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# **EurEau position paper on shale gas**

## **The EU must do more to minimise the impacts on water and waste water services of the exploration for and extraction of unconventional onshore hydrocarbons**

### **Summary**

This paper outlines the EurEau position with respect to the exploration for and extraction of unconventional onshore hydrocarbons (including shale gas). We believe that in order for the safe exploitation of natural resources there must be:

- ~ full consideration given to the protection of drinking water resources, and safe and healthy drinking water supply
- ~ full consideration given to the principles established by the European Commission Recommendation (2014/70/EU) and subsequent assessment
- ~ full, open and transparent engagement between authorities, water and waste water utility operators and oil and gas companies
- ~ consideration given to updating existing legislation to ensure that exploration for and extraction of unconventional onshore hydrocarbons falls under the scope of the Environmental Impact Assessment Directive
- ~ consideration given to existing legislation being revised in a way that onshore hydrocarbons (including shale gas) projects will be covered by the Environmental Liability Directive to assure integrity in the long-term.





## 1. Background: hydraulic fracturing or 'fracking' method

The economic development of unconventional onshore hydrocarbons is increasingly being considered as part of the energy mix for Europe. In many cases, reservoirs of onshore hydrocarbons are located at depths of over 1500 metres and contained within shale formations that require the use of hydraulic fracturing. The artificial fracturing of rocks creates the necessary routes (permeability) for extracting gas or oil.

The method uses water at high pressure to create fractures in the hydrocarbon-bearing rock formation. Along with water, the process introduces suspensions of particulate matter (typically a fine grain sand known as proppant), which are used to ensure that the extracting routes created are retained during the entire extraction phase, and chemicals, to reduce viscosity, reduce friction, act as a biocide and prevent corrosion.

As with any industrial practice, the associated risks need to be assessed. For example, the substances used in fracking fluids may be hazardous to the water environment and human health, and are subject to regulation under chemical and health & safety legislation. Furthermore, methane and higher chain hydrocarbons linked with shale gas exploration and/or extraction may contaminate waters and the atmosphere.

According to the study commissioned by the European Parliament on 'Impacts on shale gas and shale oil extraction on the environment and on human health'<sup>1</sup> and the subsequent Resolution made in 2012<sup>2</sup> it is accepted that these risks exist.

Although water utilities in Europe would not wish to hinder the exploration of new energy sources and subsequently economic development, there is a view that the risks to drinking water resources and waste water treatment processes are real and need to be adequately addressed.

The impact on the environment is potentially wide-ranging and may be also trans-boundary as it affects aquifers as well as surface water and soil contamination caused by chemical substances contained in process water and residual soil.

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<sup>1</sup> Directorate General for Internal Policies, Policy Department Economic and Scientific Policy 'Impacts of shale gas and shale oil extraction on the environment and human health' IP/A/ENVI/ST/2011-07.

<sup>2</sup> European Parliament Resolution of 21 November 2012 on the environmental impacts of shale gas and shale oil extraction activities (2011/2308(INI)).



## 2. Fracking and the protection of drinking water resources

In respect to water resources for the supply of drinking water, the fundamental questions that need to be addressed are:

- ~ Can the risks associated with the exploration and extraction of unconventional hydrocarbon reservoirs be rated as 'controllable'?
- ~ Can the protection of the drinking water resources be guaranteed?
- ~ How are water management issues taken into account during the necessary approval procedures?
- ~ How will the volumes of water needed be accessed within local resource constraints?

## 3. Fracking and waste water treatment

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

The feasibility of treating this water at a municipal WWTP will depend on the volume and concentration of the waste water in relation to the size of the treatment plants and the concentrations of NORM present. Specific licences and permits may be required under national legislation and will be the responsibility of the facility management to arrange.

It is unlikely that the standard WWTP will be able to manage waste water from unconventional oil and gas exploration. Advanced treatment plants or those with larger flows may be able to treat such waste water but utility operators will need to be mindful of other downstream impacts (such as on the disposal of sludge to land).

## 4. Principles for protection of water and waste water services

Current projects in connection with the exploration and development of unconventional natural gas reservoirs are essentially assessed and approved according to mining law. However, as it is stated in the European Parliament study, "existing mining laws in Europe do not take care of the specific aspects of hydraulic fracturing". So to preserve and guarantee water resources, the water protection measures need to be adequately examined in the course of the approval procedures and, if necessary, need to be augmented with legal requirements on the company operating the gas extraction.



The European Commission is assessing whether specific legislation is needed to govern unconventional gas exploration and extraction. It laid out a set of guiding principles in a 2014 Recommendation<sup>3</sup> that it encourages Member States to follow when applying or adapting their legislation to allow for the exploration for and extraction of onshore hydrocarbons.

EurEau considers that the interests of preventive water protection should be incorporated into agreements being developed by Member States by including measures as follows:

- a. The protection of drinking water resources must be given priority over extraction from unconventional onshore hydrocarbon reservoirs.
- b. A risk assessment including an appraisal of the actual situation must be submitted and take public water supply into account as well as the surrounding environment and ecosystem. This must also incorporate a 'summary effect' of possible dangers due to already existing boreholes. An environmental impact assessment, which has so far not been compulsory in mining / environmental law, must therefore become obligatory before the execution of initial exploration and extraction borings can begin.
- c. 'Sensitive areas' should be defined, where the exploration and extraction of unconventional onshore hydrocarbons must not be permitted. Apart from the designated drinking water protection areas and water priority areas, the catchment areas of water abstraction plants must be taken into account and form a priority criteria. It is not enough to limit this to designated protection and priority areas.
- d. Baseline water level and water quality monitoring should be carried out at both regional and local levels for a minimum of 12 months prior to any land-based fracking operations. These should be within the operation zone and include the maximum extent of any horizontally drilled wells, plus a nominal buffer.
- e. Hydraulic short-circuits, such as structural features and those that can occur between separate multi-aquifer formations during boring as well as damage to hydraulically effective geological barriers in the explored reservoir, in particular when applying the hydraulic fracturing method, must be prevented by suitable measures.
- f. The discharge of recovered fluids (flow back and produced waters) in terms of the consents that would be required for environmental disposal must be taken into account. The waste water resulting from the exploration or extraction from unconventional onshore

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<sup>3</sup> European Commission Recommendation of 22 January 2014 on minimum principles for the exploration and production of hydrocarbons (such as shale gas) using high-volume hydraulic fracturing (2014/70/EU).



hydrocarbons reservoirs should always be treated according to the best available techniques for such water. It is unlikely that municipal waste water treatment plants will have the processes or permits to manage such waste so are unlikely to provide a viable option. However due to the potential risks to human health and the environment waste water from the exploration or extraction from unconventional onshore hydrocarbons reservoirs should never be discharged to a municipal sewer. The operator in charge of the exploration or extraction project should in every case be legally responsible for the treatment of the flow back and produced waters.

- g. The potential impacts of seismic activity on water or waste water assets, especially those structures involved with impounding surface waters must be taken into account.
- h. The long-term management of wells after extraction has been completed must be planned for in order to minimise potentially harmful impacts.
- i. An agreement with the responsible authorities must be concluded, with the involvement of water suppliers concerned at all stages of the approval procedure according to mining law. In this regard, the applicant/operating company must set forth information that includes:
  - o how the greatest possible impermeability of boreholes, in particular in aquiferous layers, is guaranteed and how spent boreholes are filled and sealed, so that no contamination of the water-bearing strata from the surface or from below ground can take place at a later stage;
  - o which substances that are hazardous to the water environment and human health are introduced in which quantities into the subsoil;
  - o information on hazardous substances in waste fracking-fluid that may be released from deeper earth layers;
  - o how the recovery of these substances from the subsoil, as well as their necessary disposal, is guaranteed and which quantities will possibly remain in the subsoil;
  - o how monitoring of drinking water resources is ensured during the exploration and extraction phases;
  - o the measures that would be taken in the event of a contamination of drinking water resources;
  - o the treatment methods that are effective in addressing any contamination that may occur;
  - o how the adjustment of claims by the operating company/originator



is ensured;

- which countermeasures are taken to prevent the long-term impairment of the drinking water resources.

## 5. Need for adaptation of the legal framework

The exploration for and extraction of unconventional onshore hydrocarbons is governed under the existing EU regulatory framework by both mining and water legislation. Key to the protection of water and water resources are: Water Framework Directive (2000/60/EC) and the Daughter Directives: Groundwater Directive (2006/118/EC) Substances Directive (2013/39/EC), plus the Drinking Water Directive (98/83/EC), Directive on Environmental Quality Standards (2008/105/EC), Industrial Emissions directive (2010/75/EU), REACH regulation (EC No.1907/2006), Environmental Impact Assessment Directive (85/337/EEC), Directive on Environmental Liability (2004/35/EC).

Furthermore, “regional authorities should possess the right to exclude sensitive areas (e.g. drinking water protection zones) from possible hydraulic fracturing activities”, as stated in the European Parliament report on shale gas. Experiences in other countries, such as the USA, shows that, in practice, accidents may happen.

None of these individual pieces of legislation cover the risks arising from shale gas exploration/extraction specifically. Therefore EurEau welcomes any new, comprehensive legislative framework and/or guidelines from the European Commission to clarify the application of the existing EU legislation on this topic.

The study commissioned by the European Parliament indicates nine major gaps in current EU legislation regarding specific potential risks for the environment, water and human health associated with hydraulic fracturing.

With respect to the Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment (EIA Directive, 85/337/EEC), projects such as the extraction of conventional natural gas are subject to a mandatory environmental impact assessment prior to authorisation. Under the existing directive the exploration for and extraction of unconventional onshore hydrocarbons would not be included as projects requiring a mandatory assessment. Member States may wish to make this a requirement locally. EurEau considers that this should be established at a European level and involve public participation as a mandatory measure for the environmental impact assessment procedure, in order to ensure safe drinking water resources.

To that end, EurEau proposes that the annexes of the EIA Directive be amended at the next opportunity to ensure that exploration for and extraction



of unconventional hydrocarbons (oil and gas) are subject to an environmental impact assessment in accordance with the precautionary principle.

In addition it is necessary to ensure that unconventional gas drilling falls, as a minimum, under the scope of the Environmental Liability Directive (2004/35/EC) to ensure that well integrity is maintained post-extraction.

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## About EurEau

EurEau is the voice of Europe's water sector. We represent drinking and waste water service providers from 29 countries in Europe, from both the private and the public sectors.

Our members are the national associations of water services in Europe. At EurEau, we bring national water professionals together to agree European water industry positions regarding the management of water quality, resource efficiency and access to water for Europe's citizens and businesses. The EurEau secretariat is based in Brussels, from where we coordinate the work of around 150 experts from member organisations and utilities and advocate common positions with EU decision makers.

Our members are fully committed to the continuous supply of clean water and its safe return into the water cycle. We have a role in raising awareness of threats to the water environment. With a direct employment of around 500,000 people, the European water sector makes a significant contribution to the European economy.



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