

NRAPR74

Dear Mr Dawson

Thank you for your approach re: fracking radioactivity.

Naturally occurring radioactive materials (NORM) are present in many geological formations including oil and gas bearing strata such as shale formations. The flow-back fluid, which returns to the surface following hydraulic fracturing, as well as sediments and scales in gas or water process vessels, are likely to contain sufficient NORM that they will be classed as radioactive waste. Treatment and disposal of flow-back water may take place on-site, leading to re-use during subsequent hydraulic fracturing, or may be carried out at remote sites such as sewage treatment works or effluent treatment facilities. After treatment, the water may still retain some radioactivity. Its disposal to rivers, estuaries, sea or groundwater will have to be assessed for its impact on people and the environment. Such assessments are required in support of an application for a disposal permit.

We consider that hydraulic fracturing during the exploration, development or exploitation of shale gas involves the production of natural gas, which is listed as a "NORM industrial activity" in the Environmental Permitting Regulations 2010 (EPR10), due to the likely generation of radioactive wastes. Where the radioactive concentrations in these wastes are high enough, a permit is needed for the disposal of these wastes. However, simply drilling a well does not involve the production of natural gas and therefore no permit is needed for disposal of drill cuttings under radioactive substances controls (there may be mining waste controls).

A small number of samples of flow-back fluids have been taken and the details can be found at: <http://www.environment-agency.gov.uk/business/topics/134511.aspx> . The radium radionuclides are the most significant, and you will see that radium-226 was present at levels up to 90 +/- 12 Bq/litre and that radium-228 (derived from actinium-228 measurements) was present at levels up to 12 +/- 2.5 Bq/litre. Under EPR10, a permit is required for the storage and disposal of water containing more than 1 Bq/litre of radium-226 or more than 0.1 Bq/litre of radium-228 (there is a summation rule where more than one radionuclide is present and can be found in EPR10). These concentrations are in a similar range to those found in produced water from conventional oil and gas production.

So far in the UK only flow-back fluids have been produced from fracking, as yet there are no scales or sediments to manage. Information relating to scales and sediments is best obtained from sources in the USA, as no UK information/measurements exist at this time. However, if such scales and sediments are generated in shale gas production, it is likely that they will be similar to those from the offshore oil sector, though probably in much smaller quantities per well, reflecting the very much lower produced water flow during production.

There will be some radon present in the methane liberated from shale deposits, as there is in North Sea natural gas, but the radon is not subject to regulation under EPR10 (it was previously exempt from authorisation under the Natural Gas Exemption Order – now revoked).

We are dealing with applications for permits under EPR10 for three shale gas sites in Lancashire, and if you would like to understand our approach to regulation of shale gas exploration you will find more information in our Guidance Note for Exploratory Shale Gas Operations on our website here: <http://www.environment-agency.gov.uk/business/topics/133885.aspx>

Yours sincerely

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