

Unconventional/Shale Gas & the environment

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EU: Context setting

- **Unconventional gas developments (in particular shale gas) spreading fast to Europe**
- **Economic potentials are yet to be proven, and...**
- **Ongoing activities in EU Member States**
 - Concessions & explorations
 - Varying positions: extremely positive – careful – skeptical
 - Growing public concern in certain EU Member States

Commission's role is...

- **Neither to open nor to close the door to shale gas operations in Europe**
- **To obtain a clear picture on potential risks / impacts**
- **To ensure that hydrocarbons operations comply with all applicable EU legislation and offer a high level of safety for the environment & for humans**

Uncertainties / Information needs

■ Complexity of exploration / extraction processes

- Directional drilling & Hydraulic fracturing
- Fracturing fluids require large quantities of water, chemical substances
- Particular emphasis on cumulative impacts...

■ Understand if technological processes are novel

- Comparison with conventional and small-scale HF processes
- Technological advances vs. current regulations

■ Limited experience in the EU

■ Information asymmetry: private operators - regulators/CAs - public

DG ENV ongoing activities

- **Monitoring of scientific and project developments:** in MS and outside Europe, notably in the US

- **Scientific support:**
 - Desk study on potential risks to the environment and human health; best practices; risk management
 - ECHA: review of selected chemical substances generally used in shale gas operations
 - JRC- medium term: Quantification of water and land impacts of large-scale shale gas development scenarios
 - JRC-longer term considerations: Scientific assessment on LCA basis of the environmental impact of unconventional fossil fuels

- **Legal analysis:**
 - EC on-going assessment of EU environmental Acquis to prevent and eliminate potential risks arising from UG operations

Hydrocarbons & EU environmental Acquis (general overview)

- EU Acquis applies to all hydrocarbons projects
- MS responsible to ensure that existing EU legislation is fully complied with by operators

Principles of EU envt'l legislation

- **EU Regulations have general application, are binding in their entirety, are applicable in all MS**
- **EU Directives are binding for MS and have to be transposed and implemented by them**
- **Generally, EU-Directives define objectives; means are up to MS**
 - Within the framework of EU-legislation MS have to ensure adequate environmental standards
- **MS are free to set more stringent protective measures than required by EU-legislation (TFEU, Art.193)**

Environmental Impact Assessment (EIA Directive 85/337/EC)

- **All projects with significant effects on environment**
 - Natural gas extraction is subject to EIA if daily extraction $> 500,000\text{m}^3$
 - Below this threshold, projects are subject to a “screening procedure” by which MS decide whether an EIA is needed, *inter alia* on the basis of:
 - Project nature, size, location
 - Characteristics of potential impacts, cumulative effects with other projects
 - Precautionary Principle: *in case of doubt as to the absence of significant effects, an EIA should be carried out*

- **Review of EIA-Directive, with proposal to be adopted by mid-2012**

Legislation on Water

■ Obliges MS to:

- Achieve good *chemical and quantitative* status of groundwaters by 2015, prevent and limit inputs of pollutants to groundwater, prevent deterioration of water bodies

■ Water Framework Directive (2000/60/EC)

- “River Basin Management Plans” covering surface and groundwater to be established by Member States and updated every 6 years
- Requirement for surface waters: “good ecological status” (cf. Annex V) and “good chemical status” (compliance with all respective EU standards)
- Prohibition of direct discharges into groundwater (with exemptions i.a. for exploration and exploitation of hydrocarbons provided that environmental objectives for respective groundwater body is not compromised)
- Requirement to monitor groundwater bodies and to reverse any antropogenically induced upward pollution trend

■ Groundwater Directive (2006/118/EC)

- Complements Water Framework Directive
- Requirement to establish groundwater quality standards, carry out pollution trend studies and to reverse pollution trends

Legislation concerning Extractive Industries

■ Mining Waste Directive (2006/21/EC)

- Applies to extractive industries: *all establishments and undertakings engaged in surface or underground extraction of mineral resources for commercial purposes including extraction by drilling boreholes or treatment of the extracted material*
- Extractive waste, defined as wastes which are generated from the prospecting, extraction, treatment and storage and storage of mineral resources and the working of quarries
- Lays down provisions proportionate to risks involved and covering the planning, licensing, operation, closure and after-care of waste facilities (waste heaps and tailings ponds)
- Emphasis on the stability and prevention of water and soil pollution.
- Major accident hazards covered for high-risk facilities other than those covered by Seveso II
- Financial guarantee covering the permit and closure obligations is compulsory before beginning of operations.
- Operators need to develop Waste Management Plan
- Specific requirements for permitting procedures, public participation and transmission of information for projects with transboundary impacts
- Best Available Techniques (BAT) required for permits

Legislation on Chemicals

- **CLP-Regulation (1272/2008/EC) – Classification, Labelling and Packaging of substances and mixtures**
 - Enterprises must classify, label and pack their substances and admixtures before placing them on the market
 - For substances listed in Annex VI, a harmonised EU classification and labelling system applies

- **REACH-Directive (2006/1907/EC) – Registration, Evaluation, Authorisation and Restriction of Chemical Substances**
 - Manufacturers/importers required to gather information on properties of chemical substances and to register them in database run by European Chemicals Agency (ECHA) in Helsinki, and manage any identified risks.
 - ECHA coordinates in-depth evaluations of suspicious chemicals.
 - Progressive substitution of the most dangerous chemicals when suitable alternatives have been identified.
 - 30 Nov. 2010 registration deadline for (i) CRM substances > 1t/year; (ii) R/50/53 substances > 100t/year; (iii) all substances > 1000t/year;

Other legislation

- **Natural 2000 network, Birds Directive, Habitats Directive (1992/43/EC)**
- **Environmental Liability Directive (2004/35/EC)**
- **Seveso II Directive**
- **Legislation on noise applicable to installations**
- **Public access to environmental information (Directive 2003/4/EC)**

Overview on Legislation: http://ec.europa.eu/environment/policies_en.htm

Conclusions...

- **US experience as starting point; consider different EU conditions**
 - Geology, population density, social acceptability, legal framework, etc.
- **Knowledge base needs to be improved**
- **Potential environmental impacts should be taken seriously**
 - Specific impacts need to be carefully assessed
- **EC to monitor closely scientific and project developments to ensure that evt'l Acquis provides a high level of safety to the environment and humans**

Thank you!

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Improving envt'l knowledge base

■ Chemicals: REACH Regulation & ECHA initial review

- ECHA examined Chemical Safety Reports of REACH registration dossiers for a selected number of chemical substances having a high probability to be used in HF processes
- Search based on limited number of keywords (shale, gas, conventional, unconventional, hydrocarbon, recovery)
- Dossiers for the selected substances do not contain references to such keywords

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Chemicals: REACH Regulation and ECHA

■ Implications for selected substances:

- the substances for which registration dossiers have been reviewed by ECHA are not the ones currently used or expected to be used by operators in Europe
- the operators buy the substances from suppliers producing/importing them below the “first registration deadline” threshold
- the use of the selected substances for unconventional gas activities is not identified in the Chemical Safety Assessment (CSA) and the exposure scenarios included in the registration dossiers submitted by the industry to ECHA are incomplete and do not allow operators to take appropriate risk management measures when using the selected substances in their operations.

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■ REACH / ECHA initial review continued

■ REACH obligations for CAs

- Any authorizations given by MS for exploration/production of hydrocarbons must take account of the obligation for substances used in the process (REACH Regulation)
- Operators of hydrocarbons projects using chemicals (e.g. for HF) have the obligation to check whether the chemical additives they intend to use are registered under REACH.

■ REACH obligations for operators

- If chemicals not covered by a registration dossier as regards the specific use, then operators:
 - must notify ECHA and provide relevant information as requested under REACH
 - make the use of the chemicals known to their suppliers in view of updating registration dossiers
 - find a supplier who identifies that specific use in the CSA
 - prepare own chemical safety report
 - find an alternative substance or process and stop using the substance in question

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■ Chemicals: REACH / ECHA implications

- Until any of the above measures are taken, operators are not allowed to use a substance which does not fulfil REACH requirements in their activities

■ Selected substances for initial review

- methanol
- distillates (petroleum), hydrotreated light
- glutaraldehyde
- hydrochloric acid
- polyacrylamide
- isopropyl alcohol
- ethylene glycol monobutyl ether
- ethylene glycol
- sodium hydroxide