes which safeguard against possible financial failure.* http://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf	H	H
The Scottish licensing system is comparable with the majority of the jurisdictions studied and can therefore be considered to represent best practice.	Comparison to regulatory systems in other OG producing countries.	H	The comparison between the licensing systems in Scotland and Wales as evidenced above shows that the systems are relatively similar – it can therefore be reasonably concluded that the Welsh licensing system, along with the Scottish licensing system is comparable with the majority of other jurisdictions and can therefore be considered to represent best practise.	H	See Level of Agreement Commentary.	H

Section of Scottish Government Report	Conclusion, Recommendation or Evidence Gap	Level of Agreement			Amount of Evidence		Overall Confidence		
Original Text and Reference	Summary	H	M	L	Commentary	H M L	Commentary	H	M	L
The Independent Scientific Expert Panel has only identified one regulatory gap relating directly to well integrity, decommissioning or restoration, namely the absence of any mechanism requiring for long-term monitoring and responsibility for wells. (page 63)	Absence of long-term monitoring of wells (post-abandonment and permit surrender).		H		It is considered that this identified regulatory gap is equally applicable to the Welsh system i.e. there does not appear to be any provision for long-term monitoring of wells post abandonment and permit surrender.	H	Natural Resources Wales FAQ: Onshore Oil and Gas *Monitoring after a site has been abandoned will depend on the risks posed by the site, which will be assessed on a site-by-site basis. If wells are abandoned in line with Health and Safety Executive (HSE) regulations and we are satisfied that they do not pose a risk to the environment we would see no reason for continued monitoring. Natural Resources Wales will not allow the operator to surrender their permit until we are satisfied that either no pollution has occurred at a site, or if it has, that the site has been returned to its original condition.* http://naturalresourceswales.gov.uk/media/679436/eng-nrw-qanda-march-draft_basic_to-issues.pdf		H	
This report considers that existing post-decommissioning monitoring under the CAR Regulations should be sufficient to identify wells at risk of well integrity failure. (page 63) Scotland is the only jurisdiction of those reviewed where there is a legal requirement for post-closure monitoring – in this case to allow the surrender of CAR licences (SEPA, 2012) (page 64)	Requirement for post-decommissioning monitoring.		H		Existing post-decommissioning monitoring under the Environmental Permitting Regulations should be sufficient to identify wells at risk of well integrity failure.	H	The Environmental Permitting (England and Wales) Regulations 2010		H	
UKOOG's "Community Engagement Charter" includes a commitment on behalf of its membership to pay: • £100,000 per site to the local community situated near to each exploratory (hydraulically fractured) well site. This will be paid by the operator, regardless of whether or not recoverable deposits are found; and • 1% of production revenues to communities during the production stage, before the operator has accounted for their costs; (page 73) The amount of funding for community projects which is potentially available is very considerable – particularly at a time of public spending restraint. The industry is open to views about how the spending should be prioritised. (page 75)	Community funding		H		All operators in the UK holding a PEDL are required by OGA to be members of UKOOG the onshore operator group. The Welsh Government will have the ability to maintain this requirement after the OGA's petroleum licensing powers are devolved. It would be reasonable to assume that the requirement for all operators holding a PEDL being required to be members of UKOOG (and therefore will be required to operate in accordance with the Community Engagement Charter) will be adopted by the Welsh Government until such time as it makes any decision on the need for reform.	M	Whilst it is considered that there is a high level of agreement between the anticipated role of the Scottish Government following the devolvement and the role of the Welsh Government in the same capacity - no evidence has been identified that supports the assumption that the same requirements will be adopted by the Welsh Government.		M	

Appendix B – Definitions and Abbreviations

B.1 Definitions

Term	Definition
Coalbed Methane	Gas extracted from coal seams
Hydraulic fracturing	A process used to increase the permeability of a rock through the creation of networks of interconnected fractures by the injection of pressurised fluids
Licensing Authority	Currently the Oil and Gas Authority, however, licensing powers for onshore oil and gas in Wales will be devolved to the Welsh Government under the Wales Act 2017.
Local Authority	The Welsh council area in which a UOG development is located – also the Planning Authority.
Oil and Gas UK	The representative body for the UK offshore oil and gas industry
Permeability	A measure of the ability of a rock to allow fluids to pass through it
Sedimentary Rock	A rock generally formed by the deposition of the weathered remains of other rocks or by the deposition of the results of biogenic activity
Shale	A fine grained sedimentary rock
Shale Gas	A natural gas found in shale. Can also be referred to as unconventional gas
United Kingdom Onshore Oil and Gas	The representative body for the UK onshore oil and gas industry
Well Integrity	The ability of the well to prevent hydrocarbons or operational fluids leaking into the surrounding environment

B.2 Abbreviation

Abbreviation	Definition
CAR	Water Environment (Controlled Activities) (Scotland) Regulations 2011
CBM	Coalbed methane
CSG	Coal-Seam Gas
EIA	Environmental Impact Assessment
HSE	Health and Safety Executive
NRW	Natural Resources Wales
OGA	Oil and Gas Authority
OGUK	Oil and Gas UK - UK offshore oil and gas industry association
PEDL	Petroleum Exploration and Development Licence
PSB	Public Service Board
SEPA	Scottish Environment Protection Agency
TCPA	Town and Country Planning Act 1990 (as amended)
UOG	Unconventional Oil and Gas
UKCF	UK Community Foundations
UKOOG	UK Onshore Oil and Gas - representative body for the UK onshore oil & gas industry

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