

Impacts of the exploration for and extraction of unconventional oil and gas on water and waste water service providers

Water UK and its members do not support or oppose the exploitation of unconventional oil and gas. This position paper outlines our understanding of possible impacts on water and waste water services.

As with any activity of this nature there are inherent risks. Evidence suggests that these risks can be mitigated given proper enforcement of regulations, primarily by environmental and health and safety regulators.

Introduction

The UK water industry acknowledges the risks of the country's growing dependence on imported gas and recognises the arguments for government policy on the extraction of unconventional oil and gas. The UK water industry also acknowledges that there are inherent risks associated with any activity of this type and scale which need to be fully understood, regulated and mitigated.

A research programme commissioned by the water industry (UKWIR¹) provides more information to water companies on the likely demands for water during the exploration and extraction process; the impacts on water quality arising from chemicals associated with the process as well as the process itself; and the challenges of removing and treating wastewater.

The research concludes that there are inherent risks associated with exploration and extraction of unconventional oil and gas but that with proper regulation these risks can be mitigated.

Regulatory framework

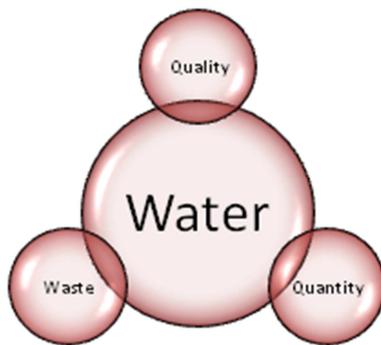
There is a robust framework of planning, environmental permitting and health and safety regulation in place in the UK. A petroleum exploration and development licence (PEDL) is required along with drilling consents, environmental permits and planning permission in order to drill or fracture a shale gas well. This regulatory framework provides a firm foundation from which to manage the possible risks to water from shale gas exploration and production.

Further information on the regulatory frameworks in the UK can be found

on the website of the Office of Unconventional Oil and Gasⁱⁱ.

Risks

The impacts of shale gas on water and waste water service providers can be considered in three broad categories – water quality, water quantity and wastewater management.



1) Water quality

The process poses possible risks to the quality of the water environment, particularly groundwater. Sources of contamination include:

- the surface spillages of chemicals, diesel and other materials at a drilling site;
- poor well design and construction with subsequent failure;
- and the hydraulic fracturing process, including the use of biocides and chemical friction reducers in fracturing fluid.

A 2012 report by the Royal Society and Royal Academy of Engineeringⁱⁱⁱ concludes that risks can be managed given a properly implemented and enforced regulatory framework. In

particular it concludes that the probability of well failure is low if it is designed, constructed and abandoned according to best practice and that the risk of fractures propagating from shale formations to reach overlying aquifers is very low. In addition, chemicals added to the water to enable fracturing to take place (for example biocides and friction reducers) are subject to approval by environmental regulators and should be classified as non-hazardous.

A greater risk would appear to be from surface spillages of chemicals and other materials. It is therefore important that on-site storage of chemicals is managed by proper site practices. The report published by Public Health England^{iv} considers these specific risks and concludes that “*good on-site management and appropriate regulation of all aspects....are essential to minimise the risk to the environment and public health*”.

2) Water quantity

The extraction process uses pressurised water to hydraulically fracture the gas-bearing shale strata. The quantities of water needed to do so vary by site but can reasonably be expected to be in the region of 10 to 20 Ml per fracture. Such as demand, whilst not being nationally significant, could have an impact on local water resources.

This demand may be met from a number of sources including from the public water supply, from direct abstraction, from water transported by tanker from other areas or from recycling and reuse of treated flowback or produced water.

The pressure on local water resources will depend in part on the pace and extent of the extraction process, although the potential to reclaim and reuse large proportions of water from each site promises to reduce the risks to local water resources.

Where water is in short supply there may not be enough available from public water supplies or the environment to meet the requirements for hydraulic fracturing. Oil and gas operators are therefore encouraged to engage with water companies as early as possible to ensure their needs can be met without reducing the security of supply to existing customers.

3) Wastewater management

Waste water companies may also be asked to accept discharge of effluents recovered from the process for treatment at waste water treatment works. This water will contain a proportion of the fluids used initially to aid fracturing, high concentrations of salinity (TDS) and potentially low amounts of naturally occurring radioactive material (NORM).

The feasibility of treating this water at a municipal wastewater treatment works will depend on the volume and concentration of the wastewater in relation to the size of the treatment works and the concentrations of NORM present.

It is unlikely that the standard wastewater treatment works will be able to manage waste water from unconventional oil and gas.

Engagement and dialogue

The water industry believes that timely and constructive consultation and engagement by operators and regulators is essential to aid planning.

These discussions will be key to understanding water and wastewater services requirements in the short and longer term, as well as helping to identify and resolve potential issues.

Key areas of interest for these discussions will include:

- The extent of baseline monitoring being proposed to assess impacts on the quality and quantity of local water resources;
- Plans relating to site water management, especially in relation to water reuse to improve understanding of local impacts;
- Shale gas company development plans including

scenarios for expansion within a local area and what this means for short and longer term demand for water at specific locations;

- The expected volumes and chemical and biological composition of waste water as well as preferred disposal routes.

This dialogue will allow water and waste water service providers to make informed decisions about potential solutions, as well as risks and any mitigation required, to ensure that the provision of services to shale gas companies does not adversely impact water resources or the natural environment more generally.

Statutory consultees

To reinforce and underpin this dialogue Water UK successfully advised government and devolved

administrations to introduce legislation to make water undertakers in the UK statutory consultees in the planning process for onshore oil and gas exploration and development.

This ensures that water companies receive vital information about proposed extraction sites and gives them time to engage with regulators and gas licence holders to ensure that development plans are fully understood, the associated risks are addressed and that the protection of water resources and the environment are considered as a priority.

Additionally, statutory water companies must be notified if a developer wishes to drill boreholes for groundwater and/or seismicity monitoring utilising their rights under the General Permitted Development Order (as amended) 2015 (England only).

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ⁱ <http://www.ukwir.org/site/web/content/home>

ⁱⁱ <https://www.gov.uk/government/publications/regulatory-roadmap-onshore-oil-and-gas-exploration-in-the-uk-regulation-and-best-practice>

ⁱⁱⁱ http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/projects/shale-gas/2012-06-28-Shale-gas.pdf

^{iv} http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317140158707