Regulatory provisions governing key aspects of unconventional gas extraction in Spain

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1 GENERAL BACKGROUND INFORMATION ON UNCONVENTIONAL GAS EXTRACTION IN SPAIN

Potential resources for unconventional gas extraction

Although reserves of unconventional gas in Spain have been found mainly in the Basque Country and Cantabria, the level of resources and their location for unconventional gas in Spain have not been fully determined yet. According to the Council of Mining Engineers, the estimated reserves of natural gas trapped in shale rock are about 1.4 trillion cubic meters which correspond to 39 years of domestic demand1. Prospecting for unconventional gas resources has increased due to high oil prices also favored by an attractive gas tax in Spain. Currently requests for investigation permits and exploratory drilling works have been submitted in Cantabria and the Basque Country but also in Aragón, Andalucía, Asturias, Castilla-León, Cantabria, Cataluña and Navarra.

Political context and stage of development

The development of unconventional gas activities in Spain is at a preliminary stage, investigating the potential of resources. No drilling has been carried out yet which does not make it possible to talk about commercial exploitation in the short term. Specialized companies based in America or Canada are looking to expand their markets in Spain and current investigation permits that have been awarded involved both national and international companies such as Repsol, Trofagas Hydrocarbons, a wholly owned subsidiary of BNK Petroleum, and the Hydrocarbon Society of Euskadi, Petroleum Oil & Gas España, S.A. Northern Petroleum Exploration Limited, Montero Energy and Frontera Energy. For example a consortium has been formed by Cambria Europe 20% (Spanish branch of True Oil LLC), and US HEYCO’s Energy Spain (Petrichor Euskadi) 36% as part of a joint venture with the Hydrocarbon Society of Euskadi “SHESA” to explore the potential of the Valmaseda Formation (Cantabrian basin) up to 4,000 meters thick.

The Spanish Minister of Energy has stated recently that Spain will continue granting investigation permits provided that the conditions and environmental safeguards established under law are complied with. However, not a single authorisation for individual well drilling or fracturing has been granted yet. The legal framework that would be applicable to unconventional hydrocarbon is not clear and the Minister acknowledged the need for new legislative proposals.

General legislative context

To date, Spain does not have specific legislation to regulate unconventional gas operations but existing legislation for conventional sources of energy has the potential to cover different aspects of unconventional gas extraction. However, the lack of precise reference to unconventional gas in the existing legislation leads to legal uncertainty and a discrentional application of environmental and health protection measures.

The Royal Legislative Decree 1/2008 modified by Law 6/2010 of 24 March on Environmental Impact Assessment for projects does not refer specifically to unconventional gas activities and follows literally the Directive requiring screening for deep drillings and an EIA for exploitation for commercial purposes referring to the same production threshold of 500,000 cubic meters/day. Under this legal framework it is not clear whether an environmental impact assessment will be always carried out for unconventional gas activities as deep drilling is not defined. The result of the screening might not require an EIA and the production threshold for EIA might not be reached by an unconventional gas exploitation. It is not clear whether the EIA is required for the individual well or for a whole

installation covering a site with several wells. In this situation, a decision taken by the Ministry of Environment in 2011 on one of the projects for drilling unconventional gas did not require full impact assessment.

In January 2012, the House of Representatives urged the Spanish Government to put on hold any projects for drilling and prospecting hydrocarbons and to make them subject to an environmental impact assessment in pursuance of the Law on Environmental Impact Assessment. Between October 2012 and January 2013 the Ministry of Environment communicated to the energy companies that all the wells (both conventional and unconventional) involving hydraulic fracturing have to be subject to a full Environmental Impact Assessment. The requirement of commercial purpose which in principle excludes EIA for exploration permits, has been interpreted by the Ministry of Environment to require an EIA for all projects involving hydraulic fracturing as it was considered that the high level of investment in these projects indicated their commercial purpose. A new draft bill has been adopted by the Council of Ministers on 15th of March 2013 amending the Law on Environmental Impact Assessment and introducing unconventional hydrocarbon activities involving hydraulic fracturing in Annex I listing the activities requiring a mandatory EIA.

At present, the Law 34/1998, on the hydrocarbon sector and the Regulation on the exploration and exploitation of hydrocarbons approved by Royal Decree 2362/1976 set up the rules for the permitting procedures and differentiates between investigation (exploration) and exploitation activities. However the legal basis for the authorisation of individual works for drilling is not clear, the requirements are not explicitly set up in the legislation and there is no reference to hydraulic fracturing. The draft bill adopted on 15th of March introduces unconventional gas extraction involving hydraulic fracturing within the scope of the current legal framework regulating hydrocarbons in Spain. The current proposal has not been published at the time of drafting this report and therefore, the implications of the introduction of hydraulic fracturing in the scope of the legislation cannot be defined.

It is worth mentioning that Spain has a very convenient tax regime in order to render the investments in this field more profitable and secure energy supply for a country with a net energy import dependency (over consumption) of about 75%, 100% over oil and gas. The tax system for the hydrocarbon sector establishes a reduction in the general 35% taxable income applicable to corporate entities by applying a depletion factor.

Concerns in Spain are coming from different stakeholders mainly at the regional level and had led to the development of proposals for the adoption of a moratorium in Aragón which was rejected in February 2013. Similarly the government of Cantabria has published on 27 October 2012 a proposal for the adoption of a law prohibiting hydraulic fracturing. The proposal has not been adopted at the time of drafting this report.
2 PRIOR TO DEVELOPMENT PHASE

2.1 Site identification and preparation phase

Key findings:

- There is no specific legislation regulating unconventional gas activities. The permitting procedure follows the legislation applied to hydrocarbon exploration and exploitation activities which are regulated by Law 34/1998 of 7 October of the Hydrocarbon Sector amended by Law 12/2007. The new draft bill adopted by the Council of Ministers on 15th of March 2013 introduces the hydraulic fracturing in the scope of the Law 34/1998\(^7\). However by the time of drafting this report, no text has been published yet.

- Throughout the duration of the exploration permit (five or six years) the drilling of each well will be subject to a specific procedure requiring the submission of a request for authorisation of works (autorización de trabajos o de sondeos). However, the legal basis for these authorisations of works for individual wells is not clear and the legal provisions do not explicitly refer to the documents that should be submitted by the operator to the authorities.

- Prior to the start of the work for exploration or exploitation activities, a civil liability insurance is required to respond for any damages to people or goods as a consequence of the activities developed. Operators requesting exploration permits or exploitation concessions are required to submit a financial guarantee to secure fulfilment of the obligations deriving from the permits.

- The operator holding a prospection authorisation, exploration permit or exploitation concession has the obligation to provide information to the authorities regarding the characteristics of the deposit and the works to be undertaken. The law considers the information submitted confidential during the whole period covered by the permit or concession. However this confidential character applies while respecting the obligation to disclose information related to environmental matters.

- Public participation is linked to the Environmental Impact Assessment and pollution control permit and thus, subject to the legal limitations in this area.

- The provision in the Law 34/1998 regarding the planning in the hydrocarbon sector has not been used to justify a Strategic Environmental Assessment of unconventional gas activities.

- The Royal Legislative Decree 1/2008 of 11 January requires an environmental impact assessment (EIA) of Annex I projects which, inter alia, include extraction of more than 500,000 cubic meters/day of oil and natural gas for commercial purposes. It requires screening for deep drilling. This legislation does not refer to unconventional gas or hydraulic fracturing. However, recently in 2012 the State Authorities have taken a decision to require a full EIA for all unconventional gas exploration projects involving hydraulic fracturing.

- The legal uncertainty regarding EIA for unconventional gas projects is meant to be closed by the new draft bill that has been adopted on Friday 15th of March by the Council of Ministers and has been submitted to the Parliament. It requires an EIA for unconventional hydrocarbon activities involving hydraulic fracturing, introducing them in Annex I of Royal Legislative Decree 1/2008.

2.1.1 General description of key legal requirements

Article 149.1.13 and 25 of the CE determine the competence of the State for planning economic activities and for establishing the basis of the mining and energy regime. Therefore the implementation and further development of the basic legislation on mining and energy regime falls within the competences of the CCAA. Furthermore, under Article 148.1.13 the CCAA have

\(^7\) http://www.lamoncloa.gob.es/ConsejoRedeMinistros/Referencias/_2013/refc20130315.htm
competences to promote the economic development of the region within the national economic policy objectives. Regarding environmental policy, Article 149.1.23 CE provides for the exclusive competence of the Spanish Central State to approve basic legislation for environmental protection without detriment to the competence of the Autonomous Communities to establish additional protection measures and/or measures developing the state basic legislation. Article 148.1.9 CE provides that competence on environmental management can be attributed to CCAA.

There is no specific legislation regulating unconventional gas activities. The permitting procedure follows the legislation applied to hydrocarbon exploration and exploitation activities which are regulated by Law 34/1998 of 7 October of the Hydrocarbon Sector amended by Law 12/2007. The new draft bill adopted by the Council of Ministers on 15th of March 2013 introduces hydraulic fracturing in the scope of the Law 34/1998. However by the time of drafting this report, no text has been published yet. The provisions of the Regulation on exploration, investigation and exploitation of hydrocarbons (prospection, exploration and exploitation of hydrocarbons) adopted through the Royal Decree 2362/1976 of 30 July are in force as far as they do not contradict the Hydrocarbons Act and until specific regulations developing that Act are adopted. The Regulations developing the Act have not been adopted yet at the time of drafting this report.

The Law 34/1998 and the Royal Decree 2362/1976 defines the procedures and requirements needed for authorisations and concessions for the exploration and exploitation of hydrocarbons, including underground storage. Authorisations and permits shall be awarded in accordance with the principles of objectivity, transparency and non-discrimination (Art 8(1) of the Law 34/1998) and should only be granted to commercial companies with technical and financial capacity and whose objectives in their statutes include exploration, exploitation and underground storage of hydrocarbons (Art 8(2 of the Law 34/1998)). These activities can be carried out by any public or private body, national and foreigner, by obtaining the corresponding authorisations, permits and concessions.

Procedures for prospection, exploration and exploitation projects of unconventional gas are governed by the same rules applied to conventional gas (and oil). Article 9 of Law 34/1998 distinguishes between exploration authorisation/license and research permit and exploitation concession.

The autorizaciones de exploración (prospection authorisations) grants the holder the authority to carry out exploration work in free areas, meaning those geographical areas where neither exploration permit nor mining concession is currently in force. These prospection activities include geophysical work or other work that does not include any deep drilling, this is to say, more than 300 metres (Article 12 Royal Decree 2362/1976). Operators carrying out this type of activities are generally multi-client companies offering information on sites. They are required to present to the competent authorities a prospection programme including the techniques to be used and the measures planned for ensuring the protection of the environment.

The permisos de investigación (exploration permits) entitles the holder to investigate, on an exclusive basis and within the granted area, the existence of hydrocarbons under the conditions set forth by law and by the previously approved exploration plan during a period of up to 6 years, which can be exceptionally extended for three more years. The granting of an exploration permit confers upon the holder the exclusive right to obtain mining concessions at any time during the term of the permit and within the same area, as long as they fulfil the required conditions for it. The prospection authorisations and exploration permits are issued by the autonomous community whose territory is affected by the request. If it affects the territory of several CCAA the authorisation is granted by the General State Administration.

The operator is required to submit a specific exploration programme describing the work to be done,

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8 http://www.lamoncloa.gob.es/ConsejodeMinistros/Referencias/_2013/refc20130315.htm
9 Second Transitional Provision of Law 34/1998, of 7 October
an investment plan, the environmental protection measures and restoration plan and a financial guarantee.

The approval of these exploration permits does not include express authorisation for each work referred to in the program. Conducting exploratory drilling requires individualised authorisation proceedings, so throughout the duration of the exploration permit (five or six years) the drilling of each well will be subject to specific procedure including the submission of a request for authorisation of works (autorización de trabajos o de sondeos) accompanied of the technical description of the project, environmental impact assessment and a plan for security and health requirements. However, the legal basis for these authorisations of works for individual wells is not very clear as it refers to “authorisations, permits and concessions covered by this Act shall be without prejudice to any other authorisations that might be required by the works, construction and facilities needed to implement them for reasons relating to taxation, spatial management and urban development, environmental protection or living marine resources protection, or as required by the corresponding industry legislation or the safety of people and property” (emphasis added). Furthermore under Article 28 of Royal Decree 2362/1976 when the permit holder wishes to exercise a right to drill a well, the operator shall inform in writing to the competent authorities, sending at least one month prior to starting the works, the implementation report describing the well, location, depth for drilling, equipment to be used, casing foreseen, objectives and budget. These legal provisions do not explicitly refer to the documents and information to be submitted by the operator to the authorities, in relation to the assessment of the environmental impacts.

This legal uncertainty provides for flexibility for the competent authorities to define the requirements for each project request on an ad hoc basis depending on the characteristics of the works to be done.

Article 3(3)c) of the Law 34/1998 declares that it is competence of the Autonomous Communities to grant prospection authorisations and exploration permits that have an impact in their territory. However, exploration permits and authorisations for works are granted by the Ministry of Industry when they concern the territory of several Autonomous Communities.

Article 3(2) of Law 34/1998 recognises the competence of the General State Administration (Ministry of Industry, Energy and Tourism) to grant exploitation concessions through the adoption of a Royal Decree provided a favourable report from the autonomous communities affected. The Directorate General (DG) of Industry, Energy and Tourism manages the registry of the requests for exploration/research and for the exploitation concessions.

The exploitation concession enables the commercial company to carry out activities for the exploitation of the resources through their extraction, the use of structures and will have the right to pertinent authorisations for the construction and use of installations needed for such activity provided that they comply with the applicable legislation. The right to carry out the exploitation would have a validity of 30 years that can be prolonged twice for periods of 10 years. Finally the Act provides that the termination of a mining concession will imply that the exploitation will immediately revert to the State which may require the company to dismantle the facilities.

Operators requesting an exploitation concession are due to provide technical specifications detailing the position, area extension and technical data on the concession in support of their application. They also need to provide general mining development plan and investment programme, estimates of production profile and a plan to decommission and abandon the facilities once the concession has concluded as well as the plan to restore the environment once the concession is concluded. The environmental impact study is required for hydrocarbon extraction under certain criteria according to EIA legislation (see below). An insurance guarantee covering all requested obligations is also

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10 Article 6 Law 34/1998 and Article 5(4) Regulation adopted through Royal Decree 2362/1976
11 Article 3(2)a) of the Law 34/1998
mandatory. This guarantee is intended to secure fulfilment of legal obligations.

Under Article 17(2) of Law 34/1998, within 2 months from the date of the publication of the request for concession in the BOE, any competing company may present an offer and anyone may submit comments opposing the project. Once the exploration activity under permit has concluded, the contracting company can abandon the exploration programme or apply for the appropriate operating licence.

As stated before, the concessions are without prejudice to any other authorisations that might be required by the works, construction and facilities needed to implement them for reasons relating to taxation, spatial planning and urban development, environmental protection, industry legislation or the safety of people and property. Under this basis, authorisations for works may be requested. The legislation refers to the implementation report to be submitted for drilling (Article 35 Royal Decree 2362/1976) but it does not include any related to environmental impacts. Further to the implementation report for individual works, under Article 25(3) of Law 34/1998, three months prior to the start of each calendar year, the concession holder has to submit to the Ministry of Industry, Energy and Tourism an annual work plan in keeping with the mining development plan in effect at the time in question.

Financial guarantee

- Under Article 9(4) of the Law 34/98 the operator is required to provide, prior to the start of the work for prospection, exploration or exploitation activities, a civil liability insurance to respond for any damages to people or goods as a consequence of the activities developed. Civil liability is linked to reasons of non-compliance with obligations, fault, negligence or intent. The definition of the amount required is not regulated and therefore the amounts are established ad hoc.

- This insurance might cumulate with the insurance covered under the Law 26/2007 on environmental liability to cover damages caused by strict responsibility (negligence, fault) during the development of activities listed under Annex III such as those requiring IPPC permit, discharges to groundwater subject to permits, discharges or injections of pollutants to groundwater subject to permits or the management of mining waste.

- Under Article 21 of Law 34/98 operators requesting the exploration permit are required to provide a financial guarantee (in the format a bank guarantee or in cash). The guarantee is linked to the obligations required under the permits regarding the investments, fiscal, social security and restoration obligations. The amount of the guarantee is fixed regulatory and should cover all obligations, being updated regularly to cover new permits or concessions granted. In the case of non-fulfilment of the investment commitment or any other obligation, the guarantee will be executed. However, contrary to this provision, the amount of the guarantee has not been fixed regulatory and is determined ad hoc according to the number of hectares involved in the request.

- Operators requesting exploitation concessions are required to submit a financial guarantee to secure fulfilment of investments, taxation, Social Security, decommissioning and restoration obligations and any other obligations deriving from the exploitation concession. Article 27 of the Law 34/98 requires the guarantee to cover the investment plan, fiscal, social security, dismantling and restoration obligations and any other requirements established by the concession. The definition of the amounts for the guarantee has not been subject to regulation yet and therefore it is determined on the basis of a fixed amount per hectare.

- **Access to information and Public Participation**

Article 12 of the Law 34/1998 establishes the obligation on the operator holding a prospection

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12 Article 6 Law 34/1998 and Article 5(4) Regulation adopted through Royal Decree 2362/1976
authorisation, exploration permit or exploitation concession, to provide information to the authorities regarding the characteristics of the deposit and the works to be undertaken. They also need to provide information on the estimated production and the investments required, the geological and geophysical reports relating to the authorisations, permits and concessions as well as any other information required by regulatory provisions. Furthermore, the technical documentation generated by prospecting programmes in exploration authorisations, research permits or exploitation concessions must be submitted to the Ministry so that it may be added to the Technical file.

This article considers the information submitted confidential during the whole period covered by the permit or concession excepting technical information for statistical purposes such as general information about characteristics of the research, location maps, statistical data of activities, global investment volumes, summary sheets of the explorations including ceilings of formations crossed (Article 11(2)(2) of the Royal Decree 2362/1976 adopting the Regulation developing the law).

This confidential character applies while respecting the obligation to disclose information related to environmental matters under Law 27/2006 regulating the rights of access to information, public participation and access to justice in environmental matters. Article 2(3)h) of the Law 27/2006 considers environmental information any information regarding factors, inter alia, substances, energy, emissions, discharges or waste affecting the environment. Article 7(7) refers to access to the environmental impact assessments. The authorities interviewed confirmed that the document on the environmental impact of the project is not considered confidential. In the current case, information on the characteristics of the reservoir, the geological and geophysical situation of the works to be undertaken, the chemical substances used during the hydraulic fracturing are needed for Environmental Impact Assessments. Disclosure of information on the chemical substances used, after the hydraulic fracturing, could be considered covered under Article 7(5) providing for access to data from the monitoring of activities likely to affect the environment. Monitoring unconventional exploration and exploitation activities is the responsibility of the Ministry of Energy, which would decide on any access to information requests on a case by case basis. It could also decide to disclose this information without request under Article 6 of Law 27/2006 (similar to the Directive).

Under Article 13(2)d) of the Law 27/2006, refusal of access to documents can be justified due to the confidentiality of commercial or industrial information when that confidentiality is recognised by law in order to protect economic interests. As mentioned, the Law 34/98 recognises this character. However it should be interpreted in strict way in relation to environmental information balancing on a case by case basis the public interest of disclosure and legitimate economic interest protected if public access to information were refused (Article 13(4) of Law 27/2006). This exemption cannot be used to refuse access to information related to emissions to the environment.

Public participation is regulated under Articles 16 to 18 of the Law 27/2006. These provisions only refer to public participation in plans and programmes or provisions of general character related to the environment. Public participation regarding projects is required when they are subject to impact assessment under the Royal legislative Decree 1/2008 of 11 January adopting the Spanish Law on the Impact Assessment for projects listed in Annex I (see below). Article 45 of Law 42/2007 requires an evaluation of the impacts of any project likely to affect a Natura 2000 site which is reflected in the Royal Legislative Decree 1/2008. In Spain, a reduced public participation procedure is required for the screening of Annex II projects before a decision on the need for a full environmental impact assessment is adopted. In addition Article 9 of the Royal legislative Decree 1/2008 requires public participation to be carried out for projects requiring the environmental permit related to Law 16/2002 on the integrated prevention and pollution control.

Public participation is therefore linked to the Environmental Impact Assessment and pollution control permit and thus, subject to the legal limitations in this area. A project that is not legally required to be subject to impact assessment or pollution control permit would not follow the public participation procedure. Recently the Spanish Ministry of Environment has communicated to the companies that all
authorisations for drilling wells in which a hydraulic fracturing is involved require full environmental impact assessment, and therefore the public participation will be required. However, the scope of the public participation is defined by the authorities on a case by case basis. Given the uncertainty that these case by case decisions generate, a draft bill amending the Spanish Royal Legislative Decree 1/2008 has been adopted on 15th March by the Council of Ministers\textsuperscript{13} and has been submitted to the Parliament. It amends Annex I of Royal Legislative Decree 1/2008 and requires full environmental impact assessment for all unconventional hydrocarbon projects involving hydraulic fracturing. This law ensures public participation within the scope of the impact assessment of those projects.

Furthermore, the granting of concessions for exploitation under the Law 34/98 on Hydrocarbon sector and permits under the Water Act adopted through Royal Decree 1/2001 are subject to the principles of publicity and therefore both the requests and the decisions are published in the official journal (BOE). This publicity of requests enables a certain degree of participation.

Article 6 of the Royal Decree 975/2009 on mining waste management, refers to the public participation requirements of the impact assessment procedure for those mining exploration or exploitation projects whose permitting procedure requires it. The public information procedure should also apply to the permit for the restoration plan. In the cases where the adoption of the permit for the exploration or the exploitation of geological-mining resources does not require environmental impact assessment, the project should still be subject to public participation in relation to the waste management plan and the document on the prevention policy for serious accidents. For Category A installations defined under Annex II of the Mining Waste Royal Decree 975/2009, the public information/participation procedure is mandatory with regards to the development of the installation external emergency plan.

Spain is Party of the Aarhus Convention which requires in its Article 6 public participation of projects linked to activities listed in Annex I which goes further than the EIA Directive. The Convention’s provisions are part of the Spanish legal system once published in the Official Journal as established by Article 96(1) of the CE and are therefore directly applicable in the Spanish Courts. However, no cases have been registered yet.

2.1.2 Specific requirements above ground

- **Environmental and health information requirements prior to the start of the project (e.g. EIA for exploration and/or extraction/any other national provisions)**

Article 55 of the Law 34/98 requires the respect of the technical, safety and environmental requirements by gas installations. Furthermore, Article 6(2) of Law 34/98 requires the implementation of Law 21/92 on industry for the industrial safety and quality of all the technical and industrial elements used for the facilities covered by Hydrocarbon Law. Furthermore, para 1 of this Article states that the authorizations under the Hydrocarbons legislation are granted without prejudice to other permits required by the works and constructions required by other reasons such as fiscal, landplanning, environmental or health and safety.

As mentioned in previous section, Law 34/98 on Hydrocarbons requires operators requesting a prospection authorisation to submit information on measures planned for ensuring the protection of the environment to be taken prior to the start of the project. The exploration permit requires the holder to submit a specific exploration programme describing the work to be done and the environmental protection measures and restoration plan. Within the permit, authorities require for the drilling of each well a specific authorisation which, in practice, must be accompanied by the environmental impact assessment and a plan on safety and health. Under the current Legislative Decree 1/2008 as modified by law 6/2010 of 24 March, an environmental impact study is required only for hydrocarbon

\textsuperscript{13} http://www.lamoncloa.gob.es/ConsejodeMinistros/Referencias/_2013/refc20130315.htm
extraction for commercial purposes (mainly within exploitation concessions) where the amount extracted surpasses 500,000 cubic meters/day. However the current draft bill requires an environmental impact assessment for all unconventional gas projects involving hydraulic fracturing.

- **Strategic planning**

It is up to the government to exercise the planning powers on hydrocarbons. The Law considers hydrocarbon sector a type of economic activity that it is not subject to mandatory State planning as it is liberalised (Article 2(2) Law 34/1998).

Art 3(1) Law 34/1998 requires the development of an indicative energy (hydrocarbon) plan to be submitted to the Parliament which should take into account the environmental protection criteria informing the activities covered by this law (Art 4(3)h of Law 34/1998). This provision in the Law 34/1998 regarding planning in the hydrocarbon sector has not been used to justify a Strategic Environmental Assessment of unconventional gas activities.

The adoption the energy plan is the same as the plan for the electricity sector. The plan for Spain covering the electricity and gas sectors for the period 2008-2016, was approved in May 2008. It prioritizes the development of electricity generation from renewable energy sources and the construction of pipelines they can cover gas demand for both combined cycle cogeneration to natural gas. The projections of the planning document state that the primary energy consumption in Spain will grow at an average annual rate of 1.4% between 2006 and 2016, reaching a total of 165 million tonnes of oil equivalent (Mtoe) in the last year of period. However, it does not refer to unconventional gas.

A new plan for the electricity and gas sector covering the period 2012 and 2020 has been developed and made subject to environmental impact assessment following the Law 9/2006, of 28 of April, on the evaluation of the impact of certain plans and projects on the environment. However this plan does not refer to unconventional gas or shale gas.

- **Impact assessment**

The Royal Legislative Decree 1/2008 of 11 January adopting the Spanish Law on the Impact Assessment for projects requires an environmental impact assessment of Annex I projects which, inter alia, include projects for the extraction of oil and natural gas for commercial purposes, where the amount extracted by concession is more than 500,000 cubic meters/day for gas or 500 tonnes/day for oil (Group 2 d).

It also requires that projects under Annex II are subject to a screening by the competent authority which would determine whether they should be subject to impact assessment. Annex II projects include:

- Projects related to deep drilling, in particular oil drilling (Group 3 extractive industry, a);
- Industrial installations for the extraction of coal, oil, gas and minerals (Group 3b);
- Storage of natural gas on the ground through tanks of more than 200 tonnes (Group 4e);
- Building pipelines for gas and oil of more than 10 kms (Group 4 d);
- Projects requiring impact assessment by the legislation of the Autonomous Community if justified by the significant effects in the environment (under Group 9n);

However Annex II does not include expressly, seismic campaigns.

The provision of Annex I is clearly aimed at the exploitation of conventional gas, excluding prospection or exploration activities because they are not for commercial purposes. Indeed, under the law 34/98, operators requesting prospection authorisations or exploration permits are not required to
provide an impact assessment. Impact assessment is required when drilling for exploitation of specific well for commercial purposes. The Ministry of Environment has interpreted that the latest requests for exploration works to drill for unconventional gas relate to projects of commercial purpose given the high level of investment required.

Regarding the exploitation of unconventional gas, the AEA Report 2012 on potential risks for the environment and human health from hydrocarbon operations involving hydraulic fracturing clarifies the difference between the level of production of conventional and unconventional wells: “Many more shale gas wells are required for recovery of a given volume of gas than for recovery of the same volume of gas from conventional reservoirs. Of the order of 50 shale gas wells might be needed to recover the same volume of gas as a typical North Sea well”14. As unconventional gas wells might generate lower amount of gas production, the threshold of production levels might exclude such projects from submission to EIA.

However, an EIA is also required under the current Royal Legislative Decree 1/2008 (Annex I) when:

- Environmental permits are required under legislation for water, air, waste; etc.
- The project is located close to a sensitive nature area pursuant to Directive 2009/147/EC (Birds Directive) and Directive 92/43/EEC (Habitats Directive) reflecting Article 45 of the Biodiversity Law 42/2007 requiring an impact assessment of any plan, programme or project that may affect a Natura 2000 site, individually or in combination with other plans or projects.

Certain reports15 refer to experience showing that the general practice, both for conventional and unconventional gas exploration, is that the State Authorities do not require the obligation to pass EIA which, therefore, restricts public participation in the authorisation proceedings.

However, recently the State Authorities have taken a decision to require full environmental impact assessment of unconventional gas exploration projects and thus, have communicated it to the companies involved. The Ministry of Environment considers that all these projects involve deep drilling of high investment costs which indicates commercial purposes. The uncertainty of the impacts and the social reaction are additional factors that contribute to these decisions. It needs to be clarified that some of the requests for authorisation of works within exploration projects do not go to the Ministry of environment but are decided by the competent authorities of the CCAAs. The decisions to request EIA are not based on the EIA law requirements and, thus, are discretionary, generating legal uncertainty. Some examples of decisions from the Ministry of Environment requiring a full impact assessment are:

- Decision of 9 June 2011 concerning a project for drilling one well for the exploration of hydrocarbons, exploration Enara-3 in the territory of Kuartango, Alava, project number 20100432.
- Decision 26 October 2012 concerning a project for drilling one well for hydrocarbon exploration, Nuevo Enara-7 in the territory of Kuartango, Alava, project number 20110233.
- Decision of 21 November 2012 concerning a request for drilling one well for hydrocarbon exploration. Exploration Nuevo Enara-5 in the territory of Vitoria Gasteiz (Alava), project number 20110236.
- Decision of 21 November 2012 concerning a project for drilling two wells for hydrocarbon exploration Enara 1 and Enara 2 in the territory of Vitoria Gasteiz, project number 20110465 MIN.
- Decision of 18 December 2012 concerning a project for drilling one well for the exploration of hydrocarbons, Enara-9 in the territory of Traslaloma, Burgos, project number 20110234.
- Decision of 18 December 2012 concerning a project for drilling one well for the exploration of hydrocarbons, Enara-9 in the territory of Traslaloma, Burgos, project number 20110234.

15 “Spanish Environmental Regulations for the Exploitation of Unconventional Gas” IIMA Consultora S.L, May 2012
Milieu Ltd., Brussels
March 2013

Regulatory provisions on unconventional gas extraction in Member States

- Decision of 7 February 2013 concerning a project for drilling one well for the exploration of hydrocarbons, Espinosa CB-1 in the territory of Espinosa de los Monteros, Burgos, project number 20110470.

- Decision of 7 February 2013 concerning a project for drilling one well for the exploration of hydrocarbons, Angosto-1 in the territory of Espinosa de los Monteros, Merindad de Montija, Burgos, project number 20110467.

It needs to be noted that Enara-4 well is a different case. It is based on a resolution of 22 November 2011 (BOE 8 December 2011) concerning a project for drilling one well for the prospection of hydrocarbons, exploration Enara-4 in the territory of Vitoria-Gasteiz, Alava, project number 20100459 and no requirement of a full impact assessment has been included.

All projects subject to these decisions forecast a preparation of the ground, covering it with concrete slab to place the drilling tower of about 40m high. Most projects will use rafts for storing water and sludge but the project involving two wells (Enara-1 and Enara-2) is based on closed system for water treatment without any water and sludge rafts. All projects require improving or building a road to enable access to the platform and drilling space. The wells will reach between 4000 and 5000 m depth and volume of water required is estimated at 3300 cubic meters/well in the first three months for drilling the well hole and 35,000 cubic meters during the two month of hydraulic fracturing for each well production. In most cases the water used will come from close rivers or ground water aquifers. All projects estimate that only 10-11% of the water used will be recuperated and will be re-used, leaving very little need for waste water management which will be in charge to an authorised waste manager. If the results of the exploration were negative the well would be abandoned and sealed. If the exploitation goes ahead, the well would be temporarily abandoned and locked with a safety valve until future works can start.

In all cases the Ministry requested further information and analysis of the projects’ impacts on all environmental aspects including the air, water and noise pollution, use of chemicals as well as the effects on biodiversity and landscape. The specific requests are mentioned throughout the text referring to the specific issues.

The above mentioned legal uncertainty regarding the requirement for a full EIA has been recognised in interviews with the representatives of the Ministry of Environment and the Ministry of Energy. For that reason, a draft bill has been adopted on 15th March 2013 by the Council of Ministers amending the Spanish Royal Legislative Decree 1/200816 and has been submitted to the Parliament. It requires by law the development of environmental impact assessment of projects for unconventional hydrocarbon drilling involving hydraulic fracturing, introducing them in Annex I of Royal Legislative Decree 1/2008. Furthermore hydraulic fracturing will be explicitly included in the scope of the Law 34/1998 on Hydrocarbon Sector.

- Requirements to avoid/minimise disruptions to land use, biodiversity, community and water stress (in particular for cumulative developments)

Requirements to avoid or minimise disruptions to land use, biodiversity or water stress can be imposed through the permitting procedure on the basis of impact assessments decisions. The recent decisions by the Ministry of Environment requiring full environmental impact assessments for projects requesting authorisation of works within exploration permits refer to all the potential threats and impacts including specifically on the waters, soil, biodiversity and landscape. They require the adoption of measures to reduce, eliminate or compensate them. However they do not refer to specific legislation with requirements to avoid disruptions to land use, biodiversity or water courses. The impact assessments should include estimated consumption of resources including water resources

16 http://www.lamoncloa.gob.es/ConsejodeMinistros/Referencias/_2013/refc20130315.htm
needed for the exploitation of the well and their compliance with the relevant hydrological plans. They should also include an assessment of the cumulative effects with other projects already evaluated and with those currently in evaluation.

All of them raised questions on the direct or indirect effects in the integral cycle of the water streams used as sources for the water needed (Aquifers such as Subijana, Nanclares or Calizas de Losa and rivers such as Alegria, Zadorra, Bayas, Jerea or Salón). In some cases the water streams are sources for wetlands such as Salburua protected under Ramsar and projects may indirectly affect areas part of the Natura 2000 Network or including priority habitats and species link to the river (vison, lutra, avion zapador) protected under the nature conservation legislation. One of the projects may affect an archeological site ("las Quintanas").

Some of these decisions acknowledge the absence of direct impact but refer to the indirect impact of unconventional gas extraction on Natura 2000 sites, Sites of Conservation Importance or sites with priority habitats or habitats hosting protected species (Decision on Project 20110465 MIN ENARA 1 and 2, Decision on Project 2011233 ENARA 7 and Decision 20110263 ENARA 5, all in Alava.

Under Article 5(3) of Law 34/1998 on Hydrocarbon Sector, restrictions derived from land use planning or infrastructure planning can be imposed to exploration and exploitation activities but only if they do not have a generic character and are motivated. This provision does not define what motivated arguments would be considered enough justification. However, it opens the possibility to restrict hydrocarbon activities on the basis of environmental aspects linked to land use and infrastructure planning such as the protection of Natura 2000 sites or the existence of a water stream that could be polluted from the activities.

On that basis Article 3 of the proposal for law prohibiting the use of hydraulic fracturing in Cantabria refers to the law 2/2001 of 25 June on the land use planning and regime of Cantabria and defines as infringement the use of hydraulic fracturing in the region’s territory and therefore subject to sanction. This proposal has not been adopted yet, at the time of drafting this report.

Similarly the proposal for law submitted by the parliamentary group “Izquierda Unida” in Aragon on the prohibition of the use of hydraulic fracturing for unconventional gas exploration and extraction referred to Article 275(b) of the law 3/2009 of 17 June on land use in Aragon which sanctions as an infraction any activity without permit against this law. This proposal was rejected in February 2013.

According to Article 45 of the Law 42/2007 of 13 December, the projects, plans or programmes subject to an assessment of their impact on Natura 2000 sites can only be authorized by the competent authority if they do not damage the integrity of the Natura 2000 site and after being subject to a public consultation procedure.

- Setbacks, zoning restrictions and minimum well spacing requirements. Rules on vehicles and mobile working machines during leveling phase

Article 15 of Law 34/98 and Article 16 of Royal Decree 2362/1976 refer to the minimum and maximum dimension for the exploration permits (10,000 to 100,000 hectares) and Article 26 of the Law 34/98 on Hydrocarbons refers to the minimum dimensions needed for exploitation. They do not include zoning restrictions except to the limitation that wells cannot be located at less than a hundred meters from the boundaries of the exploitation concession (Article 35 RD 2362/1976) Interviews with Energy Ministry refer to the specificities of shale gas activities and the need to include zoning in the authorisations for works under exploration permits but mainly under exploitation concessions which would enable proper planning of the activities in an area according to the situation of each well, take into account the number of wells and their cumulative impact.

17 http://cantabria.es/web/gobierno/detalle/-/journal_content/56_INSTANCE_DETALLE/16323/1782904
Article 97 of the Water Act adopted by Royal Decree 1/2001, prohibits any activity subject to cause contamination or degradation of State public waters and in particular it refers to activities developed in specific protection zones established in the Hydrological plan. Furthermore, Article 99 bis requires the establishment of a registry of the special protection zones under legislation for the protection of superficial or groundwater or the conservation of habitats and species depending directly of water.

2.1.3 Specific requirements below ground

- Requirements for geological characterization survey including risks of geological faults (transport routes), manmade structures (e.g. abandoned wells), seismicity, characteristics of the cap rock

Within the permitting procedure of the projects for which authorisation of works within exploration permits have been requested, the decisions by the Ministry of Environment requesting full Environmental Impact Assessment require operators to provide a detailed geological study identifying potential faults; geotechnical study of the structure and resistance of the rocks to be crossed; study of the hydrodynamic of the aquifers affected directly or indirectly by the projects. They also require injection tests with micro-seismic monitoring prior to fracturing and measures in the well design to prevent possible blowout.

Under Article 25 of the Law 34/98 operators requesting an exploitation concession need to submit:

- A technical report with information on the situation, extension and technical data justifying the concession.
- An exploitation plan, investment plan, environmental impact assessment and estimate of the reserves that could be recovered and expected production profile.
- Plan for dismantling and abandonment of installations as well as the restoration plan, once the exploitation is finalised.

Furthermore, under the second paragraph of this Article 25, the holder of an exploitation concession has to submit to the Ministry of Industry, Energy and Tourism three months prior to the start of the calendar year, an annual work plan in keeping with the mining development plan in effect at the time in question.

Both the technical report and the exploitation plan should have information regarding the geological characterization, including seismicity of the area. Under Article 11 of the Royal Decree 2362/1976 refers to the reports for surveys including the information on the geology, the characteristics of the geological caps crossed and results of production tests. There is no explicit reference to the risks of geological faults but it would be the objective of some of the information and assessments provided. In any case they are not excluded and practice covers these aspects on case by case.

The Royal Decree 975/2009 requires the submission of studies of the area where the mining waste facility will be including the Geological-geotechnical study of the site, the hydro-geological study of the site and the hydrological study of the site. The geological and geotechnical study of the site are required to make sure the field is capable to resist the mechanical and hydraulic requirements imposed by the accumulation of mine tailings. This study should include the characterization of coating materials, with the determination of the parameters of strength and drainage, characterization of the rock mass substrate, defining its lithology, degree of weathering, permeability and bearing capacity, the erosion of soils and the elements needed for planning the final rehabilitation of the land.

Furthermore, under Article 2 of the Royal Decree 975/2009, the geotechnical stability study should include a section devoted to justify the conduct or analysis of seismic effects in order to assess their influence to the stability of the tailings facility. The seismic geological calculations are based on Seismic Resistant Construction Standard.
There is no explicit reference under Law 34/98 on Hydrocarbons to the need for assessing the seismicity related to each well to be exploited. The interviews with the representative of the industry and with the representative of the Ministry of Energy confirm that there are certain requirements to gather information on the general seismology of the area but not monitoring the seismicity prior or during the drilling works.

- Requirements on baseline monitoring prior to drilling or fracturing. (e.g. water quality, air quality, seismicity)

Under the permitting procedure, recent decisions by the Ministry of Environment requesting the environmental impact assessment of the projects mentioned in section 2 (requesting authorisations for works within exploration permits for unconventional gas) do not refer to specific legislation requiring monitoring obligations but include requests to assess the quality of the air around 20 km of the well to be exploited. They require a detailed evaluation of the quality of the surface waters and groundwater prior to extraction project activities to enable an evaluation of the future impact of the projected activities. The decisions require a study of the anticipated potential transport of the toxic substances that will be used in fracturing into the soil or water together with a study of the flows of the superficial waters and groundwater subject to contamination and a study of the protected areas, the habitats of European interest and the protected species in areas close to the project are also requested.

The existing Spanish Law 34/98 on hydrocarbons does not require a specific assessment of the seismicity per drilling project or well. Companies execute geological and seismicity controls of the area in order to provide the general geological information required in the request for exploration permits or exploitation concessions (see article 25 Law 34/98 and Article 11 of Royal Decree 2362/1976).

Royal Decree 1/2001 of 20 July adopting the Water Act establishes environmental and water protection objectives for any water source defined under Article 2 and which are considered State public water. This law is based on hydrological planning with the objective to ensure good status and protection of the waters as well as satisfying water demands. All river basins need to count with a hydrological plan which should be consistent with the national hydrological plan. They are adopted through royal decree and therefore, public and legally binding.

The content of the river basin hydrological plans should include baseline information including the description of the river basin with maps and location boundaries, the inventory of the resources which should include surface and ground water regimes and their basic characteristics of the water quality, description of the uses, pressures and impacts on the quantitative status of the water, point source pollution, a summary of land use, and other significant conditions of human activity as well as the list of environmental objectives for surface water, groundwater and protected areas and the summary of the programs of measures adopted to achieve the objectives including (Article 42):

- Summary of on-water extraction and storage, including records and identify control exceptions;
- A summary of planned controls on point discharges and other activities with an impact on the status of water management including direct and indirect discharges to public water;
- An identification of cases that have authorized direct discharges to groundwater;
- A summary of actions taken on priority substances;
- A summary of the measures taken to prevent or reduce the impact of accidental pollution incidents.

Article 92 of the Water Act 1/2001 requires the public authorities to prevent deterioration, protect and improve the aquatic environment by establishing specific measures to progressively reduce discharges, emissions and losses of priority substances and priority hazardous substances; to ensure the
progressive reduction of pollution of groundwater and prevent further contamination including to avoid any buildup of toxic or hazardous compounds into the ground. For each river basin district, a program of measures needs to be developed to achieve the environmental objectives (Article 93 of the Water Act). This programme of measures are part of the hydrological plan and are based on the studies conducted to determine the characteristics of the river, the impact of human activity on the water, as well as the economic study of water use therein.

All this information could be used as baseline for monitoring the achievement of the protection objectives. However, this information does not address unconventional gas extraction involving hydraulic fracturing and does not impose monitoring obligations on the operators. Competent authorities would take it into account for permitting considerations.

There are no air quality baseline monitoring requirements in the current phase of development of unconventional gas activities. The current works under exploration permit (drilling for exploration) would not reach the threshold under Industrial Emissions (IPPC) or air quality legislation. However, the situation might be different for exploitation and would be addressed, if needed, under the impact assessment and the permitting procedure when the exploitation concession would be requested.

- Requirements for mandatory risk assessment differentiating individual or cumulative risks

The Royal Decree 975/2009 on Mining waste requires the development of an assessment of the risk and impact on human health derived from the deposit of the tailings prior to the start of operations.

Article 97 of the Water Act prohibits any activity likely to cause pollution or degradation of State public water. On that basis, the authorisations or concessions for the use of water or activities affecting a water stream can be subject to limitation through the requirement to adopt the necessary measures to ensure environmental protection.

Thus the granting of licences or permits affecting public waters that could pose risks to the environment require the submission of a report on the possible harmful effects to the environment, which will be forwarded to the relevant environmental agency to decide on corrective measures. These measures are without prejudice of an environmental impact assessment required by law or by the competent environmental body (Article 98 of the Water Act). No other measures requiring risk assessment have been found under other pieces of legislation.

- Any other relevant requirements, including monitoring and reporting requirements and verification requirements

The decisions adopted by the Ministry of Environment mentioned in section 2.1.2 regarding projects for which requests for authorisations have been submitted concerning works within exploration permits for unconventional gas activities, request environmental impact assessments including monitoring programme to detect impacts on aquifers, superficial water courses. Prior to the programme a hydrogeological study of the functioning of the water courses and aquifers should be carried out with samplings taken in specific points with a periodicity of 15 days prior to the start of the activities and every 15 days requiring specific parameters to be measured in order to enable the identification of leakages that might affect the quality of the waters by the changes in the pH.

Article 25 of the Law 34/98 requires an annual plan of the works to be undertaken that should be in consistency with the exploitation plan, to be submitted 3 months prior to the start of every calendar year. Furthermore, according to Article 11 of the Regulation 2362/1976 on hydrocarbons, operators have to submit the annual plan of the exploitation work, a monthly report, an investment report every three months and an annual report. In addition, operators during the drilling or perforation phase are due to submit a weekly report.
Even though there are no legal requirements for assessing seismicity, authorities acknowledged in interviews that it would make sense to monitor seismicity with a view to control the impact of hydraulic fracturing.
3 EXPLORATION AND EXTRACTION PHASE

Key findings:

- Health and Safety requirements are fairly well covered in Spanish legislation. Hydrocarbon legislation refers Law 21/92 of 16 July Industry which covers not only general aspects related to health and safety, but also certain environmental matters (inspectors may close an installation for serious and imminent risk of damage to people or the environment and installations with high potential risk for persons, flora, fauna or environment are required to develop safety plans). Law 31/1995 on the prevention of occupational accidents or hazards requires the operator to adopt a plan for the prevention of such risks. Further regulatory measures define minimum requirements for the protection of the safety and health of workers.

- Specific Health and Safety requirements are based on Royal Decree 863/1985 adopting the Regulation on Basic rules for Security in Mining which applies also to hydrocarbon extraction activities and refers specifically to safety for mine exploitations, groundwater, natural or artificial underground reservoirs, boreholes and drilling and other facilities.

- None of the currently submitted requests for authorisation of works for exploration referred to in Section 2 forecast accumulation of chemicals in the site that would pass the threshold established by the Royal Decree 948/2005 measures to control the major accidents hazards involving dangerous substances and transposing Council Directive 2003/105/EC). However, it might be the case for exploitation projects. Where applicable given the substances used, this legislation requires classified installations to draw safety report, safety management systems, a policy of accident prevention and an internal emergency plan.

- Furthermore, if considered applicable to unconventional gas activities, Royal Decree 975/2009 on mining waste requires a policy for the prevention of major accidents applying in a mining waste facility should be established together with the implementation of a safety management system, an internal emergency plan specifying the measures to be taken at the site and an external emergency plan.

- Legislation setting environmental protection requirements during drilling do not refer specifically to unconventional gas. Hydrocarbons legislation refers mainly to emergency measures and requires the operator when drilling, to take into account all safety standards and measures necessary to prevent discharges or spills of brine, oil or other environmental pollutants. In addition, operators are obliged to notify any normal or exceptional incidences, including the leakage of hydrocarbons to the competent authority (Article 28 Royal Decree 2362/1976). Article 11 of the Regulation 2362/1976 on hydrocarbons, operators have to submit the annual plan of the exploitation work, a monthly report and a weekly report during the drilling. The analysis of seismicity would be required under permitting procedure or before operations under article 24 of Hydrocarbons law or under Royal Decree 975/2009 on mining waste if applicable but it is not a legal requirement during operations.

- Requirements regarding the well and its integrity are mainly based on the general legislation for hydrocarbons which required in its Article 35 during drilling operations, to provide the well with the equipment and materials to prevent eruptions; to protect all strata containing drinking water by casing and cementing the well; to protect the strata containing oil or gas by casing and cementing, to ensure collection of all appropriate geological samples from the hole well being drilled; to perform all appropriate research including electric logs, radioactive, sonic and any other diagraph they might need for the proper understanding of the formations crossed.

- Venting and Flaring are firstly addressed through the Hydrocarbon legislation which requires that any associated gas to the hydrocarbon extraction should be used. If it cannot be used, economically exploited or returned to the ground, it will be destroyed always on the basis of a permit by the DG of Energy where the security measures will be set up. The hydrocarbon legislation requires that any destruction of the gas should follow the rules under legislation on
There is not specific legislation regulating hydraulic fracturing in Spain. However, the draft bill adopted on 15th March by the Council of Ministers proposes the introduction of hydraulic fracturing in the Hydrocarbons Law. Obligations to monitor the effects of hydraulic fracturing do not exist. The existing legislation covering certain aspects such as water abstraction or the discharges (injection) of pollutants or hazardous substances into the water from industrial or other uses can be applied.

Definition of the legislation applicable to all specific aspects of unconventional gas involving hydraulic fracturing such as waste management needs to be clarified. Law 16/2002 on Integrated Prevention and Pollution Control could be applicable if the injection of the fracturing fluid into the reservoir could be considered an activity under the IPPC related to waste management; however, the Spanish law refers only to the recovery of hazardous waste and not to the disposal. The competent authorities interviewed have confirmed that unconventional gas activities in Spain are in an early development stage and the definition of the legislation applied to exploitation still needs to be decided.

The decisions requiring full impact assessments of projects submitted for authorisations of works within unconventional gas exploration permits in the North of Spain (mentioned under Section 2 of this report) request operators to submit information on the treatment systems of mining waste referring expressly to Royal Decree 975/2009. However, representatives from an operator of extractive companies currently requesting few of these permits consider that the Royal Decree 975/2009 is not applicable. The argument put forward is that the waste generated from the hydraulic fracturing is excluded from the scope of this legislation as it does not result “directly” from the extraction regulated by Mining Law but from the fracturing or injection prior to extraction. According to such operators, it would not be qualified as mining waste but as an industrial waste subject to the general legislation on waste Law 22/2011.

The use of chemicals in the fracking fluid is not regulated specifically for unconventional gas activities. Information on the specific chemicals used in the fracturing of a well is not ensured through the REACH Regulation however, within the permitting procedure, decisions of the Ministry of environment in relation to the EIA for the authorisation require operators to provide information on the fracturing fluid used including the concentration levels or quantities of the components.

3.1 General requirements

- Health and Safety measures and reporting of occupational incidents/accidents

In general terms, the Law 21/92 of 16 July Industry is applicable to energy activities and energy products as well as to activities for the exploration and exploitation of mineral or geological resources. Article 3 requires the implementation of industrial safety rules for the prevention and limitation of risks and the protection against accidents in installations or by activities and processes using elements, mechanisms and techniques likely to produce damages to people or the environment.

This law covers not only general aspects related to health and safety, but also certain environmental matters as described under Articles 9 to 12. Specifically, Article 10 of Law 21/92 requires the respect of legal and regulatory safety requirements in the use of equipment, activities and industrial products. In case where inspections would identify deficiencies implying a serious and imminent risk of damage to people or the environment, the competent authority can request the temporal stop (total or partial) of activities.

18 http://www.lamoncloa.gob.es/ConsejodeMinistros/Referencias/_2013/refc20130315.htm
the activity until they are corrected. This is without prejudice of the application of sanctions for any infractions under this law or other measures such as workers law. Article 11 of Law 21/92 requires the development of safety plans for their approval and regular revision by the competent authorities when the installations are classified as installations with high potential risk for persons, flora, fauna or environment.

Article 117 of the Mining Law 22/1973 requires the competent authorities, the Ministry of Industry, to ensure through inspection and monitoring the adoption of policies to prevent occupational accidents and diseases and to promote the compliance with occupational health and safety standards.

Law 31/1995 on the prevention of occupational accidents or hazards requires the operator to adopt a plan, including procedures and resources, for the prevention of occupational risks. Article 20 requires the adoption of emergency measures including first aid, emergency medical care, rescue and firefighting and evacuation of workers. It requires the adoption of measures to ensure the regular monitoring of workers’ health status according to the risks inherent to the type of work. Regular labor inspection of the plans and measures are required and the non-compliance with the rules on risk prevention involving a serious and imminent threat to the safety and health of workers, may require the inspector to order the immediate cessation of the work or the closure of the workplace without prejudice of the payment of wages or compensations or administrative fines. Further regulatory measures defining the minimum requirements for the protection of the safety and health of workers are:

- Royal Decree 1215/1997, of July 18, laying down minimum safety and health requirements for the use of equipment by workers.
- Royal Decree 486/1997, of April 14, laying down minimum safety and health in the workplace.

Specific Health and Safety Requirements

There are no specific Health and Safety Regulations referred to hydrocarbons exploration and production activities, but mining regulations have been extended to subsurface activities and consequently are applicable such as:

- Royal Decree 863/1985 adopting the Regulation on Basic rules for Security in Mining applies also to hydrocarbon extraction activities and refers specifically to safety for mine exploitations, quarries, groundwater, natural or artificial underground reservoirs, boreholes and drilling and other facilities when they apply mining techniques. It requires all mining installations to ensure the maximum level of safety of personnel.
- Complementing the Regulation on Basic rules for Security in Mining, there are Technical Instructions, especially relating to works applicable to drilling. For example the ITC/101/2006 Order regulates the minimum content and structure of the safety and health rules for the extractive industry. Furthermore the Royal Decree 681/2003, adopts rules for the protection of the health and safety of workers at risk from explosive atmospheres in the workplace.

The decisions by the Spanish authorities requiring environmental impact assessments for authorisation of works under an unconventional gas exploration projects require the establishment of external emergency plans. However they do not refer to Royal Decree 948/2005 (or Royal Decree 1254/1999). None of the requests for authorisation of works for exploration include information forecasting accumulation of chemicals in the site that would pass the threshold established by the Royal Decree 948/2005 (modifying Royal Decree 1254/1999 of 16 July approving measures to control the major accidents hazards involving dangerous substances and transposing Council Directive 96/82/EC). However, it might be the case for exploitation projects. Where applicable given the substances used,
this legislation requires classified installations hosting chemicals to draw safety report, safety management systems and a policy of accident prevention. In addition, all installations covered by the Royal Decree 948/2005 (modifying Royal Decree 1254/1999) are required to adopt an internal emergency plan and the competent authorities shall draw an external emergency plan to prevent and mitigate the consequences of an accident. The internal emergency plan should reflect the requirements under Law 31/1995 on the prevention of occupational accidents or hazards.

In situations where the well or the plants foundations have to be prepared in order to accommodate all the equipment for drilling, stimulation or testing, civil works regulations may also be applicable including the Royal Decree 1627/1997 laying down minimum safety and health requirements in construction requiring specific permits for works.

If considered applicable to unconventional gas operations, Article 18(1)b) and 37 of Royal Decree 975/2009 on mining waste require the development of a policy for the prevention of major accidents of mining waste facility together with the implementation of a safety management system, an internal emergency plan specifying the measures to be taken at the site and an external emergency plan addressed to the measure outside the exploitation area. As we have seen in decisions for environmental impact assessment of unconventional gas exploration projects, there are cases where waste from the exploitation of unconventional gas will not be stored in the tailings pond or in tanks but transported for their management and therefore the mining waste legislation would not be applicable. In those cases, Article 7 of the Law 22/2011 on waste requires the adoption of the necessary measures to ensure that waste management is carried out without endangering human health and without harming the environment. However, as all requests for permits consider that only 10% of the flow-back fluid will be emerging to the surface, the fluid remaining underground could have the consideration of mining waste and therefore mining waste legislation could be applicable. The Spanish authorities have not yet decided what would be the applicable legislation at the time of drafting this report.

- Third party evaluation and verification of health and environmental performance

River basin bodies, known as “Confederaciones hidrograficas” are autonomous bodies responsible for the development of river basin hydrological plan and its monitoring and review; the management and control of public waters; the administration and control of the uses of general interest or those affecting more than one region; the issue of licenses and concessions relating to public water and the inspection and enforcement of the terms of concessions and authorizations relating to public waters.

The impact assessments required by the decisions of the Ministry of environment on the authorizations for works within the exploration permits for above mentioned projects (section 2.1.2) request in all cases the establishment of control mechanisms during the whole process with test of the integrity of the pipelines and the well and sealing tests to be carried out regularly by independent actors guaranteeing the integrity of the elements and the absence of breaches.

3.2 Above ground requirements during the exploration and extraction phase

3.2.1 Drilling requirements

- Noise and fumes from engines used for the drilling

With regards to noise, the Law 37/2003 of 17 November on Noise and the Royal Decree 1367/2007 do not impose noise limits for specific activities but requires the authorities to establish strategic noise maps and zoning in order to tackle the problems where maximum noise levels are violated. The noise from vehicles regulated under Decree 1439/1972 does not set noise emission levels but requirements for the new vehicles in the market.
• **Groundwater or other water distance from drilling**

Under the Water Act adopted through the Royal Decree 1/2001, the competent water authorities may adopt a programme regulating the uses and abstraction of groundwater at risk which would include the definition of perimeters for the protection of groundwater bodies which should be reflected in the permit required for authorising water use to infrastructure or facilities that might affect it, without prejudice to any other authorizations required under the sectoral legislation concerned. Such demarcation should be respected the land planning authorities. Furthermore Article 99 bis requires the establishment of a registry of the special protection zones under legislation for the protection of superficial or groundwater or the conservation of habitats and species depending directly of water.

Under Article 5(3) of Law 34/1998 on Hydrocarbon Sector, restrictions derived from land use planning or infrastructure planning can be imposed to exploration and exploitation activities but only if they do not have a generic character and are motivated.

Article 35 of Royal Decree 2362/1976 establishes requirements of distance to buildings, other hydrocarbon production wells, industrial installations or other concessions but no further rules have been identified in relation to conditions or requirements of distance from drilling points to the water streams.

• **Potential risks of induced seismicity(measuring, stopping if needed)**

Within this permitting procedure, further requirements to control all environmental impacts may be included. Additional reporting requirements, can be prescribed in the concession for exploitation on the basis of the environmental impact assessment that would go beyond any legal requirements. For example, we can refer to the decisions by the Ministry of environment requesting the environmental impact assessment of the projects mentioned in section 2 for which requests were submitted for authorisation of works involving drilling within exploration permit of unconventional gas. These decisions include a request to assess during drilling phase the physical and chemical character of the formations crossed by analysing samples obtained. The decisions include request of analysis of specific substances present in the geological formation. The decisions do not refer to existing legislation which might be applicable to justify the requirements imposed.

Prior to operations, under Article 24 of Law 34/98 on Hydrocarbon sector, the operator should submit the technical report and the exploitation plan with information regarding the geological characterization, including seismicity of the area. During drilling, operators are required to ensure collection of all appropriate geological samples from the hole well being drilled. It aims at performing all appropriate research including electric logs, radioactive, sonic and any other diagraph they might need for the proper understanding of the formations crossed. If considered applicable the Royal Decree 975/2009 would require the justification of the analysis of seismic effects and the submission of seismological and earthquake resistance studies of constructions. The seismic geological calculations are based on Seismic Resistant Construction Standard. However, the Spanish legislation does not require the assessment of the seismicity during operations.

• **Emergency measures (including safety plans) and reporting of incidents/accidents**

When drilling, the operator shall take into account all safety standards and measures necessary to prevent discharges or spills of brine, oil or other environmental pollutants. In addition, operators are obliged to notify any normal or exceptional incidences, including the leakage of hydrocarbons to the competent authority (Article 28 Regulation on Hydrocarbons, Royal Decree 2362/1976).

According to article 35 of Royal Decree 2362/1976, operators have to make sure that the drilling equipment and installations are up to date and follow internationally accepted oil and gas mining standards. Furthermore Article 10 of Law 21/92 on Industry requires the respect of legal and
regulatory safety requirements in the use of equipment, activities and industrial products.

- **Any other relevant requirements, including monitoring and reporting requirements**

Further to the requirements under Law 34/1998 prior to operations for the holder of exploration or exploitation permits to submit an assessment of the environmental impacts and environmental management and contingency plans, operators have reporting obligations during drilling and extraction phases. Article 11 of the Regulation 2362/1976 on hydrocarbons, operators have to submit the annual plan of the exploitation work, a monthly report, an investment report every three months and an annual report. In addition, operators during the drilling phase are due to submit a weekly report.

Under Article 31 of the Law 34/1998 on Hydrocarbons sector, the Ministry of Industry and Energy granting an exploration license or research permit may inspect the execution of the activities to control the respect of the obligations and conditions set up in the authorisation.

In Spain Articles 17 and 18 of Law 26/2007 of the environmental liability might apply to extractive industries requiring the operator to apply prevention measures when there is an imminent risk of damage derived from economic activities as well as measures to avoid new damages according to the criteria established in its Annex II. Operators must inform the authorities of the damages or risk of damages and the prevention measures and those adopted to avoid new damages. According to Article 18 of this law, the competent authority may adopt a motivated resolution requiring the operator to adopt in case of threats of damages or of new damages specific prevention or avoidance measures.

### 3.2.2 Well requirements

- **Requirements for the construction of linked infrastructures (e.g. pipelines)**

The decisions by the Ministry of Environment requiring environmental impact assessments prior to granting authorization of works within exploration permits above mentioned (section 2) require the operators to submit a description of all infrastructures needed for the exploration and exploitation activity, including transport, waste management and any auxiliary infrastructure. Operators are required to present the control mechanism established during the whole process including test of the integrity of the pipelines, integrity of the well, cement and casting of well and pipelines as well as sealing tests to be carried out during drilling, fracturing and at the end of the activities. The control mechanisms should be carried out regularly by independent actors. Operators should also submit information on the technique used for fracturing and the control mechanisms during fracturing process. The above mentioned decisions require the development of a monitoring programme including information in case of accidents affecting populations or the environment with evaluation of damages caused, damages in the integrity of the wells and measures to be adopted.

Article 35 of RD 2362/1976 on hydrocarbons includes certain provisions requiring equipment and installations to follow international standards. Article 34 of the Law 22/1973 of Mining recognises operators the possibility to obtain permission to use underground structures. To this end operators shall submit the appropriate application to the Ministry of Industry, Energy and Tourism providing all the necessary documents and the appointment of perimeter protection deemed necessary.

- **Gas leakage and air pollution incl. methane (e.g via venting and flaring)**

The decisions by the Ministry of Environment requiring environmental impact assessments prior to granting authorization of works within exploration permits above mentioned (section 2) do not refer to specific legislation regarding requirements for air pollution or avoidance of gas leakage. However, they request an evaluation of the potential emissions to the atmosphere from motors, flaring and venting, fugitive or diffuse emissions as well as the evaluation of emissions from methane or other greenhouse gases.
In the event of leakage, Article 35 of RD 2362/1976 on hydrocarbons requires the holder of permit or concession to report the leakage to the competent authorities in the Ministry of Industry, Energy and Tourism informing of the causes, the measures taken to control it and an estimate of the gas lost, destroyed or allowed to escape. Similarly any major leaks that may occur in the well head, discharge pipes or tanks shall be reported detailing the location, causes of the incident, measures taken to remedy and amount of gas lost, destroyed or allowed to escape. Under this provision, any associated gas to the hydrocarbon extraction should be used. If it at cannot be used, economically exploited or returned to the ground will be destroyed always on the basis of a permit by the DG of Energy where the security measures will be set up. The hydrocarbon legislation requires that any destruction of the gas should follow the rules under legislation on air quality. However the law does not include any definition of the term “destruction of the gas” which would enable defining the scope of activities allowed for the destruction.

Annex IV of the Law 34/2007 of air quality and protection of the atmosphere recognises the activities gas extraction, fossil fuel extraction and hydrocarbon production as well as and the torches of oil and gas extraction plants as potentially polluting activities of the air quality. Operators of installations where those activities are carried out are required under Article 7 to respect the emission limit values and perform emission controls. Under Article 13 of Law 34/2007, those activities are required to obtain permits establishing the emission limit values, adopting systems for emissions control or measures relating to the operating conditions in situations other than normal which may affect the environment, such as leaks, malfunctions. Inspection measures are defined and carried out by the CCAA. Any infringement of the authorisation regime under Article 13 is considered a very serious infraction which will be sanctioned with fines between 200.001 to 2.000.000 Euros, permanent or temporary closure or termination or suspension of the authorisation. However, the air pollutants listed under Annex I do not include methane or any greenhouse gas.

Installations classified under the IPPC regime are required to obtain a permit defining the conditions and emission limit values to respect and due to avoid pollution to air, water or soil by using the Best Available Technologies. Law 16/2002 of 1 July for the integrated prevention and pollution control is applicable to pollution sources that can be controlled and not to accidental ones. Further it is applicable to installations for the production of fuel gas other than natural gas and LPG as classified installations covered by this Act. However, in Annex I of the law, these installations refer to refineries, thus do not apply to hydrocarbon extraction installations. It would also be difficult to consider them combustion installations or installation for the disposal or recovery of waste or a landfill. Furthermore, the emissions would be accidental and thus, not subject to permits. Under the current terms of the national law, the request for an IPPC permit for methane emissions from an unconventional gas installation in Spain and the applicability of this law is not clear and has not been clarified during the interviews with the authorities who confirmed that the Spanish authorities have not defined an official position.

The Royal Decree 975/2009 on Mining Waste requires the operator to apply the necessary measures in the design and construction of the waste facility to prevent or reduce dust and gas emissions.

This type of installations release methane emissions (a greenhouse gas) regulated under the ETS Directive 2003/87/EC which would require proper monitoring and control. However, the ETS Directive, transposed under Spanish legislation by Law 1/2005 amended by in 2010 does not include unconventional gas extraction in the scope of the Directive (according to the list of Annex I activities). Therefore installations for the extraction of unconventional gas are not required to surrender allowances for every tone of GHG emitted. Currently a gap in legislation might be considered.

- Any other relevant requirements, including monitoring and reporting requirements and emergency measures

As described below.
3.3 Below ground requirements during the exploration and extraction phase

3.3.1 Well integrity (casing and cementing)

- Well design, construction and integrity, on the positioning of the casing and number of casings on the correct choice of cement and its setting time to ensure that wells withstand the cycle of stress during hydraulic fracturing preventing leaks
- Well-integrity tests before (e.g. pre-drilling water well testing) during and after drilling and objectives of such requirements (i.e. workers protection, environmental protection)
- Requirements on emergency, safety plans and measures and reporting of incidents/accidents
- Any other relevant requirements, including monitoring and reporting requirements

No specific legislation applying to well integrity for unconventional gas extraction has been adopted and therefore the legislation on Hydrocarbons would apply. Article 35 RD 2362/1976 on hydrocarbons requires international standards for equipment and installations. It requires all the machinery, equipment and materials used in the course of operations to meet the requirements of safety and efficiency recognized by the oil/gas industry and the Regulations on policy of mining and metallurgy and all complementary rules applicable to them. The same provision requires operators, during drilling operations, to provide the well with the equipment and materials to prevent eruptions; to protect all strata containing drinking water by casing and cementing the well; to protect the strata containing oil or gas by casing and cementing, to ensure collection of all appropriate geological samples from the hole well being drilled; to perform all appropriate research including electric logs, radioactive, sonic and any other diagraph they might need for the proper understanding of the formations crossed. Article 35 requires the owner to install in all production wells surface and underground equipment to

- Properly control production and injection of fluids;
- Allow the measurement of pressure down hole;
- To maintain the security of the site, people and property and prevent environmental pollution.

Furthermore, at least once a year, the operator must monitor the down hole pressure in a sufficient number of surveys in order to obtain information on the average pressure of the well and the reservoir. In wells where abnormal pressure levels would appear, corrective measures must be taken in accordance with the standards of the oil and gas industry.

Under Law 34/1998, prior to drilling, operators must submit request for authorisation of the characteristic of the well construction by the Ministry of Industry, Energy and Trade. The information received through the interviews for this project refers to the application of three layers of steel and two of cement in the exploration projects currently on going or under request. These seem to be the best level of international standards.

The information to be submitted under the EIA procedure includes the characteristics of the well construction as well as the measures to be adopted to ensure the integrity of the well and to avoid migration of gas and fluids to aquifers. They require measures for the control of the integrity of the well in each phase before the continuation of the drilling. However no reference to existing legislation applicable to hydrocarbon exploitation activities is made in these decisions. The impact assessments should include information about the monitoring mechanism established during the whole process including test of the integrity of the well, cement and casing of well as well as sealing tests to be carried out during drilling, fracturing and at the end of the activities. The control mechanisms should be carried out regularly by independent actors guaranteeing the integrity and absence of breaches.

3.3.2 Hydraulic fracturing

- Obligation on the operator to monitor the effects of fracturing operations (e.g. extent of the...
fractures) on the geology of the area

There are no specific monitoring requirements addressed explicitly to hydraulic fracturing in unconventional gas activities to assess its impact on the geology of the area during and after injection.

The Spanish legislation requires an assessment of the geology of the area during the permitting phase. Indeed, when requesting a concession for exploitation Article 24 of Law 34/98 on Hydrocarbon sector, the operator should submit the technical report and the exploitation plan with information regarding the geological characterization, including seismicity of the area. There is no express reference to assessing the risks of geological faults even if they might be considered under the geological characterisation analysis. During drilling, operators are required to ensure collection of all appropriate geological samples from the hole well being drilled; to perform all appropriate research including electric logs, radioactive, sonic and any other diagraph they might need for the proper understanding of the formations crossed. The Spanish legislation does not require the need for assessing the seismicity during operations.

The requirements under the Royal Decree 975/2009 on Mining Waste could be applicable to ensure the well integrity when fracturing and to monitor the situation prior to hydraulic fracturing. The permit for operating these facilities requires the submission of the geological-geotechnical study of the site, the hydro-geological and the hydrological study of the site, including seismological and earthquake resistance studies. These requirements could be applicable if it is considered that the well is a facility for the hydraulic fracturing fluid that remains underground. The geological and geotechnical study of the site should include the characterization of the rock mass substrate, defining its lithology, degree of weathering, permeability and bearing capacity, the erosion of soils and the elements needed for planning the final rehabilitation of the land. The geotechnical stability study should include a section devoted to justify the conduct or analysis of seismic effects in order to assess their influence of this phenomenon in relation to the stability of the facility. However these requirements are not targeting hydraulic fracturing and are not required during operations.

However, the applicability of these provisions has not been confirmed by the competent authorities interviewed arguing that the activities in Spain are in an early stage and definition of the legislation applied to exploitation still needs to be decided.

- Specific requirements applicable to the hydraulic fracturing activity itself

There is not specific legislation regulating hydraulic fracturing in Spain. However the draft bill adopted on 15th March by the Council of Ministers proposes the introduction of hydraulic fracturing in the Hydrocarbons Law. The current Hydrocarbons Law requires in all production wells to have the necessary equipment in the surface or at the bottom to properly control production and injection of fluids, allow the measurement of down hole pressure and maintain the security of the site, people and property and to prevent environmental pollution.

Obligations to monitor the effects of hydraulic fracturing do not exist. The existing legislation covering certain aspects such as water abstraction or the discharges (injection) of pollutants or hazardous substances into the water from industrial or other uses can be applied.

The impact assessments requested in the decisions by the Ministry of environment to be carried out prior to granting authorizations requested for works under exploration of unconventional gas permits (and described under section 2) should include information on the technique intended to be used for fracturing and the control mechanisms during fracturing process.

Law 16/2002 of 1 July as amended in 2011 establishes a system of Integrated Prevention and Pollution
Control of air, water and soil based on the granting of “environmental permit” under certain requirements such as the adoption of preventing measures particularly through the use of best available technologies (BAT). Hydraulic fracturing is a potential cause of water pollution. This law is applicable to facilities or industrial activities within the categories listed in Annex 1, excluding those facilities used for research, development and testing of new products and processes. Annex I does not refer to hydrocarbon exploration or extraction and even less to unconventional gas exploration or extraction in the same way as it refers to the capture and storage of CO₂. In principle, unconventional gas activity does not seem to be covered by the Spanish legislation. The following unlikely options could be considered: the injection of the fracturing fluid into the reservoir could be considered an activity under the IPPC related to waste management, specifically to recovery or disposal of hazardous waste. Secondly, the installation would require an IPPC permit if it were considered similar to an installation for the production of gas, however, this category refers to refineries in the Spanish law. Thirdly, the exploitation of unconventional gas could be considered a combustion installation if unconventional gas, once extracted, would be combusted to generate electricity or heat, (eg. for the treatment of the waste water or fluid from the hydraulic fracturing). Furthermore, the hydraulic fracturing would be an accidental source of pollution rather than a source subject to control and therefore would not be subject to the IPPC Law 16/2002. The Spanish authorities have not defined yet what would be the applicable legislation.

The permit would require the operator to comply with the emission limit values established by law or through regulatory provisions for substances or activities and with conditions established in the permit. The operator would therefore be required to monitor the emissions of methane and other air pollutants, or the emissions into the groundwater or surface water. The operator is required to control the emissions to the limits established as well as inform about any incident or accident which could affect the environment. The Public authorities are required to establish specific systems of inspection and control and a registry or inventory with information on emissions and authorised emission limit values.

However, explicit clarification on the applicability or not of Law 16/2002 would be required. Authorities interviewed acknowledged that the legislation applicable in Spain to regulate and monitor the environmental impact of hydraulic fracturing has not been defined yet given the early development stage of the unconventional gas activities (authorisations for works within exploration permits have been submitted).

**Emergency or safety plans, reporting of incidents/accidents of pollution**

The impact assessments requested by the Ministry of environment regarding projects for exploration of unconventional gas in the North of Spain (described under section 2) request operators to provide an emergency and remediation plan and the development of a monitoring programme which would include information to be provided to the public in case of accident affecting populations, soil, water and any environmental resources and the measures to be taken.

According to Article 28 of Royal Decree 2362/1976 (Hydrocarbons Regulation), when drilling, the operator shall take into account all safety standards and measures necessary to prevent discharges or spills of brine, oil or other environmental pollutants. In addition, operators are obliged to notify any normal or exceptional incidences, including the leakage of hydrocarbons to the competent authority. According to article 35 of Royal Decree 2362/1976, operators have to make sure that the drilling equipment and installations are up to date and follow internationally accepted oil and gas standards.

Royal Decree 948/2005 modifies Royal Decree 1254/1999 of 16 July approving measures to control the major accidents hazards involving dangerous substances and transposing Council Directive 96/82/EC. It covers activities involved in the exploitation (exploration, extraction and processing) of minerals by drilling. It eliminates the previous exemption under Article 4(e) of Royal Decree 1254/1999 excluding from the scope of the law the extractive activities for the exploration and
exploitation of minerals including drilling. It requires operators to develop a safety report when the quantities of dangerous substances exceed the amount specified under Annex I. This safety report should include a policy of accident prevention and a safety management system. The Ministry of Industry, Energy and Tourism could propose minimum requirements for these reports. All installations covered by the Royal Decree 1254/1999 are required under Article 11 to adopt an internal emergency plan and the competent authorities to draw an external emergency plan to prevent and mitigate the consequences of an accident. The internal emergency plan should reflect the requirements under Law 31/1995 on the prevention of occupational accidents or hazards.

However, it is unknown whether the threshold of chemical substances would be reached by the volume of fluid with chemical substances accumulated or coming up as a result of hydraulic fracturing so that a safety report would be required.

The mining waste treatment aspects of the unconventional gas operations could be regulated by Royal Decree 975/2009 on the management of mining waste from extractive industries and the protection and restoration of the land affected by the mining activities as amended by Royal Decree 777/2012. It transposes Directive 2006/21/EC on the management of mining waste from extractive industries and requires the adoption by the operator of all necessary measures to prevent or minimize any adverse effects on the environment and human health derived from research and exploitation of mineral resources. These measures will be based on the best available techniques and includes the management of mining waste and all waste facility including after closure. Article 3 requires also the prevention of major accidents that may occur on the premises, and limitation of their consequences for the environment and human health.

Under this provision the abandonment, dumping or uncontrolled depositing tailings is banned. In order to reduce to a minimum the negative effects caused during the development of exploitation into the environment and the risks of delaying rehabilitation until later stages of it, a restoration plan must be drawn defining rehabilitation phases. In any case, restoration and exploitation plans will be coordinated so that the rehabilitation works are carried out during the performance of the operations.

If applicable, under Article 5 of the Law 16/2002 on Integrated Prevention and Pollution Control, the holders of a permit are required to inform the competent authorities of any incident and accident which could affect the environment.

However, as stated in previous section, explicit clarification on the applicable legislation is required. Authorities interviewed acknowledged that the legislation applicable in Spain to regulate and monitor the environmental impacts of hydraulic fracturing has not been defined yet given the early development stage of the unconventional gas activities.

- Authorization for monitoring, reporting and verification of water abstraction and use during the hydraulic fracturing

Hydraulic fracturing requires considerable levels of water abstraction that need to be regulated. The Water Act adopted through the Royal Decree 1/2001, regulates activities affecting water abstraction and water use as well as discharges. However, there is no explicit reference in the legislation to the abstraction or use of water for hydraulic fracturing or for hydrocarbon extraction.

Article 97 of the Water Act adopted through the Royal Decree 1/2001 prohibits any activity likely to cause pollution or degradation of public water such as those caused by water abstraction. On that basis, the operator needs to obtain an authorisation or permit for the use of water. Any activities affecting a water stream can be subject to limitation through the requirement to adopt the necessary measures to ensure environmental protection. Under article 55 of the Water Act adopted through Royal Decree 1/2001, the holders of administrative permits for the use of water are required to install and maintain appropriate measurement systems to ensure accurate monitoring of the water actually
consumed or used. The obligation to install and keep these measurement systems are addressed to ensure effective control of the water level (linked to abstraction) and the discharges to public waters, the proper planning and management of the water resources and water quality.

This provision requires undertakings providing energy services referred to under Law 34/1998 on the Hydrocarbon sector and the Law 54/1997 on the Electricity Sector, to provide the information that is requested by the River Basin Body in the exercise of its powers in relation with the installed power and energy consumption for groundwater extraction.

Article 57 of the Water Act refers specifically to the use of water captured during mining activities. This provision would apply given the flowback fluid that would include formation waters and the fracturing fluid after injection. Under these provisions, holders of mining exploitations can use exclusively for mining purposes the water captured through the exploitation activities. To this end, the holder is required to obtain the corresponding permit regulated by the provisions of the Water Act. If there are excess of water, the holder of the mining exploitation should inform and make it available to the river basin body which should determine the use or conditions to drain it, with special attention to quality.

- Waste management requirements during hydraulic fracturing including:
  - Treatment of waste water;
  - Wastewater storage (e.g. fluid storage options, freeboard, pit liners);
  - Disposal/re-use;
  - Discharge of wastewater;
  - Monitoring of wastewater transportation;
  - Requirements applying to re-injection of wastewater in geological formations for disposal;
  - Disclosure of the composition of wastewater.

The decisions requiring full impact assessments of projects submitted for authorisations of works within unconventional gas exploration permits in the North of Spain (mentioned under Section 2 of this report) request operators to submit information on the treatment systems of mining waste referring expressly to Royal Decree 975/2009. This option is in line with Commission official position on the legislation applied to unconventional gas exploitation. However the applicability of this legislation has not been confirmed by an official Spanish position. Assuming this is the case, the following requirements would be applicable to hydraulic fracturing in Spain:

Under Article 17 of the Royal Decree 975/2009, the operator is required to conduct a management plan focused on mining waste reduction, treatment, recovery and disposal taking into account the principle of sustainable development. In the mining waste management plan the operator shall ensure that these wastes are managed in a manner not endangering human health and without using processes or methods which could harm the environment and in particular without risk to water, air, soil, fauna and flora, without causing a nuisance through noise or odors and without adversely affecting the countryside or places of special interest represent. It should also include a description of how the environment and human health may be adversely affected by the deposit of mining waste and the preventive measures to be taken to minimize the environmental impact during operation or operation, closure and decommissioning and maintenance and subsequent control of waste facilities.

In addition, the Royal Decree 975/2009 requires the development of an assessment of the risk and impact on human health derived from the deposit of the tailings.

Under Article 18 of Royal Decree 975/2009, operators should submit the construction project and of

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mining waste management plan for the facilities, with special attention to the necessary measures for
the protection of waters and the prevention or minimization of pollution of soil and air. The mining
waste management plans should be accompanied by a study of the conditions of the land that will be
affected by the waste facility. The construction project of a mining facility requires a set of studies and
documents that comprise the definition and design of the facility, the justification of its location,
construction materials, auxiliary works, the technical studies, measures for the implementation and
control of the project, studies of the natural environment, the corrective measures and those to apply
for the purpose of its closure and subsequent maintenance and control.

The construction project should also include an appropriate justification for the location of a mining
waste facility between different alternatives. The choice of the site shall comply with all applicable
legal restrictions in regard to protected areas, the geological, hydrological, hydrogeological, seismic
topographical and geotechnical conditions or the natural drainage in the land to occupy according to
articles 20-24 of the Royal Decree 975/2009 on mining waste. The selection of the site needs to
consider certain factors such as the potential damage to the environment and human health arising
from the choice of site or the distance from a farm.

Further to the requirements on the selection of the site for the establishment of the mining waste
facility, Article 25 of the Royal Decree 975/2009 requires the mining waste facility to be suitably
constructed, in order to ensure its physical stability, to prevent contamination of soil, air, surface water
or groundwater in the short and long term, and to minimize the damage to landscape. The legislation
requires that the document for the design and construction of the waste facility is based on the
following studies:

- Study of the materials used in construction;
- Geotechnical stability studies;
- Seismological studies and earthquake resistance.

The construction project should define the design and structure of the facility, its constituent materials
and specifications such as waterproofing, filters, drains, infrastructure, etc., so as to meet the
conditions required to prevent contamination of soil, air, groundwater or surface water, as well as to
ensure efficient collection of contaminated water as provided for in the authorization of the restoration
plan and to reduce erosion caused by water and abrasion caused by wind as far as it is technically and
economically feasible.

The Royal Decree 975/2009 requires the operator to apply the necessary measures in the design and
construction of the tailings facility to prevent or reduce dust and gas emissions.

Article 32 of the Royal Decree 975/2009 requires the adoption of a plan laying down the appropriate
provisions for monitoring and regular inspection of the tailings facility by competent persons and to
intervene in case of indicating instability or water pollution or soil. For this purpose the operator shall
maintain a registry in place covering the monitoring activities and inspections.

All these requirements would be applicable if considered that the waste is a result of mining and that
the fluid injected and remaining in the installation can only be regulated as a mining waste. However,
representatives from an operator of extractive companies which have requested permits for exploration
works of unconventional gas in the North of Spain consider that the Royal Decree 975/2009 is not
applicable following Article 2(2) of the Waste law 22/2011 which excludes from its scope waste
resulting from the prospecting, the extraction, treatment and storage of mineral resources as well as
quarrying regulated under Royal Decree 975/2009. The argument put forward is that the waste
generated from the hydraulic fracturing is excluded from the scope of this legislation as it does not
result directly from the extraction regulated by Mining Law but from the fracturing or injection prior
to extraction. According to such operators, it would not be qualified as mining waste but as an
industrial waste produced from an industrial activity and therefore subject to the general legislation on
waste or eventually industrial waste water.
If the Waste law were to be applicable, the waste generated from the exploitation of a well would be regularly sent for treatment to a certified waste manager as required by Law 22/2011 on waste. This legislation requires the government to guarantee the rights of access to information and participation on the waste issues according to the provisions of the Law 27/2006. According to Article 17 of Law 22/2011 the operator (producer of waste) should ensure proper treatment of waste by carrying out the treatment of waste itself or ordering the treatment of their waste to an entity or company, registered under the provisions of this Act or by delivering the waste to a public or private waste collection company for its treatment. Documented evidence of those operations need to be provided.

The research undertaken for this project has not provided any evidence that the authorities would be considering the applicability of the Law 16/2002 of 1 July requiring an IPPC or integrated environmental permit. The pollution generated by the injection of the fracturing fluid could be considered an activity under the IPPC related to water or air pollution from persistent hydrocarbons. The permit would require the operator to comply with the emission limit values according to the conditions established in the permit. The operator would therefore be required to monitor the emissions to the air or into the groundwater or surface water and to establish specific systems of inspection and control and a registry or inventory with information on authorised emission limit values. However, explicit clarification on the applicability or not of this law would be required. Authorities interviewed acknowledged that the legislation applicable has not been defined yet. The authorities from the Ministry of Environment and the Ministry of Industry, Energy and Tourism considered that unconventional gas activities in Spain are in an early stage of development and legislation for fracturing has not been defined yet.

The Water Act adopted through the Royal Decree 1/2001, contains provisions regulating discharges. It is unclear whether the legislation is enough to cover the injection of the liquid used for the hydraulic fracturing.

For the purposes of the Water Act, it is prohibited the direct or indirect discharges made directly or indirectly in inland waters and in the rest of the public water, regardless of the method or technique used. The direct or indirect discharge of water and waste products that can contaminate any element of public water is prohibited unless it is in accordance with the prior administrative authorisation. The permit must target the achievement of environmental objectives. The authorisations should be granted taking into account best available techniques, environmental quality standards and emission limits set by regulations. When a permit is granted pollution abatement programs can be included to ensure progressive adaptation of the waste discharged to the limits set up. The authorisation of the water discharge does not exempt from getting any other permits required under other laws applicable to the activity or facility in question (Article 100 Water Act).

When the discharges could lead to contaminating aquifers or groundwater operators the permit or authorisation could only be granted if a hydrological study would show the lack of environmental impact (Article 102 Water Act). Discharges to public water resources are subject to a tax (canon of discharges control) which should be addressed to the protection and improvement of the river basin.

The government, in the scope of its powers, may order the suspension of the activities causing unauthorized discharges and take steps to correct them, without prejudice to any civil, criminal or administrative responsibility in which the operators might have incurred.

Re-injection is not regulated under the Water Act in similar terms as the Water Framework Directive 60/2000/EC. Under Article 54 mining exploitations regulated under mining legislation may use captured water for mining purposes only. To this end, they must request the corresponding permit, in accordance with the provisions of this Act. The reuse of water will require administrative concession as a general rule. Article 109 requires the Government to establish the basic conditions for water reuse, specifying the required quality of the water to be re-used. The holder of the license or authorization shall bear the necessary costs to bring the water that would be reused to the quality requirements.
generally applicable.

- **Obligation on the operator to disclose information on the chemicals contained in the fracturing fluids and requirements (including prohibition) regarding use or non-use of certain chemicals**

The decisions by the Ministry of Environment requiring full impact assessment of projects within exploration permits for which request for authorisation of works were submitted require a study of the anticipated potential transport of the toxic substances that will be used in fracturing into the soil or waters together with a study of the flows of the superficial waters and the groundwater subject to contamination and a study of the protected areas, the habitats of European interest and the protected species in areas close to the project are also requested.

The key issue therefore seems to be the information on the chemicals used in the liquid for hydraulic fracturing. The REACH Regulation 1907/2006 entered directly to be part of the Spanish legal system. Under Article 37(5) of the REACH Regulation 1907/2006, downstream users of chemicals, such as companies using hydraulic fracturing techniques, shall ensure that the chemicals used are registered for their intended use. They must take risk management measures on substances for which data safety sheets are not required. However, these companies are not obliged to communicate the substances used. There is no further legislation in Spain that would go beyond that provision. However the above-mentioned recent decisions (mentioned under section 2.1.2 of this report) on environmental impact assessments required prior to granting permits to projects for unconventional gas exploration and exploitation, request operators to provide the data sheets for each of the substances used and in the cases where this is not required, the information on the substances to be used should be communicated by the provider of the substances to the operator according to Article 32 of REACH Regulation.

Furthermore, the decisions of the Ministry of environment with regards to the authorisation for works requested within exploration permits require in all cases operators to provide information on the fracturing fluid used including the concentration levels or quantities of the components.

The companies composing the platform Shalegas España advertise on their web page that information on the (max. 12) chemicals used in the hydraulic fracturing would be provided to the competent authorities.21

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4 CLOSURE PHASE

Key findings:

- Closure rules are based on the general requirements under the legislation on hydrocarbons.
- Legislation on mining waste contains detailed rules but clarification on its applicability to unconventional gas activities is needed.
- Where inspections of installations would identify deficiencies in implementation of the requirements under the legislation on health and safety for the use of equipment, activities and industrial products or for the prevention of occupational accidents or hazards, involving a serious and imminent threat to the safety and health of workers, the inspector may require to order the immediate cessation of the work or the closure of the workplace.

- Requirements for temporary abandonment/ well idle time
- Requirements to maintain the integrity of the well
- Requirements to dismantle the installations
- Requirements on liability (including for the longer term) and responsibility
- Any other relevant requirements, including monitoring and reporting requirements

Under Article 15 of the Hydrocarbons Law 34/98 the operator requesting an exploration permit needs to submit environmental protection measures and a restoration plan. Similarly, Law 34/98 requires the operator requesting an exploitation concession to submit, prior to the start of the activities, a plan for the restoration of the environment once the concession is concluded. The restoration plan needs to be completed or otherwise, the guarantee would be executed.

The hydrocarbon legislation refer to the closure of the well, the well site, and the installations abandonment, which and must be approved by the competent authorities of the public administration before being executed, following the hydrocarbon's law and more specifically Article 35 1.14 of RD 2362/1976. Under this provision, when a new well is abandoned for technical reasons or for not having found hydrocarbons in commercial quantities, the operator shall take the necessary precautions for sealing it prior to abandonment, according to the principles accepted in the industrial sector and by Government as part of the concession conditions. In the event that the owner decides to abandon a well that has had commercial oil or gas production, or which has been used to stimulate production in other wells, notification to the competent authorities should be submitted describing the intention to leave and reasons and the projected abandonment procedure and observations regarding possibilities of further use including for fresh water abstraction.

Within two months of completion or abandonment of a well or deepening an existing one, the operator shall submit a report of end of exploitation including a summary sheet and a complete Memory of the activity. To ensure compliance with these obligations the guarantee shall be maintained throughout the period of operation, in the proportion corresponding to the surface.

When a concession reverts to the State due to cancellation or termination of operations, all wells and permanent equipment will be for the benefit of the State free of charge except for the main oil and gas pipelines, water treatment facilities, refineries and mobile equipment.

As indicated in section 1, prior to the granting of a license, permit or concession regulated by Law 22/1973, of 21 July, of Mines, the applicant shall submit to the competent authority a restoration plan of the natural area affected by the mining.

Article 15 of Royal Decree 975/2009 regulates the abandonment of the mining waste facility, requiring the submission of an abandonment plan to the competent authority for its approval. The
permanent abandonment of the facility requires the final on-site inspection by the competent authority, within a year, as well as the assessment of all the reports submitted by the operator. The approval should be communicated to the operator after an inspection body certifies that all requirements listed in Annex I have been complied with. The abandonment of a mining waste facility without the authorization by the competent authority would require the operator to take the necessary security measures to protect the safety and interests of third parties, without prejudice of administrative sanctions and responsibility.

Article 33 of the Royal Decree 975/2009 regulates the closure of a mining waste facility as the permanent cessation of the operation of the installation or operation. The operator is required to submit in the construction project of the mining waste facility and in close relation to the rest of the rehabilitation work, a Draft Study or project for the Closure of the facility. It will describe the measures necessary for the rehabilitation of the land and all technical aspects that are useful to provide for the closure.

The closure procedure can only start if all the requirements laid down in the authorization of the restoration plan are complied with and if the competent authority approves the closure. Furthermore, the closure of a mining waste facility requires the competent authority to carry out, within a year, a final on-site inspection, assess all the reports submitted by the operator and communicate to the operator the approval of the closure. In addition, an inspection body has to provide certification of the compliance with Annex III requirements regarding the restoration of the land affected by the waste facility.

The closure authorization by the competent authority does not in any way reduce the responsibilities of the operator regarding the conditions for closure in the authorisation or other legal obligations. The operator shall be responsible for the maintenance, control and corrective measures in the closure and post-closure of the facility required by the competent authority, which must be at least thirty years for facilities of category A mining waste installations.

It has to be noted that all these requirements only apply to the waste facility and not to the whole activity for the unconventional gas exploration and exploitation, unless the well and the whole installation were considered a waste facility (due to the injection of the fracturing liquid which remains under the ground up to 90%).

Article 10 of Law 21/92 requires the respect of legal and regulatory safety requirements in the use of equipment, activities and industrial products. In case where inspections would identify deficiencies implying a risk serious and imminent of damage to people or the environment, the competent authority can request the temporal stop (total or partial) of the activity until they are corrected.

Law 31/1995 on the prevention of occupational accidents or hazards requires the operator to adopt a plan for the prevention of occupational risks including procedures, processes and resources needed to prevent risks in the company. Article 20 requires the adoption of emergency measures including first aid, emergency medical care, rescue and firefighting and evacuation of workers. It requires the adoption of measures to ensure the regular monitoring of workers’ health status according to the risks inherent to the type of work. Regular labor inspection of the plans and measures are required and the non-compliance with the rules on risk prevention involving a serious and imminent threat to the safety and health of workers, may require the inspector to order the immediate cessation of the work or the closure of the workplace without prejudice of the payment of wages or compensations or administrative fines.
5 GENERAL CROSS-CUTTING ENFORCEMENT REGIME

Key findings:

- There is no sanction regime specific to unconventional gas extraction. The system applied for conventional hydrocarbon exploration and extraction applies.
- The complementary regime on environmental liability may be applicable as it is not limited to the activities under Annex III and hydraulic fracturing would not fall within the case of accidents from extractive industries.
- Sanction regime specific to unconventional gas extraction;
- Sanctions including restorative measures and injunctive measures (e.g. suspension of the activity until in conformity) related to non-compliance with permits, concessions, licences or authorizations;
- Civil liability.

There is no sanction regime specific to unconventional gas extraction. The system applied for conventional hydrocarbon exploration and extraction applies.

The liability and compensation regime in Spain is first based on Article 45 of the Spanish Constitution which already refers to the citizens’ right to enjoy a clean environment as a prerequisite for individual development and to the polluter pays principle for repairing the environmental damage (in addition to any criminal or administrative sanctions) applied on those breaching the obligation of rational use of natural resources and nature conservation.

Under the permitting procedure established by Law 34/1998 on Hydrocarbon sector, operators are required by the Ministry of Industry, Energy and Tourism to provide a liability insurance that covers unlimited liability for any damage to people, to property or to the environment, on top of the financial guarantee (See section 2.1.1).

Furthermore Article 109 of Law 34/1998 considers serious breaches for which a penalty of 30,000,000 Euros will be imposed the following actions:

- The performance the activities regulated in this Act or the construction, extension, operation, modification, transfer or closure of facilities affected by such activities without the necessary concession or administrative authorisation, or failure to satisfy the limitations and conditions of such concessions and authorisations whenever people or property are clearly endangered.
- The use of instruments, equipment or elements subject to industrial security without meeting the technical standards and obligations that must be satisfied for security reasons by the equipment and facilities belonging to the activities covered by this Act whenever they might endanger or cause serious damage to people, property or the environment.
- Refusal to accept inspections or checks imposed by regulations or agreed upon in each case by the competent administrative body or any attempt to prevent these inspections.

Spain has a liability regime for hydrocarbons that can overlap and is complemented by a strict liability regime for environmental damages. The Law 26/2007 of 23 October on environmental liability establishes strict liability regime away from the classic civil liability that requires Court intervention to determine whether the requirements of dole/negligence that justify liability exist. Once the responsibility is determined, liability is unlimited, covering all damages up to the total restoration of the natural resources and the services they provide.

The scope of the liability regime is complemented with Article 3 establishing that the Act applies to damages or imminent threats caused by activities listed in Annex III of the Law 26/2007 such as:
• The management of waste from extractive industries, in accordance with Directive 2006/21/EC of 15 March 2011 on the management of waste from extractive industries.
• Installations subject to authorization in accordance with Law 16/2002 of 1 July on Prevention and Control of Pollution.
• Activities and establishments subject to the scope of Royal Decree 1254/1999 of 16 July, approving measures to control the risks inherent in major accidents involving dangerous substances.
• The waste management activities,
• The discharge or injection of pollutants into surface water or groundwater which require a permit, authorization or registration in accordance with Royal Decree 1/2001 of 20 July, adopting the Water Act.
• It does not cover the discharges due to accidents from extractive industries. These activities are not mentioned in Annex III and they do not fall within the activities needing authorisation under Law 16/2002 on integrated pollution prevention and control.

However, the Spanish legislation goes further than the Directive and stipulates that Law 26/2007 on environmental liability also applies to activities not listed under Annex III. Strict liability is applicable to damages caused by activities listed in Annex III and a liability regime based on fault is applied to all environmental damages caused by activities outside those listed in Annex III of the Directive. In addition, it sanctions the lack of prevention and avoidance measures for all damages caused by activities not listed in Annex III regardless whether there is no fault or negligence.

Articles 24 to 26 of the Law 26/2007 on environmental liability, establish that only operators of the activities listed in Annex III are required to provide a financial guarantee to enable them to cope with environmental responsibility inherent to the activity to be developed. The minimum amount to be secured (not limiting the responsibility) shall be determined by the competent authority according to the intensity and extent of the potential damage that can be caused with that activity and according to regulatory criteria.

The guaranteed amount is specifically and exclusively designed to meet the operator's environmental liabilities arising from the economic activity and shall be independent of any other liability, whether criminal, civil or administrative.

The financial guarantee maybe established by different forms as regulated by Article 26 of the Law 26/2007 and which may be alternative or complementary to each other, both in amount and in the facts warranted:

• An insurance policy according to the Law 50/1980 of 8 October, on Insurance Contract, signed with an insurance company authorized to do business in Spain. In this case, correspond to the Insurance Compensation Consortium functions referred to in Article 33.
• A guarantee granted by a financial institution authorized to operate in Spain.
• The constitution of technical reserves by allocating a fund ad hoc realized through financial investments backed by the public sector.

The infringements established by Law 26/2007 are classified as very serious or serious. In the case of very serious infringement according to Article 37, the sanctions established are:

• A fine of EUR 50,001 to 2,000,000.
• Termination or suspension of the authorization to develop the activity for a minimum of one and a maximum of two years.

The sanctions defined in the case of serious offenses are:
• Fine of EUR 10,001 to 50,000.
• Suspension of authorization for a maximum period of one year.

Article 113 of the Water Act adopted by Royal Decree 1/2001, considers administrative offence any actions that cause damage to public water, failure to comply with the conditions imposed in the concessions and authorizations referred to in this Act, without prejudice to its expiration, revocation or suspension, the discharges that may impair water quality made without authorization or failure to comply with the prohibitions laid down in this Act and the opening of wells and the installation on the same instruments for groundwater extraction without previous authorization. Those offenses are statutorily qualified as minor, less serious, severe, or very severe, according to their impact, importance in relation to the safety of persons and goods and the circumstances of responsibility, degree of malice, participation and benefit derived and to the deterioration of the quality of the resource. They may be liable to the following fines:

• Minor offenses, a fine of up to 10,000.00 euros.
• Less serious offenses, a fine of 10,000.01 to 50,000.00 euros.
• Serious offenses, a fine of 50,000.01 to 500,000.00 euros.
• Very serious offenses, a fine of 500,000.01 to 1,000,000.00 euros

Under Article 31 of the Law 16/2002 on integrated prevention and pollution control, the exercise of an activity without the required environmental permit or not complying with the conditions established in it is considered a very serious infraction if the damages to the environment or to the human health were serious. Sanctions may reach up to 2,000,000 Euros. When there is no damage or impact on human health the infractions would be considered serious and the sanctions may be of up to 200,000 Euros.
6 IDENTIFICATION OF POTENTIAL LIMITATIONS AND USEFUL PRACTICES

This section represents the conclusions drawn by the country expert acting on behalf of Milieu Ltd. It is based on her legal research and interviews with relevant stakeholders (see Annex I).

6.1 Prior to development phase

• The permitting procedure

There is no specific permitting procedure for unconventional gas. Information provided by public authorities interviewed recognised that the current system does not take into account the specificities of shale gas extraction. The recently adopted draft bill will include hydrocarbon activities involving hydraulic fracturing within the scope of the Law 34/1998. This draft bill has been adopted by the Council of Ministers held on 15th of March 2013 and will be submitted to the Parliament soon. No written text of the draft bill has been published yet, at the time of drafting this report.

It needs to be highlighted that clarification on the requirements for authorisation of works both for exploration purposes within an exploration permit or for exploitation concession is desirable under the current Spanish legal and regulatory system. The legal basis for authorisations of works under a exploration permit is not very clear as it refers to “authorisations, permits and concessions covered by this Act shall be without prejudice to any other authorisations that might be required by the works, construction and facilities needed to implement them for reasons relating to taxation, spatial management and urban development, environmental protection or living marine resources protection, or as required by the corresponding industry legislation or the safety of people and property” (emphasis added). Furthermore, under Article 28 of Royal Decree 2362/1976, when the permit holder wishes to exercise a right to drill a well, the operator shall inform in writing to the competent authorities, sending at least one month prior to starting the works, the implementation report describing the well, location, depth for drilling, equipment to be used, casing foreseen, objectives and budget. These legal provisions do not explicitly refer to the documents and information to be submitted by the operator to the authorities, in relation to the assessment of the environmental impacts.

For exploitation concessions, legislation refers to the implementation report to be submitted for drilling (Article 35 Royal Decree 2362/1976) but it does not include any related to environmental impacts. Further to the implementation report for individual works, under Article 25(3) of Law 34/1998, three months prior to the start of each calendar year, the concession holder has to submit to the Ministry of Industry, Energy and Tourism an annual work plan in keeping with the mining development plan in effect at the time in question.

This legal uncertainty provides for flexibility for the competent authorities to define the requirements for each project request on an ad hoc basis depending on the characteristics of the works to be done. However, further clarification on the legal basis and the requirements with regards to the impact assessments individually and cumulative with several wells is needed.

Shale gas exploitation requires the drilling of several wells. The current procedure considers each well individually but it is not based on any zoning of the area under consideration and therefore does not guarantee an evaluation of the whole information of the works to be done and does not establish appropriate requirements per zone according to the number of wells, their placement and the specific impacts forecasted. The current procedure responds to the characteristics of hydrocarbon exploitation where the number of wells is more limited. Furthermore, the inspection requirements for hydrocarbon exploitation activities in Spain cannot apply to shale gas projects given the reduced number of wells

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for conventional hydrocarbon exploitation and the use of hydraulic fracturing for unconventional gas activities which would require more regular inspections.

The representatives of the Ministry of Energy confirmed their current consideration to modify or complement the current legislation to properly reflect the specificities of the unconventional gas.

6.2 Operation: Extraction phase

The legislation that would be applicable to installations involved in shale gas extraction activities has not been defined yet and clarification is needed.

- Flaring and Venting

The decisions by the Ministry of Environment requiring environmental impact assessments prior to granting authorization of works within exploration permits above mentioned (section 2) do not refer to specific legislation regarding requirements for air pollution or avoidance of gas leakage. However, they request an evaluation of the potential emissions to the atmosphere from motors, flaring, venting, fugitive or diffuse emissions as well as the evaluation of emissions from methane or other greenhouse gases.

In the event of leakage Article 35 of RD 2362/1976 on hydrocarbons requires the holder of permit or concession to report the leakage to the competent authorities in the Ministry of Industry, Energy and Tourism informing of the causes, the measures taken to control it and an estimate of the gas lost, destroyed or allowed to escape. Similarly any major leaks that may occur in the well head, discharge pipes or tanks shall be reported detailing the location, causes of the incident, measures taken to remedy and amount of gas lost, destroyed or allowed to escape.

Under this provision, any associated gas to the hydrocarbon extraction should be used. If it at cannot be used, economically exploited or returned to the ground will be destroyed on the basis of a permit by the DG of Energy where the security measures will be set up. The hydrocarbon legislation requires that any destruction of the gas should follow the rules under legislation on air quality. However the law does not include any definition of the term “destruction of the gas” which would enable defining the scope of activities allowed for the destruction.

Annex IV of the Law 34/2007 of air quality and protection of the atmosphere recognises the activities gas extraction, fossil fuel extraction and hydrocarbon production as well as the torches of oil and gas extraction plants as potentially polluting activities of the air quality. Operators of installations where those activities are carried out are required under Article 7 to respect the emission limit values and perform emission controls. Under Article 13 of Law 34/2007, those activities are required to obtain permits establishing the emission limit values, adopting systems for emissions control or measures relating to the operating conditions in situations other than normal which may affect the environment, such as leaks, malfunctions. Inspection measures are defined and carried out by the CCAA. Any infringement of the authorisation regime under Article 13 is considered a very serious infraction which will be sanctioned with fines between 200.001 to 2.000.000 Euros, permanent or temporary closure or termination or suspension of the authorisation. However, the air pollutants listed under Annex I do not include methane or any greenhouse gas.

Installations classified under IPPC regime are required to obtain a permit defining the conditions and emission limit values to respect and due to avoid pollution to air, water or soil by using the Best Available Technologies. Law 16/2002 of 1 July for the integrated prevention and pollution control is applicable to pollution sources that can be controlled and not to accidental ones. Further it is applicable to installations for the production of fuel gas other than natural gas and LPG as classified
installations covered by this Act. However, in Annex I of the law, these installations refer to refineries, thus not covered. It would also be difficult to consider them combustion installations or installation for the disposal or recovery of waste or a landfill. Furthermore, the emissions would be accidental and thus, not subject to permits. Under the current terms of the national law the requirement of an IPPC permit for methane emissions from an unconventional gas installation in Spain or the applicability of the industrial emissions legislation is not clear. It has not been clarified during the interviews with the authorities which confirmed that the Spanish authorities have not defined an official position.

The Royal Decree 975/2009 on Mining Waste requires the operator to apply the necessary measures in the design and construction of the facility to prevent or reduce dust and gas emissions.

Unconventional gas extraction installations release methane emissions (a greenhouse gas) regulated under the ETS Directive 2003/87/EC which would require proper monitoring and control. However, the ETS Directive, transposed under Spanish legislation by Law 1/2005 amended by in 2010 does not include unconventional gas extraction in the scope of the Directive (according to the list of Annex I activities). Therefore installations for the extraction of unconventional gas are not required to surrender allowances for every tone of GHG emitted. Currently a gap in legislation might be considered.

- **Well integrity**

  No specific legislation applying to well integrity for unconventional gas extraction has been adopted. However, the legislation on Hydrocarbons would apply and Article 35 RD 2362/1976 on hydrocarbons covers fairly completely the requirements for well integrity. It is complemented with the practice of Environmental Impact Assessment.

- **Hydraulic Fracturing**

  There is no specific legislation regulating hydraulic fracturing in Spain. However the draft bill adopted on 15th March by the Council of Ministers proposes the introduction of hydraulic fracturing in the Hydrocarbons Law. Obligations to monitor the effects of hydraulic fracturing do not exist. The existing legislation covering certain aspects such as water abstraction or the discharges (injection) of pollutants or hazardous substances into the water from industrial or other uses can be applied.

  The impact assessments requested in the decisions by the Ministry of environment to be carried out prior to granting authorizations requested for works under exploration of unconventional gas permits (and described under section 2) should include information on the technique used for fracturing and the control mechanisms during fracturing process.

  Explicit clarification on the applicability of legislation covering specific environmental impacts by unconventional gas extraction involving hydraulic fracturing would be required. Authorities interviewed acknowledged that the legislation applicable has not been defined yet. It is considered that unconventional gas activities in Spain are in an early stage of development and the applicable legislation for fracturing is yet to be confirmed.

  The Spanish legislation requires an assessment of the geology of the area during the permitting phase. Permits under Article 24 of Law 34/98 on Hydrocarbon sector or under the Royal Decree 975/2009 on Mining Waste require the submission of Geological, geotechnical, hydro-geological and hydrological information of the site. However, there are no requirements designed specifically to unconventional gas and hydraulic fracturing in order to monitor the impact of fracturing operations in the geology of the area during and after the injection of the liquid, including monitoring seismic impacts.

  The research undertaken for this project has not provided any evidence that the authorities would be considering the applicability of the Law 16/2002 of 1 July requiring an IPPC or integrated
environmental permit. The pollution generated by the injection of the fracturing fluid could not be treated as a discharge to be controlled but rather as an accidental release to be prevented. Annex I does not refer to hydrocarbon exploration or extraction and even less to unconventional gas exploration or extraction. It does refer to the capture and storage of CO₂. In principle, unconventional gas activity is not explicitly covered by the Spanish legislation and it is unclear what legislation will be applied. The hydraulic fracturing could be considered an activity under the IPPC related to hazardous waste disposal as 90% of the fluid would remain in the ground and 10% of it would flow back (according to operators’ information). Should it apply, the Law 16/2002 would then cover impacts related to the pollution from the injection of the hydraulic fracturing fluid. Law 16/2002 of 1 July as amended in 2011 establishes a system of Integrated Prevention and Pollution Control of air, water and soil based on the granting of “environmental permit” under certain requirements such as the adoption of preventing measures particularly through the use of best available technologies (BAT). However no official position as to the applicability of the Law 16/2002 has been communicated yet.

The permit would require the operator to comply with the emission limit values established by law or through regulatory provisions for substances or activities and with conditions established in the permit. The operator would therefore be required to monitor the emissions of methane and other air pollutants, or the emissions into the groundwater or surface water. The operator is required to control the emissions to the limits established as well as inform about any incident or accident which could affect the environment. The Public authorities are required to establish specific systems of inspection and control and a registry or inventory with information on emissions and authorised emission limit values.

The Water Act requires a permit for the use of the water for hydrocarbon extraction. Under article 55 of the Water Act adopted through Royal Decree 1/2001, the holders of administrative concessions for the use of water are required to install and maintain appropriate measurement systems to ensure accurate evaluation of the water actually consumed or used. The obligation to install and keep these measurement systems are addressed to ensure effective control of the water level (linked to abstraction) and the discharges to public waters, the proper planning and management of the water resources and water quality.

The Water Act adopted through the Royal Decree 1/2001, contains provisions regulating discharges. It is unclear whether the legislation is enough to cover all aspects of injection required for hydraulic fracturing.

For the purposes of the Water Act, it is prohibited the direct or indirect discharges made directly or indirectly in inland waters and in the rest of the public water, regardless of the method or technique used. The direct or indirect discharge of water and waste products that can contaminate any element of public water is prohibited unless it is in accordance with the prior administrative authorisation. The permit must target the achievement of environmental objectives. The authorisations should be granted taking into account best available techniques, environmental quality standards and emission limits set by regulations. When a permit is granted pollution abatement programs can be included to ensure progressive adaptation of the waste discharged to the limits set up. The authorisation of the water discharge does not exempt from getting any other permits required under other laws applicable to the activity or facility in question (Article 100 Water Act).

When the discharges could lead to contaminating aquifers or groundwater operators the permit or authorisation could only be granted if a hydrological study would show the lack of environmental impact (Article 102 Water Act). Discharges to public water resources are subject to a tax (canon of discharges control) which should be addressed to the protection and improvement of the river basin.

The government, in the scope of its powers, may order the suspension of the activities causing unauthorized discharges and take steps to correct them, without prejudice to any civil, criminal or administrative responsibility in which the operators might have incurred.
Re-injection is not regulated under the Water Act in similar terms as the Water Framework Directive 60/2000/EC. Under Article 54 mining exploitations regulated under mining legislation may use capture water for mining purposes only. To this end, they must request the corresponding permit, in accordance with the provisions of this Act. The reuse of water will require administrative concession as a general rule. Article 109 requires the Government to establish the basic conditions for water reuse, specifying the required quality of the water to be re-used. The holder of the license or authorization shall bear the necessary costs to bring the water that would be reused to the quality requirements generally applicable.

Hydraulic fracturing could also be regulated under the Royal Decree 975/2009 on Mining Waste. The decisions requiring full impact assessments of projects submitted for authorisation of works under permits of unconventional gas exploration in the North of Spain (mentioned under Section 2 of this report) request operators to submit information on the treatment systems of mining waste referring expressly to Royal Decree 975/2009. The applicability of the mining waste law to unconventional gas exploitation activities is in line with Commission official position.

However, representatives from an operator of extractive companies which have requested permits for exploration works of unconventional gas in the North of Spain consider that the Royal Decree 975/2009 is not applicable. The argument put forward is that the waste generated from the hydraulic fracturing is excluded from the scope of this legislation as does not result directly from the extraction regulated by Mining Law but from the fracturing or injection prior to extraction. According to such operators, it would not be qualified as mining waste but as an industrial waste produced from an industrial activity and therefore subject to the general legislation on waste or eventually industrial waste water. If the Waste law were to be applicable, the waste generated from the exploitation of a well would be regularly sent for treatment to a certified waste manager as required by Law 22/2011 on waste. This legislation requires the government to guarantee the rights of access to information and participation on the waste issues according to the provisions of the Law 27/2006. According to Article 17 of Law 22/2011 the operator (producer of waste) should ensure proper treatment of waste by carrying out the treatment of waste itself or ordering the treatment of their waste to an entity or company, registered under the provisions of this Act or by delivering the waste to a public or private waste collection company for its treatment. Documented evidence of those operations need to be provided.

However, explicit clarification on the applicability or not of this law would be required. Authorities interviewed acknowledged that the legislation applicable has not been defined yet. The authorities from the Ministry of Environment and the Ministry of Industry, Energy and Tourism considered that unconventional gas activities in Spain are in an early stage of development and legislation for fracturing has not been defined yet.
ANNEX 1 – LIST OF INTERVIEWED STAKEHOLDERS

- EVE / SHESA, (Soc. de Hidrocarburos de Euskadi SA) Basque Oil Company
- Ministry of Industry, Energy and Tourism
- DG Hydrocarbons
- Ministry of Agriculture and Environment
- DG Environmental Impact Assessment

The country report has been submitted to a review by the relevant national authorities.
ANNEX 2 – LIST OF NATIONAL LEGISLATION

In this report we have looked at the following pieces of legislation considered relevant for unconventional gas extraction:\(^{23}\):

On Hydrocarbons:
- Royal Decree 2362/1976 of 30 July, approving Regulation implementing the Law on Research and exploitation of hydrocarbons of 27 June 1974

On Pollution:
- Law 16/2002 of first July on integrated prevention and control of pollution Royal Decree 508/2007, of 20 April, approving the Regulation for the development and implementation of Law 16/2002, of first July on integrated prevention and control of pollution

On Toxic substances:
- Royal Decree 1254/1999 of 16 July approving measures to control the major accidents hazards involving dangerous substances.
- REACH Regulation 1907/2006

On Noise:
- Law 37/2003 of 17 November on Noise
- Royal Decree 1513/2005 of 16 December, which implements the Law 37/2003 of 17 November on noise, in relation to the assessment and management of ambient noise
  - Royal Decree 1367/2007 of 19 October implementing Law 37/2003 of 17 November on noise regarding zoning acoustic quality objectives and acoustic emissions
  - Decree 1439/1972 of 25 May on approval of motor vehicles in respect to noise

On Water:

On Impact Assessment:
- Law 3/1998 for the protection of the environment in the Basque Country which contains provisions regulating environmental impact assessments in this region
- Royal Decree 1131/1988, of 30 September, which approves the Regulation for the implementation of Royal Decree 1302/1986, of 28 June on Environmental Impact Assessment

On mining, mining waste and health and security – transposing Directive 92/91:
- Royal Decree 975/2009 on waste management of extractive industries and the protection and restoration of areas affected by mining
- Law 21/1992 of 16 July on industry
- Law 22/1973 of 21 July on Mining
- Royal Decree, 2857/1978 adopting the Regulation on the Mining Regime
- Royal Decree 863/1985 of 2 April adopting Regulation establishing Basic rules of safety in

mining (Reglamento general de normas básicas de seguridad minera) (Articles 74-83)
• Complementary technical instructions for Chapter VI of RD 863/1985

On waste:
• Law 22/2011 of 28 July, on waste and contaminated soil
• Law 10/1998 on waste

On Access to information:
• Law 27/2006 of 18 July regulating the rights on access to information, public participation and access to justice in environmental matters
• Law 27/2006 of 18 July 2006 which regulates the rights of access to information, public participation and access to justice in environmental matters.

On Environmental liability:
• Law 26/2007, of 23 October on Environmental liability
• Royal Decree 2090/2008 of 22 December, adopting the Regulation for the partial implementation of the Law 26/2007 of 23 October on Environmental liability

On nature conservation and Natura 2000 Network:
• Royal Decree 1997/1995, of 7 December, laying down measures to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora
• Law 42/2007, of 13 December 2007 on natural heritage and biodiversity