



Permitting & Support Centre  
Environment Agency  
Sheffield  
27 February 2014  
Dear Sir / Madam,

**Application:**

**Consultation on Rathlin Energy Crawberry Hill Site**

We write to respond to the Environment Agency's consultation on EPR/BB3000KC/A001 and EPR/PB3930DV/A001.

Our objections to Rathlin's application for an extractive waste permit and an accumulation and disposal of radioactive waste for its activities at Crawberry Hill wellsite are:

- Insufficient detail in the application about the extent of the operations
- application of the *precautionary principle*;
- risks to *groundwater particularly given the location of the development site within a Source Protection Zone*
- *monitoring* and environmental liability issues;
- characterisation of *drilling muds* and use of *acid*;
- *surface water pollution* and the on-site management in relation to dealing with flood risk and surface drainage;
- *air quality* impacts;
- failure to describe *testing* process adequately;
- *process* concerns.

**Sufficiency of detail**

The planning application submitted to East Riding Council by Rathlin indicates that their intent is to core the Bowland shale interval which is located at about 2477m TVD. The permit application does not mention the Bowland shale apart from the schematic Fig 1 in the Non-technical summary which simply identifies that the carboniferous interval contains sandstones, siltstones, mudstones, coal and shales. Therefore, we do not consider that the permit application has sufficient clarity over the applicant's intentions vis a vis the Bowland shale interval.

We are also concerned that the process identified in the permit application, the mini fall off test, was not specified in the original planning application submitted by Rathlin to East Riding Council. We therefore believe that to carry out this activity would fall outside the remit of the planning consent and would be a significant failure of due process were the Environment Agency to permit where there is any doubt over the planning consent.

We note that the applicant has made a significant error in labelling Fig 8 of the Site Condition Report as being the plan for West Newton not Crawberry Hill. Similarly, the conceptual model for West Newton has been submitted. We would expect the Environment Agency to require the applicant to submit the correct information and undertake further consultation on the basis of this information.

## **Environmental Impact Assessment**

We note that no Environmental Impact Assessment has been carried out in relation to the activities planned for the site. Friends of the Earth believes that EIA is critical to assessing the risks which the Mining Waste permit is intended to address. The EIA would have provided the Agency with information on indirect, secondary, short, medium and long-term, permanent and temporary impacts resulting from the introduction of pollutants into the underground hydrology system and the integrity and longevity of the well casing.

The importance of EIA to shale gas activities is underlined in a letter from EU Commissioner Janez Potocnik to Mr Mattias Groote on the 26.01.2012, in which the Commission expresses its view that the EIA directive applies to unconventional hydrocarbon extraction using horizontal drilling and hydraulic fracturing at an exploration stage. Friends of the Earth is of the view that, without full EIA being carried out, the Environment Agency (and the planning authority) lack sufficient information about the impact of the proposed activity to enable it to take a robust decision. As a result the public concerned also lack sufficient information to enable them to participate effectively in planning and environmental decision making.

## **Precautionary Principle**

The precautionary principle has long been recognised as a key principle in environmental law. First enshrined in the Rio Declaration of 1992 (principle 15), it is also one of the grounding principles of EU environmental policy (see Article 191 of the Treaty on the Functioning of the European Union) and is expressed in a number of pieces of EU environmental legislation.

The EA's Groundwater Principles document states in relation to the precautionary principle: *"Development must be appropriate to the sensitivity of the site. Where the potential consequences of a development or activity are serious or irreversible we will adopt the precautionary principle to the management and protection of groundwater, particularly in the absence of adequate information with which to conduct an assessment."* (A2 – Precautionary principle – p54, GP3).

The EU Water Framework Directive applies strict standards and controls in particular in relation to groundwater, and the prohibition on pollution of groundwater is explicit in (for example) Article 6 of the Groundwater Directive 2006/118. This approach to groundwater has been summarised as follows:

*The case of groundwater is somewhat different. The presumption in relation to groundwater should broadly be that it should not be polluted at all. For this reason, setting chemical quality standards may not be the best approach, as it gives the impression of an allowed level of pollution to which Member States can fill up. A very few such standards have been established at European level for particular issues (nitrates, pesticides and biocides), and these must always be adhered to. But for general protection, we have taken another approach. It is essentially a precautionary one. It comprises a prohibition on direct discharges to groundwater, and (to cover indirect discharges) a requirement to monitor groundwater bodies so as to detect changes in chemical composition, and to reverse any antropogenically induced upward pollution trend. Taken together, these should ensure the protection of groundwater from all contamination, according to the principle of minimum anthropogenic impact.*<sup>1</sup>

At EU level, four risks have been identified to water resources: over-abstraction, chemical pollution of groundwater bodies, treatment of waste water, and risks to surface water.

We are concerned that the precautionary principle has not been effectively applied in this case. The developer's risk assessment in relation to groundwater is confined to contamination from sources

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<sup>1</sup> [http://ec.europa.eu/environment/water/water-framework/info/intro\\_en.htm](http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm).

above the surface and protected by the impermeable HDPE membrane. They have failed to identify and demonstrate mitigation of potential risks to groundwater from leakages below the surface e.g. from damage to and loss of well integrity.

We believe that the lack of knowledge about the risks together with the threat of serious environmental harm<sup>2</sup> triggers the application of the precautionary principle in this case. Monitoring pollution levels (as proposed for groundwater – see further below) and taking action after harm to the environment has occurred is the precise opposite of what the precautionary principle requires.

### **Groundwater**

We are very concerned that groundwater will be inadequately protected in this case and that there is a real risk of breach of the Groundwater Directive (2006/118), as the Agency seems to have decided that the applicant is not required to apply for a groundwater permit under Schedule 22 of the Environmental Permitting (England & Wales) Regulations 2010 in this case. For the sake of clarity, please confirm that this is the Agency's position.

First, we are concerned about the prospect of well failure and longevity which has the potential to cause significant risk of pollution of groundwater. Leaking wells are known to be a problem for the shale gas industry. The recent UNEP briefing supports this stating:

*“Leakage of fracturing fluids into the water table causing water contamination or explosions can occur if the cement columns around the well casings have an imperfect seal. Several examples of leaks in the casing leading to explosions or contamination of the water table have occurred in the USA”<sup>3</sup>*

A steadily accumulating body of evidence from the USA demonstrates that groundwater has been contaminated through fracking activities<sup>4</sup> and the European Commission report makes clear this is an acknowledged risk<sup>5</sup>. The British Geological Society accepts that the USA experience has to be taken into account for the UK<sup>6</sup>. No information seems to have been provided by the applicant concerning the risk of failure or longevity of the well and we struggle to see how the Agency can decide not to regulate groundwater inputs through the issue of a permit under the Environmental Permitting Regulations 2010 without this information.

Second, we are concerned that the baseline monitoring of groundwater has identified elevated levels of chlorine and turbidity and a detection level for benzene in excess of that required by UK Drinking Water Standards.

Given these elevated levels in this area we struggle to see how the Agency's decision to permit drilling and testing at the site could lawfully be squared with the UK's obligations under the Groundwater Directive. We also believe that further monitoring must be undertaken to ensure that benzene levels comply with the requirements of the UK DWS and to ensure public confidence.

Third, we note the applicant's assertion that there are no licensed groundwater abstractions within 2km of the drill site, but are unclear as to the justification for this distance criterion. Furthermore

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<sup>2</sup> For example in the event that the aquifer were contaminated by “additives” in drilling mud, acid used to “wash” the well, gas extracted during testing.

<sup>3</sup> [http://www.unep.org/pdf/UNEP-GEAS\\_NOV\\_2012.pdf](http://www.unep.org/pdf/UNEP-GEAS_NOV_2012.pdf). p9

<sup>4</sup> <http://www.epa.gov/hfstudy/pdfs/hf-report20121214.pdf>. See also Duke University study of the Marcellus shale in the USA <http://www.pnas.org/content/108/20/8172.full.pdf+html>.

<sup>5</sup> <http://ec.europa.eu/environment/integration/energy/pdf/fracking%20study.pdf>.

<sup>6</sup> *Potential Groundwater Impact from the Exploration of Shale Gas in the UK*, M.E. Stuart 2012 <http://nora.nerc.ac.uk/16467/>.

there is no indication of the identification or otherwise of unlicensed abstractions requested by the Environment Agency. Rathlin Energy has sought to prioritise groundwater bodies (particularly the deeper strata) on the basis of accessibility and economic considerations. We are not clear that these are factors which the 2006 Directive permits the Agency to take into account. We are unclear as to what steps the Agency will take in order to verify whether any other water abstraction points are located within a reasonable distance of the well site.

We are concerned that the applicant appears to have failed to take account of the fact that the borehole is located in a Source Protection Zone. As the borehole is located in SPZ3, we believe thorough scrutiny (including the issue of a groundwater permit as necessary) is required, as we are not aware that a mining waste permit has been issued for unconventional oil and gas activities in any SPZ area to date and would have deep concerns about any proposal to do so (for the reasons set out above).

The documents submitted by the applicant specify that 16m<sup>3</sup> of formation water will be produced per test. However they do not seem to make clear how many tests will be conducted. We believe the Agency requires this information in order to determine whether to grant a groundwater permit, because such water containing pollutants (eg through muds or mobilised by drilling) could seep into groundwater (including through pathways opened up by drilling).

We are also concerned about the testing activities resemble fracking to some degree. The more water (or acid), and the higher the pressure, the more the applicant's activities overlap with (or indeed amount to) fracking, with the attendant extensive environmental impacts. This is particularly relevant to the acid wash/squeeze and so-called "mini fall-off tests".

We note with concern the proposal to use substantial amounts of harmful chemicals in the drilling and testing processes including up to 10,000 litres of hydrochloric acid solution.<sup>7</sup> We note that the applicant claims that all of the spent acid will be returned to the surface<sup>8</sup> but does not specify how this can be ensured given that current industry practice for hydraulic fracturing elsewhere in the world shows up to 80% of stimulation fluid remains below the surface after decommissioning. Whereas we understand that the applicant intends to pump large quantities of pollutants underground, we do not share the applicants that all spent acid will be removed.

The introduction of drilling mud<sup>9</sup> into the "reservoir formation" but states that "mitigation measures and management procedures **should** (*our emphasis*) significantly reduce the risk of contamination" (of the groundwater). The use of the word "should" in this instance suggests a real (and concerning) degree of probability that the mitigation and management procedures **will not** reduce contamination risk. We believe the applicant must clarify the degree to which this risk will be mitigated (see "significantly reduce"). Furthermore, the detail on these measures and procedures is not detailed in the application and we would struggle to see how the Agency could approve the application without these detailed plans.

We note that the application states that the pressure at which the acid will be pumped into the well during the acid wash/squeeze test will not exceed the fracture pressure but does not detail how they intend to measure that fracture pressure and ensure that such fracturing does not take place. Again the overlap with fracking (and the lack of clarity about the nature of the test proposed – see below) seems real.

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<sup>7</sup> 10 cubic metres, or 10,000 litres - Waste Management Plan.

<sup>8</sup> Sect 4.3.2.3 Non-technical summary

<sup>9</sup> Environmental Risk Assessment – Annex J ID004

We note the hazardous nature of some of the substances specified in the applicant's drilling products and are concerned that these are being introduced into the environment given the potential for harm which they are capable of causing. We note that, contrary to the assertion of the applicant, the Agency classifies the status of drilling mud depending on its content – it is not non-hazardous *per se*.

### **Monitoring**

The EU Commission believes that, as specified in the Mining Waste Directive, “the operator remains responsible for the maintenance, monitoring and corrective measures in the after-closure phase as long as it is required by the competent authority.” It can take many years for impacts to flow through to groundwater contamination, or in the case of hydraulic fracturing (or activities of a similar nature and having similar impacts), the impacts can be felt within a couple of years. It is crucial that medium and long-term monitoring plan is put in place to ensure that the environmental liability of the operator is correctly assigned, and the public interest protected.

It is at best unclear from the documents submitted by the applicant how this monitoring will be undertaken, or how the obligations outlined by Lord Smith in May 2013 to monitor material which remains in wells “for decades” after activities are complete will be met<sup>10</sup>. Whilst we recognise that Lord Smith was referring to fracked wells, we believe that the same principles should hold for the acid wash/squeeze techniques being deployed in this instance. In any event, we struggle to see why this approach would not apply to the various pollutants which are liable to remain in this well after testing, not least given the pressures which will be applied to the rocks during the testing proposed and the environmental consequences which are therefore liable to flow.

There is no indication that downside scenarios, such as wellhead failure, have been carefully considered at all. There is no indication of the longevity of this casing or its resilience to other influences. The Royal Society and Royal Academy of Engineering in its report into shale gas of June 2012 (when it called for greater use of independent inspectors at drilling sites) underlined the critical importance of maintaining wellhead integrity.

We are also unclear about what consultation has been undertaken with HSE, which seems crucial to ensuring wellhead integrity.

### **Surface water**

As regards surface water handling, we are concerned about the risks of surface water, groundwater and soil contamination in the event of extreme weather conditions. We are concerned that heavy rainfall and the capacity of on-site storage are not adequate to deal with the volumes expected, which could also cause groundwater pollution. We are concerned that the on-site storage is open to the elements and has the capacity to overflow, in which circumstances the impermeable barrier is liable to give little protection, given its limited area. We would expect the Environment Agency to require the applicant to at least ensure storage of chemicals in closed tanks to prevent overflow.

We are continuing to consider impacts around water scarcity, although in this case the lack of clarity around the amount of water used makes this process difficult.

We are also concerned that the narrow nature of Walkington Heads, a single track country lane, could present significant difficulties in the implementation of the mitigation measures and management procedures described in the Environmental Risk Assessment.

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<sup>10</sup> <http://www.thetimes.co.uk/tto/business/industries/naturalresources/article3762181.ece>.

## **Air quality**

Little consideration seems to have been given to the issue of fugitive emissions of natural gas. Many studies have flagged the importance of fugitive emissions from shale gas activities<sup>10</sup>, being one of the principal reasons why its carbon footprint is considered by many to be greater than that of other forms of gas<sup>11</sup>, and potentially greater than coal<sup>12</sup>. Fugitive emissions therefore require urgent attention, given the hazardous and polluting nature of natural gas, as well as its radiative (greenhouse) effect. Even if the testing envisaged in this case does not amount to fracking, the fact that flaring is not an all-encompassing solution to this issue remains a pressing concern.

It is remarkable that Annex H to the Environmental Risk Assessment on greenhouse gas emissions does not include reference to emissions of methane to the atmosphere (with its Global Warming Potential of 34 times that of CO<sub>2</sub><sup>13</sup>) even though it mentions it under Annex A Emissions to Air.

Little consideration seems to have been given to the impact of the use of nitrogen in cleansing the well after drilling, given the capacity for the nitrogen released to convert into NO<sub>x</sub> (in sunlight) - the Air quality technical report seems to focus on oxides of nitrogen from use of the flare rather than the nitrogen gas used to "lift" the well. You will be aware that the site is located 870 metres from the nearest residence and 1500m from Walkington village; of the harmful impact of NO<sub>x</sub> on air quality; and the recent decision by the European Union to infract the UK over non-compliance with the Air Quality Directive.

So far as the flare itself is concerned, the Waste Management Plan states that flaring will continue for 10 days around the clock. First, given the gas will be discarded it is a waste and must be regulated through the issue of a mining waste permit. Second, given the gas is hazardous, we are unclear as to the basis on which the applicant believes that a waste facility permit is not required. We believe this must be clarified by the Agency with the applicant. Third, given that the amount of gas to be flared will exceed 10 tonnes per day, an additional permit under the Industrial Emissions Directive will be required.

We would also expect the Environment Agency to require a detailed plan from the applicant for how they intend to deal with extreme situations where the escape of gas from the borehole exceeds the capacity to flare. Are the applicants planning to vent this excess gas? If so, it would be in the public interest for them to include this in the waste management plan and reconsult.

Since the Environmental Risk Assessment classifies as noise from flaring as a medium risk, we would strongly suggest that a condition is placed on the applicant to restrict the duration and intensity of flaring. We also consider that independent monitoring of air quality will be required to ensure the level of risk is minimized.

Again this demonstrates the weakness of the ERA process alongside the much stronger, robust EIA methodology. We would urge the EA to require an EIA from the applicant.

## **Testing activities**

We are concerned that the proposals by the applicant for the mini fall-off test (also known as a mini-frack) and acid wash/squeeze represent an environmental risk similar to that of hydraulic fracturing

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<sup>11</sup> <http://www.nature.com/news/methane-leaks-erode-green-credentials-of-natural-gas-1.12123> (January 2013)

<sup>12</sup> Howarth, Santoro and Ingraffea (2010) - <http://www.eeb.cornell.edu/howarth/Howarth%20et%20al%20%202011.pdf>.

<sup>13</sup> IPCC AR5 Working Group 1 Report Sept 2013

and would urge the Environment Agency to ensure that these risks are properly assessed and mitigated.

We remain concerned about the lack of clarity around the amount of water used and the pressure at which both water and acid (particularly the latter) will be pumped into the well, as well as their capacity to cause fractures in the rock. Please confirm whether these impacts have been assessed.

We do not think the applicant's description of the testing process in particular provides an adequate basis for the Environment Agency to assess environmental impacts and believe that considerable further explanation is required by the applicant, including for the benefit of local communities before any decision to issue a permit may be robustly taken.

### **Mining Waste Plan**

We are concerned that this is inadequate for the purposes of cumulative and long-term management of the area. As explained above, the process explanation and the information presented by the developer is inadequate and does not deal properly with the issues outlined above. Natural gas and oil are identified as hazardous waste by the applicant yet it has not applied for a permit to operate a waste facility (despite the presence of hazardous waste on the site for any period of time triggering this obligation through Article 3(15) of the Mining Waste Directive). We believe this issue must be clarified by the Agency with the applicant before any permit may be issued.

### **Process**

We are concerned that the Agency launched its consultation on the permits almost immediately after receiving the documents from Rathlin. This suggests that little analysis of the documents may have been carried out prior to publication. As things stand, it is unclear what the Agency's view is of the documents and whether they are likely to address its concerns around impacts which flow from the regulated activities. Full public participation in environmental decision making (in line with the Aarhus Convention and Article 8 of the Mining Waste Directive) requires a fuller statement of the Agency's views in this regard.

Given acute local and public interest in this case, and its groundbreaking nature as regards the issue of environmental permitting for the specific testing activities, we believe that fairness requires consultation on the Agency's draft permit decisions. Such consultation is arguably also required pursuant to Article 6(1) of the Aarhus Convention. We think your own policy on consultation requires this step, because the public interest and controversy around the permits clearly demonstrate this case to be one of "high public interest" within the meaning of paragraph 4.8 of your public participation statement<sup>14</sup>.

Finally, we note that the Agency consulted on draft decisions in relation to permit decisions for certain of the Cuadrilla sites in Lancashire and we would be concerned if the Agency were to adopt a different approach in this case without good reason (viz. the administrative law principle of treating like cases alike).

### **Radioactive substances**

We note with concern the likelihood that radioactive substances will be extracted as part of both the solid and aqueous waste and are disappointed that the methodology identified by their Radioactive Waste Advisors as the preferred approach for solid waste (i.e. separation of the radiological

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<sup>14</sup> [http://www.environment-agency.gov.uk/static/documents/Business/Working\\_together\\_PPS\\_v2.0.pdf](http://www.environment-agency.gov.uk/static/documents/Business/Working_together_PPS_v2.0.pdf)

contamination for transfer to a suitable treatment facility) has been deemed to be economically unviable. We do not consider it adequate that the storage, treatment and disposal of these wastes has yet to be determined, as testing operations are likely to cause Naturally Occuring Radioactive Material to be brought to the surface, hence a plan must be put in place before testing (and ideally before drilling) begins. We are also concerned that the Agency may allow its decision making to be swayed by economic considerations as perceived by the applicant rather than the mandatory requirements of the Mining Waste Directive.

Yours faithfully,

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**Friends of the Earth**

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