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The flux of radionuclides in flowback fluid from shale gas exploitation

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This study considers the flux of radioactivity in flowback fluidfrom shale gas development in three areas: the Carboniferous, Bowland shale, UK; the Silurian shales, Poland; and the Carboniferous Barnett shale, USA. The radioactive flux from these basins was estimated given estimates of the number of wells developed or to be developed; the flowback volume per well; and the concentration of K (Potassium) and Ra (Radium) in the flowback water. For comparative purposes the range of concentration was itself considered within four scenarios for the concentration range of radioactive measured in; each shale gas basin; the groundwater of the each shale gas basin; global groundwater; and local surface water. The study found that:
i) For the Barnett shale and the Silurian shale, Poland, the 1% exceedence flux in flowback water was between 7 and 8 times that which would be expected from local groundwater. However, for the Bowland shale, UK, the 1% exceedence flux in flowback water was 500 times that expected from local groundwater.
ii) In no scenario was the 1% exceedence exposure greater than 1mSv – the allowable annual exposure allowed for in the UK.
iii) The radioactive flux of per energy produced was lower for shale gas than for both conventional oil and gas production, nuclear power production and electricity generated through burning coal.